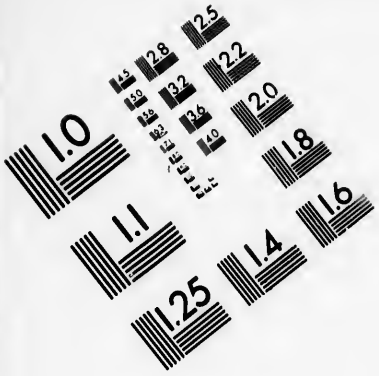

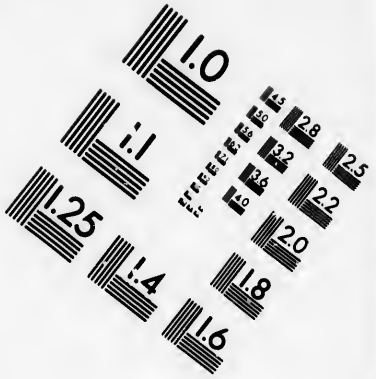

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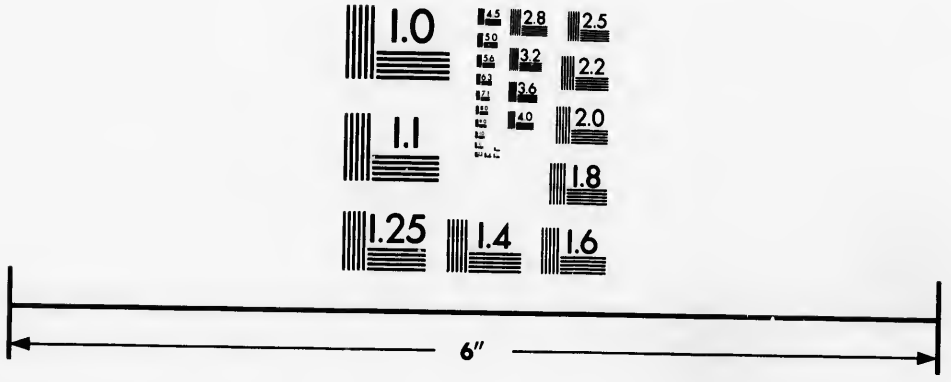

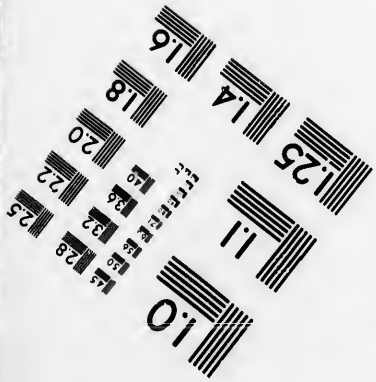

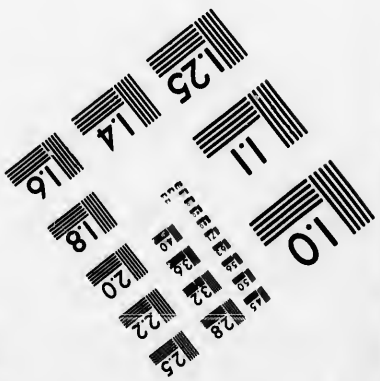

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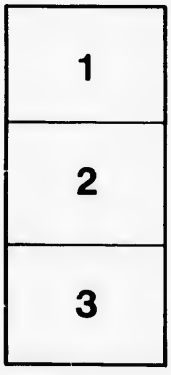

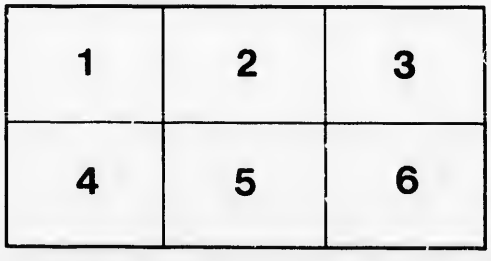

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EXAMINATION PAPERS

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EXAMINATION PAPERS

—IN—

ELEMENTARY

ARITHMETIC,

—BY—

WILLIAM WADDELL.

Stratford:
PRINTED AT THE BEACON STEAM PRINTING OFFICE.
1883.

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Burns,

PREFACE.

This work is intended to aid teachers in conducting their written examinations and class exercises in Elementary Arithmetic. A great many practical problems have been inserted to test the pupil's proficiency in solving problems by independent methods. The papers are arranged in the order in which the subject is treated in the authorized text books. To make the book more convenient the answers have been placed after the questions. As all the questions are original, it is hoped teachers may find them a useful addition to their own store of examination papers.

WILLIAM WADDELL.

Burns, 1883.

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EXAMINATION PAPERS.

Second Class—1.

1 Write in words the numbers expressed by the following figures; 943; 28674; 800304.

2 Write in figures the following numbers: Twenty-three thousand four hundred and seventy-nine; Nine hundred and eighty thousand two hundred and six.

3 Write in Roman numerals, 79; 98; 397; 1882.

4 Write in figures, XLVII: LXXXVIII; XCVII; MDCCCLXXXII. 47, 88, 97, 1882.—Ans.

5 Find the sum of 968, 37, 286, 94, 8, 328, 49 and 732. 2500.—Ans.

6 John has 94 cents, James has 386 cents, Thomas has 904 cents, and William has 45 cents. How many cents have the four boys? 1429 cents.—Ans.

7 A man bought 986 bushels of wheat on Monday, 2436 bushels on Tuesday, 777 bushels on Wednesday, and 846 bushels on Thursday. How many bushels did he buy? 5045 bushels.—Ans.

8 Find the snm of 8369, 4128, 3157, 9897, 3218, and 7329. 36098.—Ans.

9 Jane has 384 pins, Mary has 943 pins, Alice has 577 pins, and Helen has 536 pins. How many pins have the four girls? 2440 pins.—Ans.

10 Henry received 386 dollars at one time, 984 dol-

lars at another time, and 598 dollars at another time. How much money had he altogether? 1968 dollars.—Ans.

Second Class—2.

1 Find the sum of 3269+729+8368+3987+606+73+9835+5415+6133. 38415.—Ans.

2 Find the result of 3964+2871+787−3699−472+8694. 12145.—Ans.

3 What is the difference between 9986358 and 130012013? 120025655.—Ans.

4 John is 8649 yards west of the school, James is 468 yards east of it, and Thomas is 3861 yards east of James. How far is Thomas from John? 12978 yards.—Ans.

5 A has $3698, B has $486 more than A, and C has as many dollars as A and B together. How many dollars have the three? $15764.—Ans.

6 A man's income is 861532 cents a year, and his expenses are 539897 cents a year. How much does he save in a year? 321635 cents.—Ans.

7 The sum of two numbers is 18016214; one of the numbers is 9183275; find the other number. 8832939.—Ans.

8 Edward has 946 cents, James has 399 cents less than Edward. How many cents have the two boys. 1493 cents.—Ans.

9 A man bought a horse for $186 and a carriage for $157 and sold both for $370. How much did he gain? $27.—Ans.

10 Mary had 36 cards; she gave away 18 of them and bought 32 more. How many had she then? 50 cards.—Ans.

Second Class—3.

1 Find the result of (4236+7389)−(3142+5244)+(138012−99435). 41816.—Ans.

2 Find the sum of all the numbers between 4129 and 4140 both inclusive. 49614.—Ans.

3 The sum of three numbers is 416328; the first number is 194736, the second is 95817 less than the first; find the third number. 122673.—Ans.

4 The remainder it 413684, the minuend is 591363; find the subtrahend. 177679.—Ans.

5 A man had $36421, he bought a farm for $11369, three horses for $516, fifteen head of cattle for $463, a wagon for $98, a reaper for $126. How much money had he left? $23849.—Ans.

6 What is the difference between 136+794−586+429+732−949 and (369+2736)−(413−243+946)+(200131−91647)? 109917.—Ans.

7 A farmer raised 3986 bushels of wheat, 4328 bushels of oats, 976 bushels of barley, 1367 bushels of rye. How many bushels of grain did he raise? 10657 bush.—Ans.

8 How much greater is the sum of 98632 and 41637 than the difference between 136847 and 67398? 70820.—Ans.

9 How much greater than 4019+3128+3419 is 9846+8413? 7693.—Ans.

Second Class—4.

1 Find the product of 9637 and 465. 4481205.—Ans.

2 Find the result of 436×735+198×36−384×190. 254628.—Ans.

3 What will 986 copy-books cost at 9 cents each? 8874 cents.—Ans.

4 Find the value of 5436 horses at $129 each. $701244.—Ans.

5 How much greater is 9846 times 43200 than 8927 times 43200? 39700800.—Ans.

6 If one bushel of wheat is worth 98 cents, how much are 496 bushels worth? 48608 cents.—Ans.

7 How much greater than $346\times7300+386\times84-300\times8$ is $942\times8010-36\times87+28\times200$? 4992064.—Ans.

8 How many days in 498 weeks? 3486 days.—Ans.

9 The remainder is 8461, the subtrahend is 95 times the remainder; find the minuend. 812256.—Ans.

10 A watch gains 3 minutes in an hour; how much will it gain in a week? 504 minutes.—Ans.

11 What is the difference between 34 times 99 and 83 times 99? 4851—Ans.

Second Class—5.

1 Find the result of $99\times(368+641)+60\times(10123-8176)-34\times(82+82\times9+89)$. 185805—Ans.

2 A man bought 839 horses at $87 each, and sold them at $121 each; how much did he gain? $28526—Ans.

3 Find the product of the sum and difference of 396 and 784. 457840—Ans.

4 How much greater than the product of 8394 and 396 is the product of 28396 and 970? 24220096—Ans.

5 There are 4840 square yards in 1 acre; how many square yards in 789 acres? 3818760 square yards—Ans.

6 Find the number from which if 86 times 894 be taken, the remainder will be equal to the sum of $98+66+326$. 77374—Ans.

7 A merchant bought 4863 bushels of wheat at 97 cents a bushel, and sold it at a gain of 78329 cents; how much did he get for the wheat? 550040 cents—Ans.

8 A man walks 8 hours a day at the rate of 4 miles an hour; how far will he walk in 286 days? 9152 miles—Ans.

9 John is 18 years old, his brother Thomas is 12 years older, and their father's age is greater than the sum of their ages by 12 years; find the sum of all their ages. 108 years—Ans.

Second Class—6.

1 Divide 846328 by 973. $869\frac{791}{973}$—Ans.

2 How many times is 3864 contained in 1132684? $293\frac{532}{3864}$ times—Ans.

3 Find the result of $210\times(84+96)-28993\div79+2100\div700+163333\times9$. 1507433—Ans.

4 There are 365 days in a year; how many years in 147825 days? 405 years—Ans.

5 Divide the product of 864 and 397 by 498. $688\frac{384}{498}$ Ans.

6 A farmer sold 657 bushels of wheat for 103149 cents; how much did he get for one bushel of his wheat? 157 cents—Ans.

7 If 968 sheep cost $8712, what will one sheep cost? $9—Ans.

8 Edward has $9864, Thomas has half as much money as Edward, and Allan has 7 times as much money as Edward and Thomas together; how much money have the three? $118,368—Ans.

9 If 326 barrels of flour weigh 63896 pounds, how much will one barrel weigh? 196 pounds—Ans.

10 John has 86 cents, Peter has 9 times as many as John, William has as many as John and Peter together, and James has 342 cents less than John, Peter and William together; how many cents have the four boys? 3098 cents—Ans.

Second Class—7.

1 If 859 acres produce 24911 bushels of wheat, how much will one acre produce? 29 bushels—Ans.

2 A man bought 144 cows for $3456; what was the price per head? $24—Ans.

3 John Brown went into a store with 365 cents in his pocket; he bought 6 pounds of coffee at 13 cents a pound, 1 pound of tea for 45 cents, and 13 pounds of raisins at 9 cents a pound; how much money had he left after paying for what he bought? 125 cents—Ans.

4 There are 56 pounds in a bushel of rye; how many bushels in 11088 pounds? 198 bushels—Ans.

5 What is the value of one cord of wood when 468 cords of wood are worth $1872? $4—Ans.

6 How many boxes will 13585 matches fill, if 65 matches fill a box? 209 boxes—Ans.

7 If a man can do a piece of work in 228 days, how long will it take 6 men to do the work? 38 days—Ans.

8 A man earns 89 cents a day and spends 26 cents; how many days will he have to work to save 567 cents; 9 days—Ans.

9 Find the value of 864 books at 23 cents each, and 723 books at 35 cents each. 45177 cents—Ans.

Second Class—8.

1 A merchant bought 2864 bushels of wheat on Monday, 3326 bushels on Tuesday, and on Wednesday as much as on Monday and Tuesday less 1469 bushels;

how many bushels did he buy during the three days? 10911 bushels—Ans.

2 A drover bought 3269 head of cattle at $46 per head, and sold them for $159356; how much did he gain? $8982—Ans.

3 How many times 860 is 384×400? $178\frac{520}{860}$ times —Ans.

4 The divisor is 86, the quotient is 463, the remainder is 47; find the dividend. 39865—Ans.

5 Horses are worth $96 each and cows are worth $32 each; how many horses should be given in exchange for 378 cows? 126 horses—Ans.

6 A man earns 98 cents and his son earns 52 cents in a day, how long will it take the two to earn 5250 cents? 35 days—Ans.

7 If 98 men can do a piece of work in 320 days, how many days will it take one man to do half the work? 15680 days—Ans.

8 A man threshed 422 pounds of oats on Monday, 526 pounds on Thursday, 743 pounds on Friday, and on Saturday 383 pounds; how many bushels did he thresh during the four days? 61 bushels—Ans.

Junior Third Class—1.

1 Write in figures the following numbers: Two hundred and eight thousand three hundred and four; sixty-seven million seven hundred and twenty thousand and eighty-seven.

2 Write in words the numbers expressed by the following figures: 680007 and 326171208.

3 Write in figures $\overline{\text{CCCXX}}$ CDXIX; $\overline{\overline{\text{V}}}$ $\overline{\text{CCXL}}$ DCCCLXXXVIII.

4 Write in Roman numerals, 3486, 168274.

5 Find the difference between nine million eight hundred and sixty-four thousand one hundred and thirty-two, and $\overline{\text{DCCCLXXXV}}$ CMLIX, and write your answer in Roman numerals. $\overline{\overline{\text{VIII}}}$ $\overline{\text{CMLXXVIII}}$ CLXXIII—Ans.

6 What is the sum of 9 times (386+744−396−280+383) and 11 times (386+744−396−280+383)? 16740—Ans.

7 John has $3864, Edgar has $396 more than John, Thomas has $1989 less than John and Edgar together, and Robert has as many as Edgar and Thomas less $3958; how much have the four? $20696—Ans.

8 If 986 be added 9 times to 2986, what will the sum be? 11860—Ans.

9 Find the sum of the sum and difference of 8416 and 2834. 16832—Ans.

10 The sum of five numbers is 36842; the first is 869 more than the second, which is 6421; the sum of the third and fourth is equal to the sum of the first and second plus 3984; find the fifth number. 5436—Ans.

11 Find the sum of all the numbers ending in 5 and 8 which occur between 884 and 919. 7212—Ans.

12 Find the result of (8213−4186+6598)+3832−(4183−5864+2419). 13519—Ans.

Junior Third Class–2

1 Find the prime factors of 2310. 2, 3, 5, 7, 11—Ans.

2 Multiply 9863 by 105, using three factors of the multiplier. 1035615—Ans.

3 If (86+74−33+27) be added 49 times to (86+74−33+27), what will the sum be? 7700—Ans.

4 The difference between two numbers is 3212; their sum is four times their difference; find the two numbers. 4818 and 8030—Ans.

5 Find the number from which if 8693 be taken 436 times, the remainder will be 286418. 4076566—Ans.

6 Find the number from which if $(484-286+83\times8)$ be taken 99 times, the remainder will be $(484-286+83\times8)$. 86200—Ans.

7 If 69 men require 86 days to do a piece of work, how long will it take 1 man to do the work? 5934 days —Ans.

8 A man can row down a river at the rate of 300 miles a week, and up the river at the rate of 50 miles a day. After rowing 3 weeks down the river, how many weeks will it take him to return to the point where he started? He rows 6 days in the week. 5 weeks—Ans.

9 Find the product, the sum and the difference of 9436 and 6189. 58599404; 15625; 3247—Ans.

10 Find the product of the sum and difference of 812 and 588—313600—Ans.

11 Find the value of 37 loads of wheat, each containing 46 bushels, at 87 cents per bushel. 148074 cents —Ans.

12 Find the result of $30(823-146+783)-9(90\times8+99\times9)$. 29301—Ans.

Junior Third Class—3.

1 Divide 183127 by 35, using factors of the divisor, and find the complete remainder. $5232\frac{7}{35}$—Ans.

2 Divide 27143203 by 105, using three factors of the divisor, and find the complete remainder. $258506\frac{73}{105}$—Ans.

3 Of what number is 896 both multiplier and multipli-

cand? 802816—Ans.

4 Of what number is 809 both divisor and quotient? 654481—Ans.

5 There are 56 pounds in a bushel of rye and 34 pounds in a bushel of oats; how many bushels of rye are equal to 112 bushels of oats? 68 bushels—Ans.

6 John Adams owned 15 horses each worth $136, 54 head of cattle worth $36 each, 214 sheep worth $8 per head, 27 pigs worth $12 each, and land enough to make his entire property worth $13412; find the value of his land. $7392—Ans.

7 Find the remainder in subtracting 839645 as often as possible from 13846279. 411959—Ans.

8 A and B bought a farm for $17185. A paid $3 as often as B paid $2; how many dollars did each pay? A, $10311; B, $6874—Ans.

9 A boy was sent to a store with 726 cents; he bought 20 pounds of coffee at 12 cents per pound, 16 pounds of raisins at 9 cents per pound, 15 pounds of barley at 4 cents per pound, 2 brooms at 24 cents each. He paid for these articles, and bought sugar, at 9 cents per pound with the remainder of his money; how many pounds of sugar did he buy? 26 pounds—Ans.

10 The divisor is 97, the quotient is twice the divisor, and the remainder is 156 less than the quotient; find the dividend. 18856—Ans.

11 Find the prime factors of 23100. 2, 2, 3, 5, 5, 7, 11—Ans.

Junior Third Class—4.

1 Find the result of $9(174+950-812)\div 26+(84\div 7)(360\div 12)$. 468—Ans.

2 A man receives a salary of $846 a year; he pays $3 a week for board, $9 a month for travelling expenses, and

$147 a year for other expenses; how much can he save in 6 years? $2610—Ans.

3 There are 128 cubic feet in a cord; how many cords in 46976 cubic feet? 367 cords—Ans.

4 A speculator paid $14700 for 15 farm lots, and sold them at a gain of $150 on each lot, how much did he receive for 12 of them? $13560—Ans.

5 Divide $(946+321)\times637$ by $(946+321)\times7$ 91—Ans.

6 A man took 46 bushels of barley to market, and sold it at 78 cents per bushel. He bought and paid for 65 pounds of 4 inch nails at 3 cents per pound, 46 pounds of 3 inch nails at 4 cents per pound, 16 pounds of strap hinges at 6 cents per pound, 25 pounds of white lead at 9 cents per pound, 3 gallons of oil at 95 cents per gallon, and 46 panes of glass at 15 cents each; how much money had he left? 1913 cents—Ans.

7 Find the results of

(1) $80\times26\times44+(96+44)\times(860-260)$.
(2) $98460\div20+(832\times990)\div90$.
(3) $1\times2\times3+4\times5+8\div4-9\div3-1\times2\times3+6$.
(4) $6(98+22)+8(3+6\times10)-12(12+8\times4)\div2$.

(1) 175520; (2) 14075; (3) 25; (4) 960—Ans.

8 A drover bought 86 head of cattle at $39 per head, and sold half of them at $44 per head, and the remainder at $36 per head; how much did he gain? $86—Ans.

9 What sum of money must be taken 684 times from $3126813 so as to leave a remainder of $249? $4571—Ans.

Junior Third Class—5.

1 Divide $382\times46\times90\times20$ by $49\times36\times10\times98$.

$18\frac{5}{7}\frac{1}{2}\frac{2}{8}\frac{6}{7}\frac{4}{2}\frac{0}{0}$—Ans.

2 A clerk has a salary of $1200 per annum; he pays 5 dollars a week for board, 3 dollars per month for cab hire, 120 dollars per annum travelling expenses, and his other expenses amount to 144 dollars per annum; how much will he spend in 6 years and how much will he save in 8 years? $2360, $5120—Ans.

3 The sum of the divisor, quotient and remainder is 981, the remainder is 184 and the divisor is double the remainder; find the dividend. 158056—Ans.

4 The sum of 7 numbers is 69842, the sum of 8 other numbers is 78118: find the average of all the numbers. 9864—Ans.

5 A newsboy sells 17 copies of the *Globe* and 13 copies of the *Mail* in the forenoon, and 12 copies of the *Globe* and 13 copies of the *Mail* in the afternoon. He has a profit of 1 cent on each copy. At this rate how long will it take him to earn money enough to buy a new suit worth 605 cents? 11 days—Ans.

6 How many twenty-cent pieces are worth as much as 244 twenty-five-cent pieces? 305—Ans.

7 A river is 1680 miles long. How long will a log be in floating down the entire length of the river, if it floats 72 miles a day during half the time, and 96 miles a day during the remainder of the time? 20 days—Ans.

8 There are 66 feet in a chain. How much will it cost, at 3 cents per foot, to fence the four sides of a field, 12 chains long and 9 chains wide? 8316 cents—Ans.

9 A path up a mountain side is 4 miles long. How long will it take a man to ascend and return, if he ascends at the rate of half a mile an hour, and returns at the rate

of 2 miles in 3 hours? 14 hours—Ans.

Junior Third Class—6.

1 There are 100 cents in a dollar. How many dollars in 4600 cents; in 8648 cents? $46; $86.48—Ans.

2 A speculator bought 45 horses for $4050, and sold 25 of them at a loss of $5 apiece. For how much apiece must he sell the remaining horses to gain $175 by the operation? $105—Ans.

3 Three men rented a farm of 200 acres at $3 per acre; of the produce they sold 800 bushels of wheat at 90 cents per bushel; 340 bushels of oats at 30 cents per bushel; 400 bushels of barley at 45 cents per bushel; 500 bushels of peas at 60 cents per bushel. Find each man's share of the gain. $234—Ans.

4 A storekeeper sold 8 pounds of tea at 65 cents per pound, 14 pounds of rice at 4 cents per pound, 25 pounds of sugar at 9 cents per pound, and 6 yards of print at 11 cents per yard; he received in payment a ten dollar bill; how much change should he give his customer? $1.33—Ans.

5 There are 34 pounds in a bushel of oats; find the value, at 34 cents per bushel, of 16 loads of oats, each load weighing 1462 pounds. $233.92—Ans.

6 45 men cut 8642 cords of wood in 212 days; how long would 1 man take to cut the same quantity of wood? 9540 days—Ans.

7 How many hours between 12 o'clock, noon on Tuesday and 5 o'clock, p. m., on Friday? 77 hours—Ans.

8 How many letters in a book of 96 pages, there being 36 lines on a page and 43 letters in a line? 148608 letters—Ans.

9 A merchant sold 3860 bushels of wheat at $1.10

per bushel, and 2740 bushels of oats at 30 cents per bushel, and bought peas at 70 cents per bushel with the money; how many bushels of peas did he buy? 7240 bushels—Ans.

Junior Third Class—7.

1 The sum of 38 times a certain number and 689 is 1411; find the number. 19—Ans.

2 The product of 49 times a certain number and 50, increased by 38646, gives a total of 60696; find the number. 9—Ans.

3 The product of two numbers is 48 times their difference, which is 8, one of the numbers is 16; find the other. 24—Ans.

4 The product of three numbers is 8896440; the first number is 980, the second is 102; find the third. 89—Ans.

5 How many times can 17 times (46+98−74+36) be taken from the sum of 18 times (46+98−74+36), 16 times (46+98−74+36) and 34 times (46+98−74+36)? 4 times—Ans.

6 If 842 be multiplied by all the prime factors of 2310; find the sum of all the products. 23576—Ans.

7 $49.60 was spent in buying eggs at 10 cents per dozen; how many eggs were bought? 5952 eggs—Ans.

8 A man bequeathed his estate as follows: to each of his three sons $4890, to each of his two daughters $3900, to his wife $1200 more than to both his daughters, and the remainder, which was three times as much as he left to his three sons, he gave to a college. What was his estate worth? $75480—Ans.

9 A drover bought a certain number of cattle for $6200, and sold a certain number of them for $4400, at

$55 a head, and gained on those he sold, $1200. How much did he gain per head on those he sold, and how many did he buy at first? $15 gain, 155 cattle—Ans.

10 How many barrels of flour at $6 per barrel, will pay for $36 cords of wood as $4 per cord, 18 tons of coal at $5 per ton, and 24 sheep at $12 a head? 87 barrels—Ans.

Junior Third Class—8.

1 Find how many rods of ditch can be dug for $82.40, at 40 cents per rod? 206 rods—Ans.

2 It takes 12 rails to make a rod of fence; how many rails will it take to fence the four sides of a field 56 rods long and 48 rods wide? 2496 rails—Ans.

3 How many people can be seated in a church containing 128 pews, half of which will seat 6 persons, half the remainder 7 persons, and the remainder 8 persons in a pew? 864 people—Ans.

4 A man divided $3.68 equally among 8 beggars; how much did each get? 46 cents—Ans.

5 A drover bought a certain number of sheep for $276, and sold half of them for $184, gaining thereby $2 per head; how many sheep did he buy? 46 sheep—Ans.

6 How long will it take a man to travel a distance of 3549 miles if he walks at the rate of 12 miles the first day, 13 miles the second day, 14 miles the third day, 12 miles the fourth day, 13 miles the fifth day, 14 miles the sixth day, and so on. 273 days—Ans.

7 A linen draper paid $40.32 for 14 webs of linen, each web containing 36 yards; how much did he pay per yard? 8 cents—Ans.

8 By what number must 191023 be divided, in order to give 279 for quotient and 187 for remainder? 684—Ans.

9 A lady bought 14 yards of silk at 90 cents per yard, 2 yards of satin at 98 cents per yard, 13 yards of wincey at 15 cents per yard, 16 yards of factory cotton at 13 cents per yard, a bonnet for $6.75 and a pair of shoes for $3.50. She gave in payment 3 ten dollar bills, how much change should she receive? $1.16—Ans.

Junior Third Class—9.

1 A farm valued at $4550, 16 head of cattle worth $30 a head, and 4 horses worth $80 each, are given for 50 town lots; find the value of each town lot. $197—Ans.

2 Multiply 637 by 21, using factors of the multiplier, and divide the product by 715, using three factors of the divisor, and find the true remainder. $18\frac{507}{715}$—Ans.

3 Joe and Fred are 840 yards apart and approach each other, Joe walking at the rate of 41 yards a minute, and Fred at the rate of 43 yards a minute; in how many minutes will they meet? 10 minutes—Ans.

4 Multiply DCCCLIX by CDLXXVIII and express the product in Roman characters. $\overline{\text{CDX}}$DCII—Ans.

5 A laborer earns $36 a month, and his necessary expenses are $12 a month; how long will it take him to pay for a farm of 85 acres worth $48 an acre? 170 months—Ans.

6 If 26 horses cost $2444, what will 15 horses cost? $1410—Ans.

7 How long will 8 men take to do as much work as 12 men can do in 32 days? 48 days—Ans.

8 A farmer mixes 4 bushels of peas worth 60 cents a bushel with 6 bushels of oats worth 30 cents a bushel; find the value of three bushels of the mixture. $1.26—Ans.

9 If peas worth 70 cents a bushel and barley worth 50

cents a bushel be mixed in equal quantities, how much will 9 bushels of the mixture be worth? $5.40—Ans.

10 A miller mixes 3 bushels of wheat worth 95 cents a bushel with 2 bushels worth 60 cents a bushel, and of the mixture he makes a barrel of flour which he sells for $7.00; how much did he gain, supposing the cost of grinding to be 40 cents? $2.55—Ans.

Junior Third Class—10.

1 Two trains start from the same point and run in the same direction on a double track, the one at the rate of 880 yards a minute, the other at the rate of 872 yards a minute; in how many minutes will they be 1760 yards apart? 220 minutes—Ans.

2 Three times the difference between two numbers is 597, and four times their sum is 2148; find the numbers. 569 and 368—Ans.

3 If 16 bushels of wheat cost $19.20, what will 34 bushels cost? $40.80—Ans.

4 If 96 horses cost $8640, how many horses can be bought for $2430? 27 horses—Ans.

5 43 horses are worth as much as 129 cows, and 84 cows are worth $2520, how much is 1 horse worth? $90 —Ans.

6 A man exchanged $28.80 worth of oats valued at 40 cents a bushel, for wheat valued at $1.20 a bushel; how many bushels of wheat did he receive? 24 bushels —Ans.

7 The length of a field is 344 yards, the width is half the length; how long will a boy take to walk twice around the field at the rate of 43 yards a minute? 48 minutes—Ans.

8 The difference between 68 times a certain number

and 45 times the same number is 7452, find the number. 324—Ans.

9 600 soldiers have provisions enough to last them 20 days, how long will the provisions last if 400 soldiers join the 600? 12 days—Ans.

10 Three times the sum of two numbers is 3984, six times one of them is 2976; find the numbers. 496 and 832—Ans.

11 A farmer bought 4 pounds of tea at 60 cents a pound, 14 pounds of nails at 4 cents a pound, 18 yards of cloth at 70 cents a yard, and 24 yards of print at 14 cents a yard; he gave the store-keeper $15.29; how much is he in debt? $3.63—Ans.

Junior Third Class—11.

1 Write the following number in words: 83689408.

2 How much greater is $\overline{\text{DXLV}}$CDLXVII is ten million one hundred and two thousand, four hundred and eleven? 9556944—Ans.

3 The sum of five addends is 248725, the sum of three of them is 116012; find the sum of the other two. 132713—Ans.

4 The remainder is 1846, the subtrahend is 16 times the remainder; find the minuend. 31382—Ans.

5 The product of three numbers is 247225920, the product of two of them is 777440; find the third number. 318—Ans.

6 When the divisor and quotient are 843, and the remainder 319, what is the dividend? 710968—Ans.

7 Find the results of

(1) $24(30+13\times10-40\div8)\div8(21+12\times12-30\div3)$.

(2) $1\times2\times3(1\times2\times3\times4-1\times2\times3)+3\times4(5\times6-3\times6)\times7-8\times90$.

(1) 3; (2) 396—Ans.

8 A farmer sold 86 bushels of wheat at 95 cents a bushel, 57 bushels of oats at 35 cents a bushel, 70 bushels of barley at 70 cents a bushel, and 90 bushels of peas at 80 cents a bushel, and bought 8 bushels of clover seed at $6 a bushel, and 11 bushels of timothy seed at $2 a bushel; how much money had he left? $152.65—Ans.

9 A drover bought 90 sheep at the rate of 10 for $50, and sold them at the rate of 8 for $48; how much did he gain? $90—Ans.

10 A man can bind 5 sheaves of wheat in a minute, how many days of 8 hours each will it take him to bind 48000 sheaves? 20 days—Ans.

11 Forty-six times the value of a farm is $157320; how much is half the farm worth? $1710—Ans.

12 What is the value of 850 bushels of barley when half a bushel is worth 32 cents? $544—Ans.

Junior Third Class—12.

1 Reduce £13 17s. 9¾d. to halfpence. 6667½ halfpence—Ans.

2 A storekeeper bought 421 books at 9d. each; how many £ s. d. did he give for them? £15 15s. 9d.—Ans.

3 How many pens worth 6 farthings each can be bought for £1 13s. 10½d.? 271 pens—Ans.

4 If 4 books cost 120s., how many £ will 32 books cost? £48—Ans.

5 A man spent £1. 13s. 4d. on Monday, £1 6s. 11d. on Tuesday, and £2 5s. 4d. on Wednesday; how many farthings did he spend during the three days? 5068 farthings—Ans.

6 A boy bought 40 apples at the rate of 3 for 6 farthingsand sold them at the rate of 5 for 15 farthings,

how many d. did he gain? 10d.—Ans.

7 How many £ s. d. in 40975 farthings? £42 13s. $7\frac{3}{4}$d.—Ans.

8 How many sheep worth £4 each, can be bought for 61440 halfpence? 32 sheep—Ans.

9 Find the cost of 40 yards of carpeting at 5s. 6d a yard? Give your answer in £. £11—Ans.

10 A drover bought 36 head of cattle at £10 6s. a head and sold them at £11 5s. a head, how many s. did he gain? 684s.—Ans.

11 A grocer sold 427 pounds of coffee at 8d a pound; how many £ s. d. did he get for it? £14 4s. 8d.—Ans.

12 John had 3s. 8d.; Robert had 4s. 6d.; Thomas had £1 4s. 10d.; Allan had 2s. 2d., and Levi had 1s. 1d. They agreed to divide their money equally among themselves; how many d. should each get? 87d.—Ans.

Junior Third Class—13.

1 How many grains in a pound of gold? How many grains in a pound (Apothecaries') of medicine? How many grains of silver are equal in weight to a pound of butter? 5760 grains; 5760 grains; 7000 grains—Ans.

2 (1) What is the difference in weight between 5 pounds of silver and 5 pounds of meat? (2) Is there any difference between a grain Troy and a grain Apothecaries' weight? (1) 200 grains; (2) No—Ans.

3 Reduce 24 lbs. 3oz. 16dwt. 13grs., to pounds Avoirdupois weight. $20\frac{77}{7000}$lbs.—Ans.

4 How many drams in 6 tons? 3072000drs.—Ans.

5 How many pounds of flour are equal in weight to 3 lbs. 4oz. 12dwt. 22 grains of diamonds, and 4lbs. 10oz. 6drs. 2sc. 10grs. (Apothecaries') of sulphur? $6\frac{7760}{7000}$lbs. —Ans.

6 A man bought 5lbs. 3 oz. of butter at 2 cents an oz., 3lbs. 11 oz. of candy at 3 cents an oz., 6qrs. 4lbs. of flour at 4 cents a pound, and 6lbs. 3oz. (Avoirdupois) of sulphur at 1 cent an oz.; how much did he give for all? $10.58—Ans.

7 A miller can grind 31cwt. 1qr. 11lbs. of flour in a day, how long will it take him to grind 80 barrels of 196 pounds each? 5 days—Ans.

8 How many spoons each weighing 480 grains can be made from 15lbs. 4oz. of silver? 184 spoons—Ans.

9 There are 15360drs, in a bushel of a certain kind of grain; how many bushels in 3cwt. 2grs. 10lbs. 6 bushels —Ans.

10 Reduce 14000lbs. Troy to lbs. Avoirdupois. 11520 lbs.—Ans.

11 If 4 pounds of tea cost $3.20, find the cost of 6 chests of tea, each chest containing 2qrs. 12lbs. $297.60 —Ans.

Junior Third Class—14

1 Reduce 3 miles 1fur. 14rods 4yds. 1ft. 4in. to inches. 200932in.—Ans.

2 Find the value of 18 fathoms of cable at 50 cents a foot.—$54 —Ans

3 What would it cost to build 120 chains of fence at 5 cents a foot? $396 Ans.

4 A man paid for 43 fathoms 4ft. of cable at 40 cents a foot, 16 chains 3 rods of fencing at $4 a rod, 4 chains 20yds. of ditching at 5 cents a yard; how much did he pay for all? $378.20—Ans.

5 A man travelled 16 miles 7fur. 4per. on Monday, 23 miles 4fur. 2 per. on Tuesday, and 25 miles 3fur. 30per. on Wednesday; how many yards did he travel during the three days? 115918yds.—Ans.

6 A boy travels 275 yards in 5 minutes; how long will it take him to travel 23 miles? 736 minutes—Ans.

7 How many steps, each 3 feet long, will a man take in walking 5 miles 6fur. 10per. 4yds.? 10179 steps—Ans.

8 How many chains are equal to 2 miles 4fur. 24per. 4yds. 2ft.? $206\frac{14}{66}$ chains—Ans.

9 What is the height in feet and inches of a horse $15\frac{1}{2}$ hands high? 5ft. 2in.—Ans.

10 How many times will a wagon wheel whose circumference is 12 feet, turn in going a mile? 440 times —Ans.

11 Eight times the distance between two cities is 2131 miles 4fur. 2per. 5yds.; how many yards apart are they? 468932yds.—Ans.

Junior Third Class—15.

1 How many mills in 4 eagles, 3 dollars, 5 dimes, 6 cents 2 mills? 43562 mills—Ans.

2 A bankrupt paid 25 cents in the dollar; how much did he pay on a debt of $3600? $900—Ans.

3 A man pays a tax of 6 mills in the dollar on property assessed for $4600; find the amount of his taxes. $27.60—Ans.

4 How many dimes are equal to 30 twenty-five-cent pieces? 75 dimes—Ans.

5 Of what substances are the following coins composed: a dime, an eagle, a Canadian cent? Is the mill a coin? How is the mill used? Silver, gold, bronze. No; in computation—Ans.

6 A boy bought 4 books at 3 dimes each, 14 books at 15 cents each, 3 books at $2 each, and gave in payment a $10 bill; how much change should he get? 70 cents —Ans.

7 How far can a man travel on a railway for 2 dollars, 6 dimes and 8 cents, when the fare is 2 cents a mile? 134 miles—Ans.

8 A banker exchanges Canadian money for United States currency at the rate of 9 cents for a dime; how many dollars of United States currency would he get for $99.90 of Canadian money? $111—Ans.

9 An English linen-draper sold 20 ells 2 quarters 2 nails 1 inch of cloth; how many inches of cloth did he sell? 923¾ inches—Ans.

10 How many French ells are equal to 6396 English ells? 5330 Fr. ells—Ans.

11 How many window blinds 60 inches long can be made from 120 English ells of linen? 90 blinds—Ans.

Junior Third Class—16

1 How many square inches are equal to 46 acres 3 roods 32 rods 3yds. 3ft 120in.? 294504888 sq. in.—Ans.

2 How many lots each containing 968 square feet can be made of a field of 16 acres? 720 lots—Ans.

3 How many weights of 8oz. can be made out of a bar of iron which welghs 1cwt. 2qrs. 10lbs.? 320 weights —Ans.

4 There are 4 acres 3 roods 17 rods in one field, 2 acres 1 rood 24 rods in each of two other fields; how many square rods in the three fields? 1545 sq. rods—Ans.

5 If 4 men can plough 16 roods in a day, how long will it take 1 man to plough 8 fields, each containing 6 acres 2 roods? 52 days—Ans.

6 How many square inches in a board 12ft. 4in. long and 9in. wide? 1332 sq. in.—Ans.

7 A field is 12 chains long and 10 chains wide; how

many acres does it contain? 12 acres—Ans.

8 A man has four fields; in the first there are 16 acres, in the second there are 44 roods, in the third there are 220 square chains, and in the fourth there are 1440 square rods; how many acres in the four fields? 58 acres —Ans.

9 How many square yards of carpet will cover a floor 15 feet long by 12 feet wide? 20 sq. yds.

10 Find the cost of a farm 40 chains long by 20 chains wide, at $55 an acre. $4400—Ans.

11 A wall is 21 feet long and 9 feet high; how many square yards of paper will cover it if it has a wainscot 3 feet high? 14 sq. yds.—Ans.

12 How many square rods in 11979 square feet? 44 sq. rods—Ans.

Junior Third Class—17.

1 How many cubic inches in 400 tons of shipping? 29030400 cub. in.—Ans.

2 What is meant by a ton of shipping? a ton of hay? a tun of wine? 42 cubic feet of space; 2000 pounds of hay; 252 gallons of wine—Ans.

3 How many cords of wood in a pile 32 feet long, 6 feet high, and 16 feet wide? 24 cords —Ans.

4 Find the value of a pile of wood 40 feet long, 8 feet high, and 20 feet wide, at $2.50 a cord. $125—Ans.

5 How many cord-feet in 276480 cubic inches? 10 cord feet—Ans.

6 A woodcutter cut a pile of wood 10 feet long, 4 feet wide and 3 feet high on Monday, a pile 8 feet long, 4 feet wide and 6 feet high on Tuesday, a pile 12 feet long, 2 feet wide and 6 feet high on Wednesday, a pile 10 feet long, 6 feet wide and 2 feet high on Thursday, and a

pile containing half a cord on Friday. He got 60 cents a cord for cutting the wood; how much did he earn? $3—Ans.

7 A field containing 12 acres is 10 chains wide; how many yards is it in length? 264 yards—Ans.

8 A pile of wood containing 12 cords is 16 feet long and 8 feet high; how wide is it? 12 feet—Ans.

9 How many piles of wood each 12 feet long, 4 feet wide and 6 feet high, can be made out of a pile 52 feet long, 12 feet wide and 6 feet high? 13 piles—Ans.

10 How many cubic feet are in a stick of oak timber 48 feet long and 20 inches by 18 inches? 120 cub. ft.—Ans.

11 Find the value of a stick of timber 24 feet long and 18 inches by 12 inches, at $90 a thousand? $3.24—Ans.

12 If 1000 feet of lumber cost 2000 cents, what will 350 feet cost? $7.00—Ans.

Junior Third Class—18.

1 Reduce 812343 gills to tuns, pipes, &c. 100 tuns 1 pipe 59gals. 2qts. 1pt. 3gills—Ans.

2 How many pints in 4hhs. 6kil. 8 fir. 2gal. 3qts. of beer? 3190 pints—Ans.

3 The wine gallon contains 231 cubic inches, and the beer gallon contains 282 cubic inches; how many wine gallons are equal to 36 beer gallons? $43\frac{219}{231}$ gal.—Ans.

4 How many pints are equal to 46bush. 24pk. 22gal. 16qt.? 3536pts—Ans.

5 A bin of wheat contains 80 bushels; how many bags each containing 120 pounds can be filled from it? 40 bags—Ans.

6 A man bought 4 loads of wheat, each load containing 22 bags, and each bag containing 2bush. 2pk. He sold three loads at a gain of 2 cents a pk., and the remainder at a gain of 2 cents a gallon; how much did he gain? $22—Ans.

7 A miller grinds 50 bushels of wheat in a day. He gets 1 bushel in 10 for grinding; how much does he make in a day, if wheat is worth $1.22 a bushel? $6.10—Ans.

8 How many loaves of bread containing 4 pounds of flour each, can be made from 6 barrels of flour? 294 loaves—Ans.

9 A merchant bought 4 hogsheads of molasses at $44 each, and sold them at 80 cents a gallon; how much did he gain? $25.60—Ans.

10 If 1000 feet of lumber weigh 2 tons, how many pounds will 25,000 feet of lumber weigh? 100,000 pounds—Ans.

11 A cubic foot of water weighs 62½ pounds; how many tons of water will fill a cistern 10 feet long, 8 feet wide and 15 feet deep? 37½ tons—Ans.

12 A light-house is 99 feet high; how long will it take a snail to crawl to the top at the rate of 2ft. 9in. an hour? 36 hours—Ans.

Junior Third Class—19.

1 How many hogsheads of wine are equal to 7 hogsheads of beer? 6 hogsheads—Ans.

2 A merchant bought 6600 pounds of wheat at 2 cents a pound and sold it at $1.40 a bushel; 680 pounds of oats at 1 cent a pound and sold it at 40 cents a bushel. How much did he gain? $23.20—Ans.

3 How many pounds (Troy) of gold are equal to 40

pounds (Avoirdupois) of medicine and 40 pounds (Avoirdupois) of wheat? $97\frac{128}{160}$ pounds—Ans.

4 How many hours in a leap-year? 8784 hours—Ans.

5 The dividend is 8469 acres, the divisor is 428; find the remainder. 337 acres—Ans.

6 The divisor is 87 gallons, the quotient is 63 *times*, and the remainder is 54 gallons; what is the dividend? Express the quotient and remainder in *times*. 5535 gallons, $63\frac{54}{87}$ *times*—Ans.

7 What is the weight of a stick of elm timber 24 feet long and 18 inches by 16 inches, if a cubic foot of elm weighs 50 pounds? 2400 pounds—Ans.

8 How many boards 18 feet long and 12 inches wide will close the side of a building 28 feet long and 9 feet high? 14 boards—Ans.

9 A farmer put 153 pounds of wheat in one bag, 132 pounds in another, and 129 pounds in another; what was the average weight per bag? 138 pounds—Ans.

10 A merchant purchased 360 bushels 20 pounds of wheat in 4 days; find his average daily purchase. 90 bushels 5 pounds—Ans.

11 A grocer sold 3 pints of molasses for 30 cents; how much is that a gallon? 80 cents—Ans.

12 Find the value of 16 cords of wood at 55 cents a cord-foot. $70-40—Ans.

Junior Third Class - 26.

1 John Brown sold the following articles to James East on account; Jan. 20th, 4 pounds of tea at 60 cents, 8 pounds of coffee at 25 cents; Jan. 28th, 14 yards of print at 12 cents, 12 yards of factory cotton at 11 cents a yard; March 5th, 6 pounds of butter at 24 cents, and 16 pounds of rice at 5 cents a pound. How much does

East owe Brown? $9.64—Ans.

2 How many guineas are equal to 49392 farthings? 49 guineas—Ans.

3 Find the value of 816 eggs at 13 cents a dozen, and 500 pounds of beef at $6 a cwt. $38.84—Ans.

4 Four barrels of flour was divided equally among 14 poor people; how many pounds did each receive? 56 pounds—Ans.

5 By what weight are the following substances bought and sold: Wheat, tea, silver, medicines? What use is made of Apothecaries' weight? Wheat, tea, and medicines by Avoirdupois, and silver by Troy weight. Apothecaries' weight is used in *mixing* medicines—Ans.

6 How many hours and minutes between half-past one o'clock and a quarter to four? 2hrs. 15min.—Ans.

7 How many acres in a road 4 rods wide and 1 mile long? 8 acres—Ans.

8 A bookseller sold 70 books at 3 pence each and received a sovereign in payment; how many pence should he give back? 30 pence—Ans.

9 An archer can shoot 20 arrows in a minute; at that rate how long would it take him to empty 5 quivers each containing 84 arrows? 21 minutes—Ans.

10 A father is 3 score years old, his eldest son is half as old as his father, and his youngest son is half as old as his eldest son; find the sum of all their ages. 105 years —Ans.

11 The population of a city increased 25839 in 9 years; find the average yearly increase. 2871—Ans.

12 Find the value of 46 bushels 30lbs. of wheat at $1.20 a bushel. $55.80—Ans.

Junior Third Class—21.

1 How many bushels of wheat worth 2 cents a pound should be given in exchange for 120 bushels of oats worth 1 cent a quart? 32bush—Ans.

2 A newspaper is 36 inches long and 24 inches wide; how many copies of such a newspaper will cover 4 acres? 29040 copies—Ans.

3 A farmer sold 35bushels 24pounds of wheat at $1.20 a bushel, and bought 4 pounds of tea at 70 cents a pound, $2.00 worth of sugar, and put $20 in the bank; how much money had he left? $17.68—Ans.

4 How many times 20pounds 15oz. are 188pounds 7 oz.? 9 times—Ans.

5 Find the value of the following articles: 6 barrels of flour at 4 cents a pound, 13 barrels of pork at 9 cents a pound, 32bushels 25lbs. of oats at 34 cents a bushel, and 36bushels 2pk. of barley at 20 cents a pk. $321.37 —Ans.

6 If 12 men in 8 days of 10 hours each can do a piece of work, how many days of 10 hours each will 48 men require to do it? 2 days—Ans.

7 If 36 men can do a piece of work in 24 days, how long will it take twice as many men to do half the work? 6 days—Ans.

8 How many crayons in 98 boxes, each box containing 1 gross of crayons? 14112 crayons—Ans.

9 How many reams in 40320 sheets of paper? 84 reams—Ans.

10 A merchant bought 6 chests of tea, each containing 80 pounds, at 30 cents a pound. He sold half of it at a gain of 20 cents a pound, and the remainder at a loss of 15 cents a pound, how much did he gain by the

transaction? $12.—Ans.

11 How many carriages in a procession a mile long, allowing 30 feet for each carriage? 176 carriages—Ans.

Junior Third Class—22.

1 One side of a roof is 60 feet long and 20 feet wide, how many shingles will cover it if 1000 are required to cover 10 feet square? 12000 shingles—Ans.

2 A cubic foot of water weighs 1000oz.; how many oz. will 864 cubic inches weigh? 500oz.—Ans.

3 How many days from the 5th of January, 1880, to the 25th of March (inclusive) of the same year? 80 days—Ans.

4 Nine times a man's weight is greater than 6 times his weight by 480 pounds, find his weight. 160pounds —Ans.

5 If 4 oranges are worth 12 apples, and 3 apples are worth 2 cents, how much is an orange worth? 2 cents —Ans.

6 A grocer bought 24 barrels of sugar at $18 per barrel and 13 barrels at $16 per barrel, how much would he gain by selling the whole at $20 per barrel? $100—Ans.

7 A flour merchant bought 500 barrels of flour at $6 a barrel; he sold 300 barrels at $8 a barrel; and the remainder at $7 a barrel; how much did he gain? $800 —Ans.

8 If 840 books are worth 840 dimes, how many books are worth $840? 8400 books—Ans.

9 Reduce £18 18s. to guineas. 18 guineas—Ans.

10 35 head of cattle weigh 39200pounds, find the average weight per head. 1120pounds—Ans.

11 A man in shooting pigeons kills 3 out of every 5; how many will he kill out of a hundred? 60—Ans

12 A bridge 80 feet long is floored with 3-inch plank 12 feet long; how many cubic feet of plank will be required to floor the bridge? 240 cubic feet—Ans.

Senior Third Class—1.

1 Write in figures the following numbers: Fifty million eight hundred and four thousand three hundred and one; and eight hundred million one thousand and ten. 50804301 and 800001010—Ans.

2 Write in words the numbers expressed by the following figures: 201389418 and 7120183641 3. Two hundred and one million three hundred and eighty-nine thousand four hundred and eighteen; and seventy-one billion two hundred and one million eight hundred and thirty-six thousand four hundred and thirteen—Ans.

3 Multiply MDCXLIX by nine hundred and nine and express the product in Roman numerals. $\overline{M}$. $\overline{CDXC}$VIII. $\overline{C}$MXLI.—Ans.

4 Find the continued product of 908, 321 and 720. 209856960—Ans.

5 Find the result of $(37332 \div 61) \div 34$. 18—Ans.

6 The divisor is ninety-thousand and three, the quotient is twenty-thousand three hundred and one, and the remainder is eighty thousand two hundred and one; find the dividend. 1827231104—Ans.

7 What is the least number that must be taken from 186984 so that it may be exactly divisible by 9732? 2076—Ans.

8 What is the least number that must be added to 28361 to make it exactly divisible by 946? 19—Ans.

9 Find the result of $404(38 \times 55 - 902 \div 11) + 30 \times 10 - 20 + 44$. 81352—Ans.

10 How many yards of carpet 3 feet wide will cover a floor 18 feet long and 15 feet wide? 30yards—Ans.

11 If 60 men can do a piece of work in 18 days, how long would 20 men take to do the same work? 54 days —Ans.

12 A's age is twice B's age, and the sum of their ages is 90 years; find their ages. A's 60, B's 30—Ans.

13 Find the cost of 34acres 2roods of land at 50 cents a square rod. $2760—Ans.

Senior Third Class—2.

1 Divide $9440 between A and B so that A may have $1620 more than B. A $5530; B $3910—Ans.

2 Divide $900 between A and B so that A may have twice as much as B. A $600; B $300.

3 If 40 soldiers have provisions enough for 20 days, how long will they last 60 soldiers? $13\frac{2}{3}$days—Ans.

4 If 80 men have provisions enough for 40 days, how long will they last if 20 men leave? $53\frac{2}{3}$days—Ans.

5 Find the cost of carpeting a room 15feet long and 12feet wide with carpet 3feet wide and worth $1.50 a yard. $30—Ans.

6 How many yards of carpet 2 feet wide will cover a platform 13 feet long and 12 feet wide? 26yards—Ans.

7 Find the value of 800bushels 50lbs. of wheat at $1.20 a bushel, 336bushels 20lbs. of oats at 51cents a bushel, 750 feet of lumber at $15 a thousand, and a pile of wood 20 feet long, 16 feet wide and 6 feet high at $3.50 a cord. $1196.41—Ans.

8 Multiply $\overline{(20+50)\times(80-35)+40}$ by $\overline{30\div5\times20+30+(76+24)\div25}$. 1945900—Ans.

9 The difference between two numbers is 4869, their

sum is 5 times their difference; find the numbers. 9738 and 14607. Ans.

10 A wall is 81feet long, 15feet high, and 2feet thick; how many cubic yards in it? 90 cubic yards—Ans.

11 How many times must 3943 be added to itself to make 51259? 12 times—Ans.

12 A grocer bought 55lbs. of coffee at 15 cents a lb., 46lbs. at 16 cents a lb., and 80lbs at 18cents a lb.; for how much a lb. must he sell it in order to gain $11.62? 23 cents—Ans.

Senior Third Class—3.

1 Find the prime factors of 60060. 2, 2, 3, 5, 7, 11, 13—Ans.

2 The product of four consecutive numbers is 3024, find the numbers. 6, 7, 8, and 9—Ans.

3 Eight times the sum of three numbers is 12728, the least is 241. the greatest is 4 times the least; find the other number. 386—Ans.

4 Find all the measures of 60—2, 3, 4, 5, 6, 10, 12, 15, 20, 30—Ans.

5 A boatman can row 3 miles down a river in the same length of time that he requires to row 2 miles up the river; he rows 30 miles down the river in 6 hours, how long will it take him to row back to the point from which he started? 9 hours—Ans.

6 A drover bought a certain number of cattle for $1200, he sold half of them for $800, gaining thereby $10 a head, and the remainder at a gain of $5 a head, how many cattle did he buy and how much did he receive for them? 40 cattle, $1500—Ans.

7 If a certain number be multiplied by 32, the product increased by 88, and the sum divided by 28, the

quotient will be 10; find the number 6—Ans.

8 How many sheep worth $6 a head are worth as much as 9 horses at $120 each, and 33 cows worth $22 a head? 301 sheep—Ans.

9 Find the result of $4600-\overline{400\times8+20\times10}+1600\div\overline{40+10}+99$.—731—Ans.

10 A watch gains 18 minutes in 9 hours, how much will it gain in 2weeks 10hours? 11hrs 32min.—Ans.

11 John and James have $990; John has 10 times as much as James, how much has John? $900—Ans.

Senior Third Class—4

1 Find the g. c. m. of 946 and 28488? 2—Ans.

2 What is the greatest number that will divide 3220 and 8900 without a remainder? 20—Ans.

3 What is the length in yards of the longest tape-line that will measure a mile and 70 chains by taking the length of the line an exact number of times? 220yds.—Ans.

4 How many books worth 46cents each can a man buy for $56.80 so as to have 22 cents left? 123 books—Ans.

5 When wheat is worth $1.08 a bushel, and flour worth $6.00 a barrel, how many bushels of wheat are worth 45 barrels of flour? 250bush—Ans.

6 How many feet of lumber in a close-board fence 90 chains long and 6feet high? 35640feet—Ans.

7 Divide the continued product of $40\times56\times90\times20$ by the continued product of $20\times16\times40\times120$—$2\frac{5\,6\,0\,0\,0\,0}{1\,5\,3\,6\,0\,0\,0}$—Ans.

8 How long will it take a man to walk 4 times around a farm 80chains long and containing 480acres, if he

walks at the rate of 40rods in 3minutes? 5hrs. 36min. —Ans.

9 What is the remainder when 8326 is taken 12 times from 102146? 2234—Ans.

10 Peter's age is 55 years, Andrew was half as old as Peter 15 years ago, how old is he now? 35 years—Ans.

11 Find the cost of a mile of railroad at $200 a chain? $16000—Ans.

12 If 4 men can do as much work as 8 boys, how many boys will do as much work as 12 men and 20 boys? 44 boys—Ans.

13 A man has $8000, he buys 100 acres of land at $50 an acre, 4 horses at $122 each, 40 bushels of seed wheat at $1.40 a bushel, 30 bushels of seed oats at 40 cents a bushel, how much money had he left? $2444—Ans.

Senior Third Class—5.

1 What is the highest common divisor of 48 times $(90+150-130+20\times5)$ and 36 times $(90+150-130+20\times5)$? 2520—Ans.

2 Find the l. c. m. of 950 and 1260. 119700—Ans.

3 What is the least amount that can be paid by each of the following coins - 10cent piece, 20cent piece, 25 cent piece and 50cent piece? $1.00—Ans.

4 Robert had 5cents, Thomas 4cents, John 6cents, and Edward 1cent; they bought 48 pens with their money, how many pens ought each boy to get? Robert 15, Thomas 12, John 18 and Edward 3—Ans.

5 A hare runs 5rods while a hound runs 4rods, how far will the hare run while the hound runs 1mile? 1m 2fur—Ans.

6 How many men can stand on a platform 120feet

long and 20feet wide, if each man requires 4 square feet? 600 men—Ans.

7 A farmer sold 2840bushels of wheat at $1.30 a bushel and bought 30acres of land at $50 an acre, 4horses at $90 each, and 8cows at $30 each; how many sheep at $8 a head can he buy with the remainder of his money? 199sheep—Ans.

8 When wheat is selling at $1.10 a bushel, how many bushels can be bought for $108.90? 99bushels—Ans.

9 Divide 1800 into two parts so that one part may be 5 times the other part. 1500 and 300—Ans.

10 If 2 men earn 80cents each a day, and 3 boys earn 40cents each a day, how long will it take them to earn $25.20? 9days—Ans.

11 Find the cost of carpeting a room 24feet long and 18feet wide with carpet 2feet wide and worth 80cents a yard? $57.60—Ans.

12 What is the value of a field 56rods long and 40 rods wide, and worth $40 an acre? $560—Ans.

Senior Third Class—6.

1 Afarmer received £18 13s. 11¾d for one load of grain, £15 15s. 8½d. for another load, £17 13s. 0¼d for another load, and £22 11s. 9½d. for another; how much did he receive for the 4 loads? £74 14s. 6d.—Ans.

2 A grocer sold 2cwt. 1qr. 22lbs. 4oz. of sugar on Wednesday, 4cwt. 2qr. 18lbs. 8oz. on Thursday, 3cwt. 3qr. 3 lbs. 3oz. on Friday, and 5cwt. 2qr. 24lbs. 15oz. on Saturday, how much sugar did he sell during the 4 days? 16 cwt. 2qr. 18lbs. 14oz.—Ans.

3 The fence on the north side of a field is 9chains 3 rods 2yards 2feet long, on the east side 10chains 2rods 1 yard 1foot long, on the south side 8chains 1rod 4yds 2

feet, and on the west side 10chains 1rod 3yards 1foot; find the length of the fence around the field. 39chains 1rod 1yard--Ans.

4 Add together 14tons 12cwt. 1qr. 4lbs. 2oz.; 17tons 11cwt. 2qr. 5lbs. 1oz.; 36tons 18cwt. 3qr. 22lbs. 12oz.; 72tons 13cwt. 2qr. 16lbs. 14oz.; 12tons 16cwt. 3qr. 10 lbs. 13oz. 154tons 13cwt. 1qr. 9lbs. 10oz.—Ans.

5 A field contains 13ac. 3roods 30per.; each of two others contains 14ac. 2roods 20per.; how much land in the three fields? 43ac. 30per.—Ans.

6 A boy had $2.20, he bought 1lb. 2oz. of candy at 3cents an oz, 2lbs. 14oz. of maple sugar at 1cent an oz., 2 copy-books at 8cents apiece, and a pocket-book for 30 cents; how much money had he left? 74cents—Ans.

7 Ninety-eight times the sum of two numbers is 7154, the greater of them is 42; find the other number. 31—Ans.

8 Find the g.c. m. and the l. c. m. of 88, 176, 300. 4 and 13200—Ans.

9 Twenty bushels of barley are worth $16, what is the value of 256 bushels of wheat, which is worth twice as much per bushel as the barley? $409.60—Ans.

10 How much land worth $70 an acre, is worth as much as 90 horses valued at $140 a head? 180acres—Ans.

11 What is the remainder when 18360 is divided by 97? 27—Ans.

Senior Third Class—7.

1 What is the greatest number of sheep that can be bought for $1962 or $2289 or $2943, so as to get the same number each time? 327 sheep—Ans.

2 What is the least amount of wheat that can be mea

sured by each of the following measures: a quart, a gallon, a peck, a half-bushel, a bushel, a three-bushel bag, a five-bushel box? 15bushels—Ans.

3 What is the least number which, divided by 22, 24, 30 and 35, gives 21 for remainder in each case? 9261 —Ans.

4 The fore and hind wheels of a wagon are 14 and 18 feet in circumference respectively. What is the shortest distance in which each wheel will turn an exact number of times? How many turns will each wheel make? 126 feet, 9 and 7 turns—Ans.

5 A man's income is $90 a month, he pays $4 a month rent, $6 taxes yearly, $12 a month for clothes, $6 a week for provisions, and his other expenses amount to $120 a year, how much can he save in 5 years? $2250 —Ans.

6 If 4 men or 8 boys can do a piece of work in 12 days, how long will 8 men and 12 boys require to do it? $3\frac{3}{7}$days—Ans.

7 A farmer sold three farms; for the first he received £136 18s. 6d., for the second £224 17s. 9d., for the third £184 12s. 10d., how much did he receive for the three farms? £546 9s. 1d.—Ans.

8 Of the Allan line of steamships the Parisian contains 5400tons of shipping, the Sarmatian 3600tons, the Manitoban 3150tons, the Canadian 2600tons. If these four vessels carry 1475 passengers, how many cubic feet will be allowed to each passenger? 420cub. ft.—Ans.

9 Eight times one number is equal to 3 times another number, and the sum of these products is 192, find the numbers. $12 and 32—Ans.

10 A drover bought 90 head of cattle at $40 a head, and spent $5 a head for feed, $45 for carriage and $50

duty, for how much a head must he sell them in order to gain $350 by the transaction? 49\frac{85}{90}$—Ans.

Senior Third Class—8.

1 Find the cost of digging a cistern 12feet long, 9feet wide and 18feet deep, at 30cents a cubic yard for the first 9feet and 40cents a cubic yard for the remainder? $25.20—Ans.

2 A farmer has 240ac. 2roods of land and sells 145ac. 3roods 30rods of it, how much has he left? 94ac. 2 roods 10rods—Ans.

3 A laborer earned £1 17s. 8d. one week and £1 17s. 11d. the next, and spent £1. 19s. 8d. the next week, how much had he left? £1. 11s. 11d.—Ans.

4 A man bought 36ac. 2roods 15per. 14yds. of land at one time and 59ac. 3roods 14per. 25yds. at another time; he sold 64ac. 3roods 39per. 30yds.; how much had he left? 31ac. 1rood 30per. 9yds.—Ans.

5 A farmer bought a cow for £10 15s. and after keeping her four weeks and spending £1 7s. 6d. for feed, he sold her for £14 13s. 4d., how much did he gain? £2 10s. 10d.—Ans.

6 How many fields each 80rods long and 40rods wide can be made of a farm containing 240acres? 12 fields—Ans.

7 Subtract 39bush. 3pk. 1gal, 3qts. from 98bush. and subtract 28bush. 2pk. 1gal. 3qts. 1pt. from the remainder. 29bush. 1pk. 1qt. 1pt.—Ans.

8 Divide $1600 among B., C. and D., giving B. as much as C., and C. twice as much as D. B. $640, C. $640, D. $320.—Ans.

9 How many cords of wood worth $3 a cord should be given for 32bush. 30lbs. of wheat worth $1.20 a bushel? 13cords—Ans.

10 How much greater than 3ac. 2roods 39per. are 11 acres? 7ac. 1per.—Ans.

11 When 2lbs. of butter are worth 3doz. eggs, how many lbs. of butter are worth 90doz. eggs? 60lbs.—Ans.

Senior Third Class—9.

1 How much land in 18 fields, each field containing 12ac. 3roods 30per.? 232ac. 3roods 20per.—Ans.

2 How much greater than 26times 12bush. 3pk. 1gal. 3qts. 1pt. is 38 times 12bush. 3pk. 1gal. 3qts. 1pt.? 155 bush. 3pk. 2qts.—Ans.

3 A butcher bought 9 head of cattle at £8 10s. 6d. a head and sold 3 of them at £9 15s. 4d. a head, and the remainder at £9 18s. 10d. a head, how much did he gain by the transaction? £12 4s. 6d.—Ans.

4 When 1 horse is worth £34 15s. 8d., how much are 90 horses worth? £3130 10s.—Ans.

5 Find the cost of 50chains 2rods of fencing at 2s. 6d. a rod. £25 5s.—Ans.

6 Ten men and 12 boys work in a factory. Each man earns £1 16s. 8d. a week, and each boy earns 5s. 10d. a week; how much will the men and boys earn in 6weeks? £131—Ans.

7 Find the sum of 8 times 3tons 1cwt. 1qr. 22lbs.; 6 times 4tons 18cwt. 3qrs. 18lbs. and 12 times 2qr. 24lbs. 54tons 14cwt. 22lbs.—Ans.

8 Find the value of 18yds. of cotton at $6\frac{3}{4}$ a yd., 26 yds. of linen at $10\frac{1}{2}$d. a yd., 55lbs. of tea at 1s. $8\frac{1}{4}$d. a lb., 14lbs. of coffee at $11\frac{3}{4}$d. a lb., 360lbs. nails at $1\frac{1}{2}$d. a lb., and 90 pens at $\frac{1}{2}$d. each. £9 8s. $1\frac{3}{4}$d.—Ans.

9 If a field 20chains long and 15chains wide cost $1500, what will a field 200rods long and 72rods wide cost? $4500—Ans.

10 Find the result of 6times(8tons 4cwt. 3qrs. 22lbs.)+(18tons 2qrs.)−(15tons 5cwt. 3qrs. 14lbs.)+3 times (80tons 16lbs.)+(25tons 11cwt. 2qrs. 23lbs.) 369ton 10lbs.—Ans.

11 Find the value of a pile of wood 24feet long, 16 feet wide and 6feet high at £1 16s. 4d. a cord. £32 14s.—Ans.

Senior Third Class—16.

1 Twenty-five bolts were made of a bar of iron weighing 30lbs. 8oz. 14drs., find the weight of each bolt. 1lb. 3oz. $8\frac{2}{25}$drs.—Ans.

2 Divide £126 13s. 8½d. into 36 equal parts. £3. 10s. 4½d. $1\frac{9}{36}$q.—Ans.

3 A merchant bought 24chests of tea at £6 4s. 3d. each and sold them for £160 15s. 8d., how much did he gain on each chest? 9s. $8\frac{3}{4}$d. $\frac{8}{24}$q.—Ans.

4 Divide 32days 22hrs 40min. 36sec. into 24 equal parts. 1day 8hrs. 56min. $41\frac{12}{24}$sec.—Ans.

5 How long will it take a man to earn £36 15s. 10d. at the rate of £3 6s. 6d. a week? $11\frac{52}{78}$weeks—Ans.

6 How many fields each containing 4ac. 3roods can be made out of a farm of 380acres? 80 fields—Ans.

7 How many times must 4bush. 2pk. 1gal. 1qt. be taken from 31bush. 1pk. 1gal. 1qt. so as to leave a remsinder of 3bush. 1pk. 1gal. 3qts.? 6times—Ans.

8 What is the least sum that must be taken from £36 7s. 9d. to make it exactly divisible by £5 4s. 7d.? £5 3d.—Ans.

9 What is the least amount that must be added to £35 1s. 6d. to make it exactly divisible by £3 4s. 10d.? 11s. 8d.—Ans.

10 A butcher sold 3cwt. 2qr. 20lbs. of beef for £7 14s. 2d., how much did he get a pound for it? 5d.—Ans.

11 A merchant sold 3 car-loads of coal, each containing 12tons 6cwt. for £73 16s., how much did he get a cwt. for it? 2s.—Ans.

12 If 3pks. of wheat cost 75cents, what will 12bush. 2pks. cost? $12.50—Ans.

Senior Third Class—11.

1 Divide $3500 between A. and B. giving A $7 out of every $10. A. $2450, B. $1050—Ans.

2 Eight men and 10 boys earn $20 in a day, and 8 men and 15 boys earn $24 in a day, how much will 3 boys earn in 14days? $33.60—Ans.

3 If 240 be taken 20 times from 6440, how many times 82 will the remainder be? 20 times—Ans.

4 Find the value of 1800lbs. of wheat at $1.15 a bushel, 84tons of coal at 40cents a cwt., 36bush. 18lbs. of oats at 34 cents a bushel, 10cords of wood at 20cents a cord foot, 36000lbs. of hay at $12 a ton, 550feet of lumber at $10 a thousand, and 72 books at $4 a dozen. $980.42—Ans.

5 If 8 men can do a piece of work in 12 days, how many men will do 24 times the work in half the time? 384 men—Ans.

6 A man has $3464.50; he buys a store for $853.75, a dwelling-house for $1200, a horse for $120 80, 13bush. of oats at 40cents a bushel, and 3barrels of flour at $6 a barrel; how much money has he left? $1266.75—Ans.

7 Three loads of hay can be bought for £14 8s. 9d., how many loads can be bought for £52 18s. 9d.? 11 loads—Ans.

8 Two men thresh 8bush. 1pk. 1gal. 3qts, 1pt. in the forenoon and 6bush. 3pk. 1gal. 2qts. 1pt. in the afternoon. Find how much they will thresh in 12days; 185 bush. 1pk.—Ans.

9 A farm is 36chains 40links long, and 27chains 50 links wide, how many acres does it contain? $100\frac{1}{10}$ac. —Ans.

10 John had 3cents, Edward had 8cents and James had 4cents; they bought 75 marbles with their money, how many marbles ought each boy to get? John 15, Edward 40, James 20—Ans.

11 A farmer had 600bush. of wheat; he sold 36bush. 3pk 1gal. 3qt. 1pt. to one man, 143bush. 1pk. 1gal. 2qt. 1 pt to another man, and one-half the remainder to another man; how much had he left? 209bush. 3pk. 1qt.—Ans.

Senior Third Class—12.

1 What will it cost to paint a floor 21feet long and 6 yards wide, at 80cents for 4 square yards? $8.40—Ans.

2 The divisor is 7 times the quotient, the quotient is 3 times the remainder, and the sum of the three is 225; find the dividend. 5112—Ans.

3 Four numbers average 486, the first is 386, the second is greater than the first by 18, and the third is less than the sum of the first and second by 260; find the fourth number. 624—Ans.

4 The divisor is 5 times the remainder, the quotient is twice the divisor, and the sum of the three is 80, find the dividend. 1255—Ans.

5 A man bought 2 farms each containing 36ac. 3roods 30per. 9yds. 4ft. 120in., and 5 farms each containing 70 ac. 1rood 20per. 6yds. 4ft. 80in.; he then divided his land into 12 equal farms, how much land was there in each farm? 35ac. 1rood 36per. 24yds. 4ft. $29\frac{1}{3}$in.—Ans.

6 What is the value of 850 sheep and 340 cows, when 4 sheep and 4 cows cost $144, and a cow is worth 5 times as much as a sheep? $15,300.

7 A farmer sold to a grocer 32bush. of potatoes at 60 cents a bushel, and bought 2gal. of molasses at 80cents a gallon, 16lbs. of sugar at 11cents a lb., and 18lbs. of coffee at 30cents a lb.; how many lbs. of tea at 87cents a lb. can he buy with the remainder of his money? 12 lbs.—Ans.

8 Find the cost of plastering the walls and ceiling of a room 18feet long, 14feet wide and 9feet high, at 8cents a square yard. $7.36—Ans.

9 A man can row down stream at the rate of 5miles an hour and up stream at the rate of 4miles an hour. After rowing down stream for 6hours, how long will it take him to row up stream to a point 6miles further up the stream than the point from which he started? 9hrs. —Ans.

Senior Third Class—13.

1 How long will it take a man to walk 720 miles if he walks half the distance at the rate of 24miles a day, and the remainder at the rate of 18 miles a day? 35days—Ans.

2 How many horses at $120.50 and cows at $43.75 can be bought for $3285 so as to have an equal number of each? 20 horses and 20cows—Ans.

3 What will it cost to carpet a room 12feet long and 11 feet wide with carpet 22inches wide and worth 80cents a yard? $19.20—Ans.

4 A man pays a tax of 8mills in the dollar, on property assessed at $3600, and a tax of 5mills in the dollar on property assessed at $2400: find the amount of his taxes. $40.80.

5 If 2ac. 3roods 30per. of land can be bought for $90, how much land can be bought for $45? 1ac. 1rood 35 per.—Ans.

6 Make out a bill for the following account: March 21st, 1882. David Austin sold to George Dunn, 8yards print at 16cents, 4yards muslin at 20cents. March 22nd. 5lbs. tea at 70cents, 30lbs. sugar at 12cents, 16lbs. rice at 6cents; March 24th. 14lbs. butter at 20cents, 14lbs. coffee at 30cents, and 13lbs. raisins at 12cents. $18.70 —Ans.

7 The divisor and quotient are each 324, and twice the divisor is equal to three times the remainder; find the dividend. 105192—Ans.

8 The interest on $555 is $16.65; what is the interest on $1? 3cents—Ans.

9 A man insured his house for $4220 and paid a premium of 6mills in the dollar; what was the amount of premium? $25.32—Ans.

10 If 96 dozen eggs cost $12.48, what will half a dozen cost? 6½cents—Ans.

11 A farm, containing 100acres, is 200 rods long, and is divided into 4 equal fields by 2 fences crossing each other at right angles; find the length of all the fences around the fields. 840rods—Ans.

12 250 men and 120 children went on an excursion; the men paid a fare of $1.20 each, and the children paid a fare of 60cents each; how much was paid for excursion tickets? $372—Ans.

Senior Third Class—14.

1 Find the cost of carpeting a room 12ft. 4in. long and 10ft. 8in. wide, with carpet 2ft. 10in. wide, and worth 80cents a yard? 12.38\frac{26}{153}$—Ans.

2 What is the value of a pile of wood 80ft. long, 24ft. wide and 12ft. high, at $3.25 a cord? $585—Ans.

3 A boatman can row down stream at the rate of one mile in 15minutes and up stream at the rate of 9miles in 3hours; after rowing up stream for 12hours he turned and rowed back to the point from which he started; what distance did he row, and how much longer was he in rowing up stream than in rowing down stream? 72miles; 3hours—Ans.

4 Two clocks are started at 12 o'clock noon, both showing correct time; one gains 3minutes in 6hours and the other loses 1minute in 4hours; in what time will there be a difference of 3hours between them? 10days—Ans.

5 If 18men earn $36.36 in 2days, in how many days will 22men earn $199.98? 9days—Ans.

6 How many fields 12chains long and 10chains wide can be made out of a farm 160rods long and 108rods wide? 9 fields—Ans.

7 The l. c. m. of 3, 4, 12, 15, 20, 30, is how many times the g. c. m. of 195 and 435? 4times—Ans.

8 How many tons of coal worth $8 a ton are worth as much as a pile of wood 36ft. long, 16ft. wide and 8ft. high, and worth $4 a cord? 18tons—Ans.

9 Find the remainder when 8tons, 3cwt. 3qrs. 22lbs. are divided by 2cwt. 1qr. 18lbs. 1cwt. 16lbs.—Ans.

10 A linen draper bought 66yds. of linen at 22cents a yd., 40yds. at 20cents a yd., 18yds. at 30cents a yd. and 50yds. at 28cents a yd.; for how much a yard must he sell it so as to gain $17.24? 34cents—Ans.

Senior Third Class—15.

1 A man owns 75acres of land worth $50 per acre, 3 horses worth $108 each, and 212bush. of wheat worth $1.10 a bush. He owes one man $426 and another $1009, how much is he worth? $2872.20—Ans.

2 What length of rope will weigh 2tons if 18ft. of it weigh 4lbs.? 18,000ft.—Ans.

3 Find the distance around a field 50rods long and containing 15acres. 196rods—Ans

4 The divisor is 3 times the quotient, which is 232 and the remainder is the greatest whole number possible, find the dividend. 162167—Ans.

5 Divide the continued product of 44, 30, 42 and 100, by 88×60×5. 210—Ans.

6 A workman earns 20cents an hour. he begins work at 7 o'clock in the morning and stops work at 6 o'clock in the evening, taking 1 hour at noon; how much will he earn in a week? $12—Ans.

7 What number must be taken from 39993 so that the remainder may contain 843 twelve times exactly? 29877—Ans.

8 A man has $4805; how often can he give away $321 and have $1916 left? 9times—Ans.

9 Peter had 12cents, John had 18cents, and Thomas had 22cents, they bought 78 marbles with half their money; how many marbles should each get? Peter 18, John 27, Thomas 33—Ans.

10 How many bricks 9in. long, 4in. wide and 3in. thick, in a pile 18ft. long, 9ft. wide and 8ft. high? 20736 bricks—Ans.

11 A stick of timber 20ft. long, 2ft. wide and 2ft. thick weighs 2tons 8cwt.; find the weight of a cubic foot of the timber. 60lbs.—Ans.

12 Find the value of 2tons 3cwt. 18lbs of wheat at $1.20 a bushel. $86.36—Ans.

Senior Third Class—16.

1 A stick is broken into 6 equal parts and 5 of the parts are taken away. What fraction indicates the part of the stick taken away? What fraction indicates the part remaining? $\frac{5}{6}$ and $\frac{1}{6}$—Ans.

2 A part of an apple is indicated by the fraction $\frac{24}{24}$. Into how many parts is the apple supposed to be divided? 24 parts—Ans.

3 What are the terms of a fraction? The numerator and the denominator—Ans.

4 What part of the whole is indicated by a fraction whose denominator is twice its numerator? $\frac{1}{2}$—Ans.

5 The denominators of two fractions are the same, how can you tell which is the greater fraction? The one having the greater numerator isthe greater fraction—Ans.

6 The numerators of two fractions are the same but their denominators are different, which is the greater fraction? The one having the least denominator is the greater fraction—Ans.

7 An appple is divided into 2 equal parts and one of these parts is then subdivided into 3 equal parts. What fraction of the whole will indicate one of these three equal parts? $\frac{1}{6}$—Ans.

8 Reduce 84 to a fraction. $\frac{84}{1}$—Ans.

9 What kind of fractions are the following:
$\frac{2}{5}$; $\frac{5}{4}$; $\frac{3}{4}$ of $\frac{4}{5}$; $\frac{2\frac{1}{4}}{\frac{6}{7}}$; $4\frac{1}{2}$. Proper, improper, compound, complex, mixed—Ans.

10 How much is 8times $\frac{3}{5}$; 12times $\frac{1}{12}$; 9times $\frac{21}{40}$; 26 times $\frac{40}{41}$? $\frac{24}{5}$; $\frac{132}{12}$; $\frac{189}{40}$; $\frac{1040}{41}$—Ans.

11 Divide $\frac{8}{9}$ by 6; $\frac{7}{11}$ by 40; $\frac{84}{100}$ by 10. $\frac{8}{54}$; $4\frac{7}{40}$; $\frac{84}{1000}$—Ans.

12 Find the value of 364bush. of wheat at $\$\frac{7}{8}$ a bush. $318\frac{1}{2}$—Ans.

Senior Third Class—17.

1 Reduce 36 to a fraction having 22 for denominator. $\frac{792}{22}$—Ans.

2 Represent $\frac{413}{7}$ as a mixed number. $59\frac{1}{7}$—Ans.

3 Convert 321 $\frac{404}{505}$ into an improper fraction. $\frac{162502}{505}$—Ans.

4 Simplify $\frac{2\times3\times6\times12\times10}{8\times1\times4\times20\times8}$ $\frac{27}{32}$—Ans.

5 Simplify $\frac{4}{5}$ of $\frac{1}{12}$ of $\frac{18}{24}$ of $\frac{1}{3}$; and $\frac{4}{6}$ of $3\frac{1}{2}$ of $\frac{5}{7}$ of $70\frac{1}{5}$ of $\frac{1}{3\frac{1}{2}}$ of 20. $\frac{1}{6}$ and $6\frac{2}{3}$—Ans.

6 Reduce $\frac{840840}{1081108}$ to its lowest terms. $\frac{7}{9}$—Ans.

7 Reduce $8\frac{4}{5}$ to fifths, $3\frac{7}{10}$ to tenths, $18\frac{4}{7}$ to sevenths. $\frac{44}{5}$, $\frac{37}{10}$, $\frac{130}{7}$—Ans.

8 How much are $\frac{4}{5}$ of 1200, $\frac{3}{7}$ of 2100, $\frac{4}{11}$ of \$9999, and $\frac{4}{15}$ of 3015 tons? 960, 900, \$3639, 804tons—Ans.

9 Find the value of $\frac{2}{3}$ of 132bush. of wheat at 90cents a bush., $\frac{4}{7}$ of 210bush. of oats at 40cents a bush., $\frac{9}{10}$ of 330bush. of barley at 60cents a bush., $\frac{9}{11}$ of 506 bush. of clover seed at \$4.50 a bush., and $\frac{3}{13}$ of 390bush. of timothy seed at \$2.25 a bush. \$2370.90—Ans.

10 How many fifths are equal to 85? $\frac{425}{5}$—Ans.

11 A merchant bought 800bush. of wheat at $\$\frac{7}{8}$ a bush., 700bush. at $\$\frac{6}{7}$ a bush., and sold $\frac{2}{3}$ of it at $\$\frac{4}{5}\frac{9}{0}$ a bush., and the remainder at $\$\frac{4}{5}\frac{7}{0}$ a bush., how much did he gain? $150—Ans.

12 A farmer sold $\frac{3}{5}$ of his farm containing 250acres, at $60 an acre, $\frac{3}{5}$ of the remainder at $70 an acre, and what then remained for $3200; how much an acre did he get for what he sold last? $80—Ans.

13 What fraction of 72 is 31? $\frac{3}{7}\frac{1}{2}$—Ans.

Senior Third Class—18.

1 Reduce $\frac{9}{1\,2}$, $\frac{1\,5}{1\,6}$, $\frac{2\,3}{2\,8}$ to fractions having the least common denominator. $\frac{3\,1\,5}{4\,2\,0}$, $\frac{3\,6\,4}{4\,2\,0}$, $\frac{3\,4\,5}{4\,2\,0}$—Ans.

2 Which is the greatest of the following fractions: $\frac{1\,3}{1\,4}$ $\frac{2\,8}{4\,0}$, $\frac{9\,9}{1\,0\,8}$? $\frac{1\,3}{1\,4}$—Ans.

3 One road is $\frac{3}{8}$ of a league in length, and another is $\frac{1\,1}{1\,2}$ of two miles, which is the longer road? The second—Ans.

4 Edward ate $\frac{2}{3}$ of $\frac{4}{5}$ of $\frac{6}{7}$ of $\frac{1}{1\,2}$ of 3 loaves, Thomas ate $\frac{3}{5}$ of $\frac{1\,0}{1\,1}$ of $\frac{2\,2}{2\,4}$ of 2 loaves, and John ate $\frac{7}{8}$ of $\frac{1}{4}$ of $\frac{6}{1\,4}$ of $3\frac{1}{2}$ loaves, which of the three boys ate the most? Thomas—Ans.

5 Reduce $\frac{4\,3}{5\,0}$, $\frac{2\,9}{3\,0}$, and $\frac{1\,1}{1\,2\,0}$ to equivalent fractions having the same denominator. $\frac{5\,1\,6}{6\,0\,0}$, $\frac{5\,8\,0}{6\,0\,0}$, $\frac{5\,5}{6\,0\,0}$—Ans.

6 Reduce $\frac{1\,1}{3\,4}$, $\frac{1\,9}{3\,4}$, $\frac{2\,1}{3\,4}$ and $\frac{0}{3\,4}$ to equivalent fractions having the same common numerator. $\frac{1\,3\,1\,6\,7}{4\,0\,6\,9\,8}$, $\frac{1\,3\,1\,6\,7}{2\,3\,5\,6\,2}$, $\frac{1\,3\,1\,6\,7}{2\,1\,3\,1\,8}$, $\frac{1\,3\,1\,6\,7}{4\,9\,7\,4\,2}$—Ans.

7 If $\frac{7}{1\,0}$ of a dollar were divided equally among 11 persons, how much would each receive? $\$\frac{7}{1\,1\,0}$—Ans.

8 Which is the greater, $\frac{2}{3}$ of $\frac{4}{5}$ of $\frac{1\,0}{1\,4}$ of a foot or $\frac{4}{5}$ of $\frac{8}{9}$ of $\frac{1\,0}{1\,6}$ of $\frac{1\,8}{2\,2}$ of a yard? The second.

9 A man bought $\frac{3}{4}$ of a pound of butter at 2cents an

ounce, $\frac{7}{8}$ of a pound of tea at 4cents an ounce, $\frac{5}{16}$ of a pound of raisins at 1cent an ounce, and $6\frac{3}{4}$pounds of coffee at 2cents an ounce, and gave in payment a four dollar bill, how much change should he get back? 99 cents—Ans.

10 If $\frac{4}{5}$ of a farm be worth $1600, what is the value of $\frac{7}{8}$ of it? $1750—Ans.

11 A man sold $\frac{2}{3}$ of his farm for $1200, and then $\frac{1}{4}$ of the remainder at the same rate, find the value of what then remained? $450—Ans.

12 A merchant bought a quantity of grain for $999 and sold it for $1099, what fraction of the cost did he gain? $\frac{100}{999}$—Ans.

Senior Third Class—19.

1 Of what number is 35 the $\frac{1}{30}$; of what number is $\frac{32}{51}$ the $\frac{1}{47}$? 1050; $29\frac{25}{51}$—Ans.

2 A workman had $78 and earned $122 more, and then spent $\frac{1}{6}$ of what he had, how much more did he save than spend? $120—Ans.

3 A man can do a piece of work in 30 days, in how many days can he do $\frac{7}{10}$ of the work? 21days—Ans.

4 A boy's age is 15 years, his father's age is $\frac{14}{5}$ of the boy's age, find the sum of their ages. 57years—Ans.

5 Two-thirds of the pupils in a school are boys, and there are 15 girls, how many pupils are there in the school? 45 pupils—Ans.

6 A man bought a horse for $115, a carriage for $14 less than $\frac{4}{5}$ the cost of the horse, and a robe for $\frac{8}{39}$ the cost of the carriage, find the cost of the three. $209—Ans.

7 Thirty-seven is what part of $\frac{3}{4}$ of $1600? $\frac{37}{1200}$—Ans.

8 A drover bought 930sheep at $16 a pair, he sold $\frac{1}{3}$ of them at $9 apiece and half the remainder at $10 apiece, and what remained for $2480, how much did he gain by the transaction? $930—Ans.

9 Reduce $\frac{42}{56}$, $\frac{27}{24}$, $\frac{30}{80}$, $\frac{9}{72}$ and $\frac{112}{176}$ to eighths. $\frac{6}{8}$, $\frac{9}{8}$, $\frac{3}{8}$, $\frac{1}{8}$ and $\frac{5}{8}$—Ans.

10 A boatman can row a mile down stream in $\frac{1}{3}$ of an hour and a mile up stream in $\frac{2}{5}$ of an hour. After rowing down stream for $8\frac{1}{3}$hours, how long will it take him to return to the point from which he started? 10hours—Ans.

11 Thomas gave away 70cents and had $\frac{8}{15}$ of his money left, how much money had he at first? $1.50—Ans.

12 Find the cost of the following articles: 4pounds of tea at $55\frac{1}{2}$cents a pound, 14pounds of butter at $15\frac{3}{7}$cents a pound, 13yards of factory cotton at 11cents a yard, and 18pounds of nails at $3\frac{1}{2}$cents a pound. $6.44—Ans.

Senior Third Class—20.

1 Find the sum of $\frac{4}{5}$, $\frac{7}{20}$, $\frac{3}{16}$, $\frac{2}{15}$, $\frac{1}{10}$ and $\frac{1}{15}$. $1\frac{71}{80}$—Ans.

2 Find the value of $3\frac{1}{3}+4\frac{1}{2}+8\frac{3}{5}-13\frac{7}{8}$. $2\frac{67}{120}$—Ans.

3 A man bought a horse for $98\frac{8}{9}$, a carriage for $104\frac{5}{18}$, and sold both for $221\frac{1}{4}$, how much did he gain? $18\frac{1}{12}$—Ans.

4 One-eighth and $\frac{1}{5}$ of a man's property amount to $3900, find the value of his property. $12000—Ans.

5 Find the result of $(\frac{1}{3}+\frac{1}{2})$ of $(\frac{1}{4}-\frac{1}{5})$ of $(2+1\frac{1}{3})$ of $\frac{1}{2}$ $(5\frac{1}{5}-3\frac{1}{4})$. $\frac{299}{960}$—Ans.

6 A man divided his wealth which amounted to $15000 as follows: He gave $\frac{1}{3}$ to his wife. $\frac{1}{4}$ to his son, and the remainder he divided equally between his two daugh-

ters ; find the share of each and the fraction of the whole received by each daughter? Wife, $5000, son, $3750, daughter, $3125, $\frac{5}{24}$—Ans.

7 John can do a piece of work in 5 days, James can do it in 6 days, and Robert can do it 7 days how much of the work can the 3 do in 1 day? $\frac{107}{210}$—Ans.

8 William's money increased by $\frac{2}{5}$ of his money amounts to $14, how much money has he? $10—Ans.

9 The sum of $\frac{1}{2}$, $\frac{4}{5}$, $\frac{1}{8}$ is what part of $(21\frac{5}{8}-15\frac{7}{16})$ $\frac{38}{165}$—Ans.

10 The divisor is $\frac{1}{3}$ of the quotient and their sum is 4000 and the remainder is 999, find the dividend. 3000999—Ans.

11 Find the cost of fencing a field $326\frac{2}{3}$yds. long and $133\frac{1}{5}$yds. wide at the rate of 5cents a yard. $\$45.98\frac{2}{3}$—Ans.

12 Find the value of 3643ft. of lumber at $1\frac{1}{2}$cents a foot, 734ft. of lumber at $2\frac{1}{4}$cents a foot, 50bunches of lath at $25\frac{1}{2}$cents a bunch, 35bunches of shingles at $\$1.12\frac{1}{2}$ cents a bunch, 44lbs. of nails at $4\frac{1}{2}$cents a lb., and 26lbs. of hinges at $5\frac{1}{2}$cents a lb. $\$123.99\frac{1}{2}$—Ans.

Senior Third Class—21.

1 A captain owned $\frac{7}{10}$ of a vessel, he sold $\frac{4}{5}$ of his share, what part of the ship did he sell? $\frac{14}{25}$—Ans.

2 John's money equals $\frac{3}{4}$ of $\frac{2}{3}$ of $\frac{1}{3}$ of $14000, and $\frac{3}{10}$ of John's money is equal to $\frac{4}{5}$ of William's money; how much money has William? $375—Ans.

3 A father divided $\$13\frac{1}{4}$ among his three sons: he gave $\$3\frac{1}{5}$ to Thomas, $\$4\frac{1}{4}$ to Edwin, and the remainder to Peter, how much did Peter get? $\$5\frac{97}{140}$—Ans.

4 Simplify

(1) $\dfrac{\frac{2}{5} \text{ of } \frac{1}{2} \text{ of } \frac{7}{10}}{3\frac{2}{3} \text{ of } 2\frac{1}{2} \text{ of } 1}$

(2) $\left\{ (2\frac{1}{2}+3\frac{1}{3}) \text{ of } (4\frac{1}{4}-3\frac{1}{3}) \right\}$ of $\frac{4}{5}$

(3) $\dfrac{2\frac{9}{10}}{4\frac{1}{2}}$ of $\dfrac{1-\frac{1}{2}}{2-\frac{1}{4}}$ of $\dfrac{\frac{1}{3}}{\frac{1}{2}}$ $\div$ $\dfrac{3\frac{1}{2}}{4\frac{1}{6}}$ of $\dfrac{1+\frac{1}{2}}{2+\frac{1}{4}}$ of $\dfrac{\frac{1}{2}}{\frac{1}{3}}$

(1) $2\frac{7}{15}$; (2) $4\frac{5}{18}$; (3) $\frac{580}{3969}$—Ans.

5 Simplify the following by cancelling the fractions as they stand: $\dfrac{2\frac{1}{2}}{4\frac{1}{2}}$ of $\frac{9}{13}$ of $\frac{2}{5}$ of $\dfrac{3\frac{1}{3}}{10}$ of $\dfrac{5\frac{1}{2}}{11}$ of $\dfrac{4\frac{1}{4}}{9}$ of $\dfrac{4\frac{1}{2}}{17}$ $\div$ $3\frac{1}{12}$—Ans.

6 If $\frac{3}{5}$ of a yard of cloth cost 30cents, what will $\frac{7}{10}$ of a yard cost? 35cents—Ans.

7 Find the product of $\frac{3}{8}$, $\frac{4}{7}$, $\frac{9}{10}$, $\frac{10}{11}$ and $\frac{7}{16}$. $\frac{27}{352}$—Ans.

8 Divide $\frac{1}{3}$ of $2\frac{1}{2}$ of $\frac{7}{14}$ of 15 by $\frac{1}{3}$ of $\frac{1}{4}$ of $2\frac{1}{3}$. $32\frac{1}{7}$—Ans.

9 A merchant bought 760bush. of wheat at $\$\frac{7}{8}$ a bush., 300bush. at $\$\frac{4}{5}$ a bush., and 570bush. at $\$\frac{2}{3}$ a bush.; he gained $\$200\frac{1}{2}$ by selling half of the wheat; what did he get a bushel for what he sold? $\$1\frac{28}{815}$—Ans.

10 A merchant bought 2500bush. of wheat at $\$1\frac{1}{4}$ a bush., and paid $1\frac{1}{4}$cents a bush. freight; for how much must he sell it so as to gain $500 by the transaction? $3656.25—Ans.

11 The sum of two numbers is 1848, one of the numbers is $\frac{2}{3}$ of the sum; what fraction of 1001 is the other number? $\frac{616}{1001}$—Ans.

Senior Third Class—22.

1 A can do a piece of work in 5hours, B can do it in 6hours, in what time can A and B working together do

it? $2\frac{8}{11}$—Ans.

2 A man can do a piece of work in 11days, after working at it for 6days, what part of the work has he to do? $\frac{5}{11}$—Ans.

3 B can do a certain job in 15days, after working at it for 8days he is joined by A, who can do the work in 14 days; how long will it take the two to finish the job? $3\frac{1}{2}\frac{1}{0}$days—Ans.

4 Divide the sum of $13\frac{1}{3}$ and $18\frac{2}{5}$ by their difference, and to the quotient add $\frac{1}{15}$ of their product. $55\frac{6}{8}\frac{3}{4}\frac{1}{1}\frac{4}{5}$—Ans.

5 Find the greatest common measure of $\frac{2}{3}\frac{4}{0}$, $\frac{3}{3}\frac{0}{2}$ and $\frac{6}{7}\frac{0}{2}$. $\frac{6}{1}\frac{}{4}\frac{}{4}\frac{}{0}$—Ans.

6 Find the least common multiple of $\frac{1}{4}\frac{8}{0}$, $\frac{1}{1}\frac{2}{6}$, and $\frac{3}{8}\frac{1}{8}$. $11\frac{1}{8}\frac{6}{}$—Ans.

7 If $\frac{1}{3}$ of a bushel of wheat and $\frac{1}{5}$ of a bushel of oats are worth 60cents, what is the value of 18bush. of wheat and 18bush. of oats? $32.40—Ans.

8 A cubic foot of water weighs $62\frac{1}{2}$lbs.; find the weight of thewater in a cistern 10ft. long, 9ft. wide and 12ft. deep when the cistern is half full of water? 33750 lbs.—Ans.

9 A had $30\frac{1}{3}$, he bought $12\frac{1}{2}$yds. of cloth at $35\frac{1}{3}$cents a yard, $4\frac{1}{5}$yds. of cloth at 20cents a yard, and gave $\frac{2}{3}$ of $\frac{1}{4}$ of the remainder of his money to B, how much did B get? $4.17\frac{7}{1}\frac{}{8}$—Ans.

10 A and B together can do a piece of work in 20 days; A can do the work in 35 days; in what time can B do it? $46\frac{2}{3}$days—Ans.

11 How many fields $20\frac{1}{3}$chains long and $5\frac{1}{2}$chains wide are equal to a field $40\frac{1}{3}$chains long and $30\frac{1}{2}$chains wide? 11 fields—Ans.

12 Two men are 450miles apart, and approach each other, one travelling at the rate of $33\frac{1}{3}$miles a day, and the other at the rate of $26\frac{2}{3}$miles a day; in what time will the distance between them be reduced $\frac{1}{3}$? $2\frac{18}{35}\frac{2}{9}$ days—Ans.

13 A had $150 and gave away $\frac{1}{3}$ of his money, and then $\frac{2}{5}$ of it; how much had he left? $40—Ans.

Senior Third Class—23.

1 The divisor is 315, the quotient is $\frac{2}{3}$ of the divisor and the remainder is $\frac{1}{5}$ of the quotient, find the dividend. 66192—Ans.

2 The sum of the divisor, quotient and remainder is 110, the quotient is $\frac{5}{11}$ of the divisor, and the remainder is $1\frac{1}{5}$ times the quotient; find the dividend. 1405—Ans.

3 There are two numbers whose sum is $1\frac{7}{20}$ and whose difference is $\frac{3}{20}$, what are the numbers? $\frac{3}{4}$ and $\frac{3}{5}$—Ans.

4 The fore and hind wheels of a carriage are $13\frac{5}{16}$ft. and $15\frac{5}{8}$ft. in circumference. What distance must the carriage move in order to bring the wheels to the same relative position as at starting? $3328\frac{1}{8}$ft.—Ans.

5 A man at his death left his wife $6000, which was $\frac{5}{12}$ of his estate; she at her death left $\frac{1}{3}$ of $\frac{3}{4}$ of her share to her daughter; what part of the father's estate did the daughter receive? $\frac{5}{48}$—Ans.

6 A farmer sold $\frac{1}{3}$ of $\frac{3}{5}$ of his farm for $2500, how much was $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{3}{5}$ of the farm worth? $3750—Ans.

7 Two men were $85\frac{2}{3}$ miles apart and travelled toward each other. when they met one had travelled $9\frac{3}{6}$miles more than the other, how far did each man travel? $47\frac{1}{30}$miles and $38\frac{1}{30}$miles—Ans.

8 Simplify $\cfrac{3}{4+\cfrac{1}{2+\cfrac{3}{5-\frac{1}{3}}}}$ $\frac{37}{54}$—Ans.

9 Find the values of (1) $\frac{2}{3}$ of $\frac{6}{7}$ of 14ac. 2roods 18per

(2) $\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{8}{11}$ of $\$\frac{4}{5}$.

(3) $\frac{7}{10}$ of $\frac{20}{21}$ of $\frac{\frac{1}{3} \text{ of } \frac{1}{2}}{\frac{4}{5} \text{ of } \frac{3}{8}}$ of $\frac{\$3051}{\$15}$

(1) 8ac. 1rood 16per. (2) $\$1\frac{2}{5}$ (3) $744\frac{4}{9}$times—Ans.

10 Reduce 3fur. 30per. to the fraction of 2miles 1fur. 18per. $\frac{75}{344}$—Ans.

11 A and B can do a piece of work in 12days which B by himself could do in 25days; in what time could A do it by himself? $23\frac{1}{13}$days.—Ans.

12 One hour is what fraction of 1week 3days 16hours? $\frac{1}{256}$—Ans.

Senior Third Class—24

1 Divide $\frac{1}{3}$ of $\frac{6}{7}$ of $\frac{14}{15}$ of $\frac{30}{36}$ by $\frac{1}{2}$ of $\frac{2\frac{1}{2}}{5}$ of $\frac{1\frac{1}{2}}{3}$ of $\frac{1\frac{1}{4}}{17}$ of $\frac{1}{3}$

$21\frac{1}{3}$—Ans.

2 What part of a farm worth $5500 is worth as much as $\frac{2}{3}$ of $\frac{4}{5}$ of $\frac{15}{16}$ of a farm worth $3400? $\frac{17}{55}$—Ans.

3 Fifteen men and 18 boys can do a piece of work in 9days, in what time will 5 men and 6 boys do $\frac{2}{3}$ of the work? 18days.—Ans.

4 A drover bought 36cows at $50 a head and sold $\frac{1}{6}$ of them at a gain of $6 a head, and $\frac{4}{5}$ of the remainder at a gain of $7 a head, for how much a head must he sell the remainder so as to receive $2032 for the whole? $56—Ans.

5 If $\frac{2}{3}$bushel of wheat cost $\$\frac{3}{4}$, and $\$\frac{3}{4}$ buy 2bushels of oats, what is the value of 136bushels of wheat and 120 bushels of oats? $198—Ans.

6 A man earns 3times as much as a boy, how many

days must 33 men work to earn as much as 15 boys will earn in 2days? $\frac{10}{33}$day—Ans.

7 A man digs a ditch at the rate of $3\frac{1}{2}$rods for 21cents, how long will it take him to earn $\$20\frac{2}{5}$ if he digs 10rods a day? 34days.

8 A farmer sold 88bush. of wheat at $\$1\frac{1}{4}$ a bushel, $32\frac{1}{3}$bush. of oats at 33cents a bushel, 40bush. of barley at $\$\frac{3}{4}$ a bushel, and bought a plough for $\$24\frac{1}{4}$, 3bush. of clover seed at $\$5\frac{1}{3}$ a bushel, 7lbs. of tea at 70cents a lb, and 12yds. of cloth at $22\frac{1}{2}$cents a yd., how much money had he left? $\$102.82$—Ans.

9 How many times is $\frac{1}{2}$ of $\frac{3}{5}$ of $\frac{10}{12}$ of 8tons 2cwt. contained in $\frac{3}{4}$ of $\frac{6}{8}$ of 20tons 12cwt.? $5\frac{13}{18}$times—Ans.

10 Divide $3800 between A and B so that A may get $\$\frac{2}{3}$ as often as B gets $\$\frac{3}{5}$. A $2000, B $1800—Ans.

Senior Third Class—25.

1 What fraction of $2 are $33\frac{1}{3}$cents? $\frac{1}{6}$—Ans.

2 A man paid $260 for a horse and carriage, for the horse he gave $3\frac{1}{3}$times as much as for the carriage, how much did he give for each? $200 for horse, $60 for carriage—Ans.

3 Find the value of $\frac{32\frac{1}{2}}{4\frac{4}{5}}$ of $\frac{\frac{4}{5}\text{ of }9\frac{1}{9}\times 3\frac{1}{3}\text{ of }\frac{3}{5}}{\frac{3}{5}\text{ of }6\frac{1}{2}\times 3\frac{1}{2}\text{ of }9\frac{1}{9}} \div \frac{2\frac{1}{2}}{5}$

$1\frac{37}{63}$—Ans.

4 Find the sum of $\frac{1}{3}$ of $\frac{3}{4}$ of a week, $\frac{1}{2}$ of $\frac{2}{3}$ of a day, $\frac{4}{5}$ of $\frac{5}{8}$ of an hour, and $\frac{3}{5}$ of $\frac{10}{11}$ of $\frac{22}{25}$ of a minute. 2 days 2hrs. $30\frac{2}{25}$min.—Ans.

5 A can row $3\frac{1}{13}$miles down a river in an hour, B can row $2\frac{7}{11}$miles up the river in an hour. They start from the same point and row in opposite directions, A down the stream and B up the stream, how far apart will they

be at the end of 3hours? $19\frac{64}{143}$miles—Ans.

6 The product of three numbers is $\frac{8}{165}$, the product of the first and second is $\frac{2}{15}$, the product of the first and third is $\frac{4}{33}$, find the three numbers. $\frac{1}{3}$, $\frac{2}{5}$, $\frac{4}{11}$—Ans.

7 The sum of three consecutive numbers is 981, find the numbers. 326, 327, 328—Ans.

8 If $9\frac{3}{4}$acres of land cost $\$512\frac{3}{4}$, how many acres can be bought for $\$236\frac{4}{5}$? $4\frac{51}{102}\frac{56}{55}$—Ans.

9 Two men start from the same place and walk in opposite directions, the one travelling at the rate of $3\frac{1}{3}$ miles an hour, and the other at the rate of $3\frac{3}{8}$miles an hour, in how many hours will they be $86\frac{1}{12}$miles apart? $12\frac{54}{161}$hrs.—Ans.

10 A grocer bought 360lbs. of tea, and sold $\frac{1}{3}$ of it at a gain of 10cents a lb., and the remainder at a gain of 15cents a lb., his gain was $\frac{4}{15}$ of the cost, find the cost. $180—Ans.

11 A man bought a farm $25\frac{1}{5}$chains long and $18\frac{3}{4}$ chains wide at $\$62\frac{1}{3}$ per acre, find the cost. $\$2945\frac{1}{4}$—Ans.

Senior Third Class—26

1 What number is that whose $\frac{1}{5}$ being taken from its $\frac{1}{3}$, the remainder will be 1 greater than $\frac{1}{9}$ of the number. 45—Ans.

2 A mast stands $\frac{1}{6}$ in the ground, $\frac{1}{5}$ in the water, and 38ft. above the water, find the length of the mast. 60ft. —Ans.

3 A man performed $\frac{1}{3}$ of a journey on Monday, $\frac{2}{5}$ of it on Tuesday, and finished it on Wednesday by travelling 46miles, find the length of the journey. $172\frac{1}{2}$miles —Ans.

4 A person after spending $20 more than $\frac{1}{6}$ of his mo-

ney, had $10 less than $\frac{3}{4}$ of it left. How much money had he? $120—Ans.

5 A owns $\frac{4}{7}$ of a farm worth $21000, B owns $\frac{7}{9}$ of a farm worth $18000. They exchange farms, how much money must A pay to B? $2000.

6 Find the footing of the following bill:

Toronto, April 27th, 1882.

Mr. John Brown

Bought of Wm. Boyd & Co.

15 lbs. tea	at $	.62½
12½ lbs. coffee	at	.25
14 lbs. currants	at	.10½
12½ lbs. raisins	at	.12½
24 lbs. rice	at	.05
18 lbs. sugar	at	.12½
8½ lbs. barley	at	.04

Received payment.

WM. BOYD & Co.

$19.32¼—Ans.

7 Divide $400 among 4 boys and 5 girls, giving to each girl $\frac{4}{5}$ as much as to each boy. How much does each boy and girl respectively receive? Boy, $50; girl, $40—Ans.

8 A boy is 16years old, in how many years will his age be $3\frac{3}{4}$ times what it is now? 44years—Ans.

9 What is the value of $5\frac{2}{5}$acres of land when $3\frac{1}{3}$acres are worth $180. 291\frac{3}{5}$—Ans.

Senior Third Class—27.

1 A man spent $\frac{2}{5}$ of his money in buying a farm, $\frac{1}{3}$ of the remainder in buying stock and implements, and had still $1500 left, how much money had he at first? $3750 —Ans.

2 What part of $\frac{4}{5}$ is $\frac{7}{10}$? What part of $\frac{2}{3}$ of $\frac{9}{10}$ is

the product of $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$? $\frac{1}{8}$; $\frac{5}{12}$—Ans.

3 The divisor and quotient are the same and the remainder is 5, which is $\frac{1}{4}$ of the divisor, find the dividend. $1230—Ans.

4 Find the average of the four following numbers: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$. $\frac{77}{240}$—Ans.

5 A man bought a number of sheep at the rate of 32 for $200, and sold them at the rate of 17 for $114\frac{3}{4}$, how much did he gain on each sheep? 50cents—Ans.

6 Simplify the following:

(1) $\dfrac{6667\frac{2}{3}}{8571\frac{3}{4}}$ of $\dfrac{3561\frac{1}{4}+613\frac{6}{14}}{267\frac{3}{4}\div 12\frac{3}{4}}$ of $\dfrac{3}{2000}$

(2) $\left(\dfrac{\frac{6}{7}\text{ of }2\frac{1}{3}}{4\frac{1}{2}\text{ of }\frac{4}{9}} \div \dfrac{1\frac{1}{3}\times 6\frac{3}{4}}{9\frac{1}{11}\times 1\frac{21}{100}}\right) \div \left(\dfrac{\frac{1}{5}}{\frac{3}{15}\text{ of }\frac{1}{8}}\right)$

(1) $\frac{1}{18}$; (2) $1\frac{5}{6}$—Ans.

7 How many books at $33\frac{1}{3}$cents each should be given in exchange for 90lbs. of tea at 50cents per lb.? 135 books—Ans.

8 A can do $\frac{1}{4}$ of a piece of work in 3days, B can do $\frac{1}{3}$ of it in 4days, C can do $\frac{2}{3}$ of it in 6days, and D can do $\frac{1}{5}$ of it in 2days; how long will it take them all to do it? $2\frac{11}{17}$days—Ans.

9 A man bought 300 acres of land at $60 an acre and sold $\frac{1}{5}$ of it at a gain of $10 an acre, $\frac{1}{3}$ of it at $\frac{1}{3}$ more an acre than it cost him, and the remainder at a loss of $\frac{1}{10}$ the cost; how much did he gain or lose by the transaction? Gained $1760—Ans.

10 Divide the product of the sum and difference of $\frac{1}{3}$ and $\frac{1}{4}$ by $\frac{1}{3}$ of $\frac{2}{5}$ of $\frac{15}{16}$, and to the quotient add $1-(\frac{1}{3}-\frac{1}{6})$ $1\frac{2}{3}$—Ans.

Senior Third Class—28.

1 How many acres in a field $26\frac{2}{3}$chains long and $256\frac{4}{5}$ yards wide? $31\frac{7}{15}$acres—Ans.

2 Find the cost of carpeting a room $16\frac{2}{3}$ft. long and $14\frac{3}{4}$ft. wide with carpet $\frac{3}{5}$ of a yard wide and worth $\$\frac{3}{5}\frac{7}{0}$ per yd. $\$20\frac{5}{6}$—Ans.

3 How many feet of inch lumber in a solid pile 16ft. long, 8ft. wide and 6ft. high? 9216ft.—Ans.

4 A stick of timber is 36ft. long, 24in. wide and 18in. thick, a piece containing 42 cubic feet is cut off, what part of the stick remains? $\frac{11}{18}$—Ans.

5 A field is 12chains long and 8chains wide; a fence is run across at a distance of 16rods from one end; what part of the field is cut off? $\frac{1}{3}$—Ans.

6 What part of a day is 1hr. 36min. 54sec.? $\frac{3\,2\,3}{4\,8\,0\,0}$—Ans.

7 How many thirds of $6\frac{1}{5}$ is $\frac{3}{5}$ of 10? $2\frac{2}{3}\frac{8}{1}$—Ans.

8 A cistern has 4 pipes in it, by the first of which $\frac{1}{3}$ of it could be filled in 12hours, by the second it could be filled in 24hours, by the third it could be emptied in 40 hours, and by the fourth $\frac{1}{10}$ of it could be emptied in 4 hours. In what time will it be filled if all of them are opened together? $51\frac{3}{4}$hours—Ans.

9 A can do as much work in $\frac{1}{4}$ of an hour as B can do in $\frac{1}{2}$ an hour; together they take 6hours to do a piece of work; in how many hours would A alone have done it? 9hours—Ans.

10 A man bought a watch and chain, for the watch he gave \$10 more than $\frac{4}{5}$ of the cost of the chain, and $\frac{2\,1}{5\,2}$ of $\frac{2\,2}{6\,3}$ of the chain cost \$7, find the cost of watch and chain? Watch, \$38; chain, \$21.

11 A farmer after selling a part of his farm for \$500,

finds that $\frac{1}{10}$ of the remainder is equal to $\frac{1}{5}$ of the part sold, find the value of his farm at first. $1500.

12 A man bought a horse and carriage for $200, he gave $\frac{3}{11}$ as much for the carriage as for the horse, find the cost of each? Horse, 157\frac{1}{7}$; carriage, 42\frac{6}{7}$—Ans.

Senior Third Class—29.

1 The water in a cistern 8ft. long, 6ft. wide and 16ft. deep, is $4\frac{1}{2}$ft. deep, what part of the cistern is empty? $\frac{23}{32}$—Ans.

2 Reduce $\frac{4\frac{1}{2}}{9}$ of $\frac{2\frac{1}{3}}{7}$ of $\frac{9}{3\frac{1}{3}}$ of $\frac{1}{7}$ of 4acres 3roods to the fraction of $\frac{3}{4}$ of $\frac{\frac{1}{2}}{\frac{1}{3}}$ of $\frac{2\frac{1}{2}}{5}$ of $\frac{1}{2}$ of 82ac. 2roods. $\frac{76}{5775}$—Ans.

3 The sum of the quotient and divisor is 680, the divisor is $\frac{2}{8}$ of the quotient and the remainder is the greatest possible whole number, find the dividend. 115559—Ans.

4 Find the value of the following articles: $3\frac{1}{2}$cords of wood at 3\frac{1}{2}$ a cord, 9barrels of flour at 7\frac{1}{2}$ a barrel, 25bus. of wheat at 1\frac{1}{5}$ a bush., 20bush. of potatoes at $62\frac{1}{2}$cents a bush., 18yds. of silk at $98\frac{1}{2}$cents a yd., 18yds. of print at $13\frac{1}{2}$cents a yd., 14lbs. of tea at $33\frac{1}{3}$cents a lb., 22lbs. of coffee at $31\frac{1}{4}$cents a lb., 90books at 5cents each, and 12quires of paper at $12\frac{1}{2}$cents a quire. 159.95\frac{1}{6}$—Ans.

5 A man earns $11\frac{3}{4}$ a week and his expenses are $12\frac{1}{3}$ a month, how much can he save in 12years? $5556—Ans.

6 A man sold $\frac{3}{5}$ of his share of a mine for $12,000, then $\frac{1}{3}$ of the remainder at the same rate; find the value of what then remained. 5333\frac{1}{3}$—Ans.

7 An island is 60 miles in circumference; A, B, C and D walk round it. A walks at the rate of 9miles in 3 hours, B at the rate of 1mile in half an hour, C at the rate of 4miles an hour, and D at the rate of $2\frac{1}{2}$miles in half an hour. How long must they travel till they all come together again? 60hours—Ans.

8 Simplify

$$\frac{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{\frac{1}{5}+\frac{1}{6}+\frac{1}{7}} \text{ of } \frac{\frac{1}{8}+\frac{1}{9}+\frac{1}{10}}{\frac{1}{11}+\frac{1}{12}+\frac{1}{13}} \text{ of } \frac{1-\frac{1}{2}-\frac{1}{4}}{1-(\frac{1}{2}-\frac{1}{4})}$$

$\frac{15}{16}\frac{7}{6}\frac{4}{0}\frac{5}{2}\frac{7}{1}\frac{3}{2}$—Ans.

9 What part of a cord is a stick of wood 4ft. long, 12in. wide and 9in. thick? $\frac{3}{128}$—Ans.

10 Three-fifths of the sum of two numbers is 33, their difference is 15, find the numbers. 35 and 20—Ans.

Senior Third Class—30.

1 Find the value of $\frac{1}{3}$ of a guinea$+\frac{1}{4}$ of a sovereign $+\frac{1}{3}$ of $\frac{1}{4}$ of £2$+\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of 1s. 9d. 15s. 7d—Ans.

2 Divide $12000 among A, B and C, so that A may get $\frac{1}{3}$ of the money, B $\frac{1}{4}$ of the remainder, and C what then remains. A, $4000, B, $2000, C $6000—Ans.

3 What number multiplied by $2\frac{1}{3}$ will give the same product as 980 multiplied by $4\frac{1}{4}$? 1785—Ans.

4 Simplify

$$\frac{\text{£40 16s. 8d.}}{8} \times \frac{\text{£32 6s. 4}\frac{1}{2}\text{d.}}{\text{£16 3s. 2}\frac{1}{4}\text{d.}}$$

£10 4s. 2d—Ans.

5 A man had 5 fields, the first was 8chains long and $7\frac{1}{2}$chains wide, the second was 80rods long and 55rods wide, the third was 9chains 50links long and 30rods wide, the fourth was 360yds. long and 121yds. wide, and

the fifth contained 13ac. 2 roods, how much land had he? 63ac. 2sq. rods—Ans.

6 A cellar is 36ft. long, 24ft. wide and 2½ft. deep, how many cubic feet must be dug out to make it 6ft. deep? 3024cubic ft.—Ans.

7 Edward Thorn bought of James Smith the following goods: 18yds. of silk at 82½cents a yd., 8yds. of broadcloth at $3.20 a yd., 10yds. of linen at 18cents a yd., 36 yds. of print at 14cents a yd., 22yds. of factory cotton at 12½cents a yd.; how much money should Edward Thorn pay to James Smith? $53.24—Ans.

8 Find the value of a solid pile of lumber 14ft. long, 10ft. wide and 10ft. high, at $14 per M. $235.20—Ans.

9 If 83⅓bush. of oats are worth $35, what part of a bushel can be bought for 7cents? $\frac{10}{62}\frac{4}{5}$—Ans.

10 Reduce 9tons 15cwt. to the fraction of 30tons, and divide the result by the sum of ½ of ⅔ and ¾ of $\frac{8}{9}$ $\frac{13}{40}$—Ans.

11 A can do a piece of work in 3days, A and B in 2½ days, B and C in 3 days, in what time can A, B and C together do it? 1½days—Ans.

12 A merchant bought 18chests of tea, each containing 85lbs. He paid 35 cents per lb. for 8chests, and 40 cents per lb. for the remainder. How much will he gain by selling half of it at 50cents a lb., and the other half at 55cents a lb.? $225.25—Ans.

Senior Third Class—31.

1 What fraction of 20lbs. avoirdupois are 20lbs. troy? $\frac{144}{175}$—Ans.

2 Reduce ½ of ⅘ of 10ac. 1rood 10per. to the fraction of $\frac{1}{7}$ of $\frac{10}{12}$ of 1 square mile. $\frac{33}{2560}$—Ans.

3 The quotient is ¼ of the divisor, the remainder is 3

times the quotient, and the sum of the three is 495, find the dividend. 14310—Ans.

4 There are 40 men and 24 boys working in a certain factory. Each man receives 20cents and each boy 10 cents an hour; they work 10hours a day and 6days in the week; what will their wages amount to in 15weeks? $9360—Ans.

5 How many times $\frac{1}{3}$ of $\frac{2}{3}$ of $(\frac{1}{2}+\frac{1}{5}+2\frac{1}{2}-\frac{1}{6})$ is $\frac{2}{3}$ of $\frac{1}{3}$ of $\frac{4}{5}$ of $\frac{7}{8}$ of $(\frac{1}{2}+\frac{1}{5}+2\frac{1}{2}-\frac{1}{6})$? $\frac{7}{10}$times—Ans.

6 What is the difference between $\frac{3}{11}$ of $\frac{2}{3}\frac{2}{7}$ of $(\frac{3}{5}+\frac{1}{10}-\frac{1}{20}+\frac{1}{8}$ of $\frac{16}{40})$ and $\frac{4}{5}$ of $\frac{21}{8}$ of $\frac{8}{11}$ of $\frac{33}{40}$ of $(\frac{3}{5}+\frac{1}{10}-\frac{1}{20}+\frac{1}{8}$ of $\frac{16}{40})$? $\frac{21}{1800}$—Ans.

7 Find the cost of a field 20chains long and 12chains wide at the rate of $3\frac{1}{2}$acres for $140? $960—Ans.

8 Four men bought a farm for $36000. The first paid $\frac{1}{3}$ of the money, the second $\frac{1}{5}$ of it, the third paid $5 as often as the fourth paid $4; how much did each pay? First. $4500; second, $7200; third, $13500; fourth, $10800—Ans.

9 Make out a bill of the following: May 3rd, 1883—Jno. Smith bought of Adam Bean, $86\frac{1}{2}$yds. of linen at 14 cents a yd., 36yds. of print at 13cents a yd., $32\frac{1}{2}$yds. of factory cotton at 12cents a yd. May 5—John Smith bought of Adam Bean, 14lbs. of tea at 60cents a lb., 18 lbs. of coffee at 35cents a lb, and 83lbs. of pork at 11 cents a lb. $42.77—Ans.

10 Find the cost of carpeting a room 14ft. 6in. long, 12ft. 8in. wide, with carpet 26in. wide and worth $1 a yd. $28\frac{19}{39}$—Ans.

11 How many acres in a field 36chains 40links long and 30chains 50links wide. $111\frac{1}{50}$ac.—Ans.

12 How many sheep, worth $6 each, should be given

in exchange for 360bush. of wheat worth $\$\frac{6}{5}$ per bush.? 72sheep—Ans.

Senior Third Class—32.

1 Simplify—

(1) $\frac{2}{7}+\frac{1}{2}-(\frac{1}{3}$ of $\frac{1}{5}\div\frac{1}{10})+\frac{9}{10}\div\frac{2}{3}$ of $\frac{6}{7}$.

(2) $\frac{2}{7}+\frac{1}{2}-(\frac{1}{3}\times\frac{1}{5}\div\frac{1}{10})+\frac{9}{10}\div\frac{2}{3}\times\frac{6}{7}$.

(3) $\frac{4}{5}+\frac{3}{8}+\frac{1}{2}-\frac{4}{5}\times(\frac{3}{8}+\frac{1}{2}+2\frac{1}{5}$ of $\frac{3\frac{1}{3}}{10}$

(1) $1\frac{5}{84}\frac{3}{0}$; (2) $1\frac{29}{105}$; (3) $\frac{4}{15}$—Ans.

2 A man is $\frac{5}{3}$ as old as he was 20years ago, how old is he? 50years—Ans.

3 How many newspapers at 5cents each must a newsboy sell to make a gain of $15, his profit being $\frac{1}{10}$ of the selling price? 3000—Ans.

4 Find the cost of plastering a room 16ft. long, 12ft. wide and 10ft. high, at 6cents per sq. yd. $5.01\frac{1}{3}$—Ans.

5 A merchant going into a wholesale store to purchase goods to the amount $3500. He bought 120 pieces of calicoes, each containing 30yds., at 12cents a yd., 60yds. of broadcloth at $3.50 a yd., 15 pieces of silk each containing 20 yds., at 90cents a yd., 80 pieces of sheeting each containing 30yds., at 7cents a yd., 210 pieces of muslins each containing 22yds., at 20cents a yd.: how much money had he left? $1496—Ans.

6 If $\frac{4}{7}$ of $\frac{14}{15}$ of $3\frac{3}{4}$ times 8 be divided by $\frac{2}{3}$, the quotient multiplied by $\frac{4}{5}$ of $4\frac{1}{2}$, the product increased by $6\frac{14}{27}$, and the sum diminished by $\frac{3}{4}$ of itself, what will the remainder be? 4—Ans.

7 When flour is worth $\$5\frac{1}{5}$ per barrel, how many barrels should be given in exchange for 26barrels of pork worth 12cents per lb.? 120barrels—Ans.

8 A man's income is $\$82\frac{3}{4}$ a month; he pays $\$6\frac{1}{6}$ a

a month rent, $\$10\frac{1}{2}$ taxes yearly, $\$65\frac{1}{4}$ half-yearly for clothes, $\$5\frac{1}{2}$ a week for provisions, and his other expenses amount to $\$88\frac{1}{8}$ yearly, how much can he save in $3\frac{1}{3}$ years? $1346.25—Ans.

9 Find the value of the following property: $96\frac{1}{2}$acres of land at $40 per acre, 18 town lots at $90 each, 3 horses at $110 each, 320bushels of oats at $\$\frac{2}{5}$ per bush., 46bush. of wheat at $\$\frac{3}{4}$ per bush., and 98bush. of potatoes at $\$\frac{3}{4}$ per bush. $6069—Ans.

10 If $\frac{9}{10}$ of $4\frac{1}{4}$acres of land cost $160, what will $\frac{3}{4}$ of $\frac{2}{3}$ of 90acres cost? $\$188\frac{6}{17}$—Ans.

Senior Third Class—33

1 A, B and C can do a piece of work in 8days, A can do $\frac{1}{20}$ of it in 1day, B can do $\frac{1}{15}$ of it in 2days; in what time can C do it? 24days—Ans.

2 Simplify—

(1) $\frac{14}{15}\times\frac{3}{8}+1\frac{1}{2}-\frac{4}{5}$ of $\frac{10}{12}+(\frac{1}{2}+\frac{1}{3})\div\frac{6}{7}$ of $\frac{14}{15}$

(2) $\frac{3}{5}$ of $\frac{1}{4}\times\frac{1}{8}$ of $\frac{16}{20}+\frac{1}{3}$ of $\frac{6}{7}\div\frac{3}{5}$ of $\frac{1}{2}$,

(1) $1\frac{77}{120}$; (2) $\frac{4063}{4000}$—Ans.

3 Find the amount of the following bill of goods:

29yds. of silk at 1.04\frac{1}{2}$ per yd.
35bush. 10lbs. of wheat at $1.40 per bush.
950lbs. of flour at $3 per cwt.
26acres of land at 32\frac{1}{2}$ per acre.
24tons 15cwt. of coal at 30cents per cwt.
22cords of wood at $4.20 per cord.

$1171.93\frac{5}{6}$—Ans.

4 A can do a piece of work in $2\frac{1}{2}$days, B in 3days and C in $3\frac{1}{2}$days. They begin together at the work, A leaves off at the end of the first half day and B leaves off at the end of the first day, how long will C have to work alone to finish the remainder of the work? $\frac{19}{30}$days —Ans.

5 Multiply the g. c. m. of $\frac{8}{10}$, $\frac{12}{15}$, $\frac{20}{24}$ and $\frac{30}{36}$ by the l. c. m. of $\frac{1}{12}$, $\frac{2}{3}$, $\frac{8}{9}$ and $\frac{12}{15}$. $\frac{2}{1080}$—Ans.

6 A man buys eggs at the rate of 3 for 5cents and sells them at the rate of 5 for 9½cents, how much does he gain per dozen? 2½cents—Ans.

7 Two-sevenths of a post is in the ground and $\frac{2}{5}$ of the part above ground is 9ft., find the length of the post. $18\frac{9}{10}$ft.—Ans.

8 Reduce $\frac{8}{10}$, $\frac{12}{18}$ and $\frac{30}{21}$ to equivalent fractions having a common numerator. $\frac{180}{200}$, $\frac{180}{225}$, $\frac{180}{189}$—Ans.

9 Reduce $\frac{3}{5}$, $\frac{3}{4}$, $\frac{3}{20}$ and $\frac{3}{24}$ to equivalent fractions having a common denominator. $\frac{72}{120}$, $\frac{90}{120}$, $\frac{18}{120}$, $\frac{15}{120}$—Ans.

10 Six men or 8 boys can do a piece of work in 100 days, how long will it take 12 men and 10 boys to do 3½ times as much work? $107\frac{2}{13}$days—Ans.

11 Fifteen cords of wood cost $48\frac{2}{3}$, find the cost of 36½cords. $118\frac{2}{4}\frac{2}{5}$—Ans.

Senior Third Class—34.

1 The sum of the terms of a fraction is 46 and the fraction is equal to $\frac{1}{3}$, find the fraction. $\frac{11\frac{1}{2}}{34\frac{1}{2}}$—Ans.

2 A freeholder paid a tax of 2½mills in the dollar on property assessed at $4350, find the amount of his taxes. $9.57—Ans.

3 Reduce $\frac{3}{5}$ of $\frac{5}{7}$ of 10guineas to the fraction of $\frac{1}{2}$ of $\frac{4}{5}$ of 20pounds. $\frac{9}{16}$—Ans.

4 A man divided $1900 among his 3 sons, so that $\frac{1}{4}$ the share of the first was equal to $\frac{3}{4}$ the share of the second, and $\frac{1}{2}$ the share of the first was equal to twice the share of the third; find the several shares. 1st, $1200; 2nd, $400; 3rd, $300—Ans.

5 A farmer owned a farm 220rods long and 85rods wide, and sold 9ac. 2roods of it; what fraction of the whole did he sell? $\frac{76}{935}$—Ans.

6 Find the value of 30horses at \$111$\frac{1}{2}$, 16cows at \$32$\frac{1}{3}$, 120sheep at \$7$\frac{1}{4}$, 90ac. 2roods of land at \$40 per acre, 46bush. 15lbs. of wheat at \$1.18 per bush., 16bush, 17lbs. of oats at 41cents per bush., and 71bush. 20lbs. of peas at 66cents per bush. \$8460.75$\frac{1}{3}$—Ans.

7 Simplify—

(1) $\dfrac{3\frac{1}{2}}{\frac{1}{3}\text{ of }\frac{1}{6}} \div \dfrac{\frac{2}{3}}{\frac{1}{4}} \text{ of } \dfrac{\frac{3}{5}}{2\frac{1}{2}} \times \dfrac{\frac{1}{9}}{\frac{1}{2}}$

$\dfrac{\quad}{\frac{6}{8}} \qquad 2\frac{1}{2}.$

(2) $\dfrac{\frac{1}{2}\text{ of }\frac{1}{4}\text{ of }\frac{8}{9}\text{ of }\frac{1}{10}}{\frac{3}{5}\text{ of }\frac{2}{8}\text{ of }\frac{1}{3}\text{ of }\frac{9}{12}} \text{ of } \dfrac{3\div 2+\frac{1}{2}\div\frac{1}{4}}{5\div 2\frac{1}{2}+10\div 5\frac{1}{2}}.$

(3) $8+\cfrac{3}{5+\cfrac{1}{3+\cfrac{1}{4+\frac{1}{2}}}}.$

(1) $72\frac{1}{12}$; (2) $\frac{22}{81}$; (3) $8\frac{87}{154}$—Ans.

8 Eighteen bushels of oats are worth as much as 6 bushels of wheat and 56bushels of oats and 56bushels of wheat are worth \$67.20; find the value of a bushel of wheat. 90cents—Ans.

9 Two men are 365miles apart and are travelling toward each other, one at the rate of 6$\frac{1}{3}$miles an hour and the other at the rate of 25miles in 4hours; in how many hours will the distance between them be reduced one-half? $14\frac{76}{151}$hours—Ans.

10 Reduce 399lbs. troy to the fraction of 798lbs. avoirdupois. $\frac{12}{175}$—Ans.

11 Find the value of a pile of cordwood 36feet long, $9\frac{1}{2}$feet wide, $3\frac{1}{2}$feet high, and worth \$4 per cord. $\$37\frac{1}{2}\frac{3}{2}$—Ans

Senior Third Class—35.

1 The cost of a horse and carriage is \$270, the cost of the horse is $\frac{5}{4}$ the cost of the carriage; find the cost of the carriage. \$120—Ans.

2 A farmer sold $8\frac{2}{5}$bush. of wheat at $\$\frac{7}{8}$ per bush, and $16\frac{1}{4}$bush. of potatoes at $\$\frac{2}{5}$ per bush., and bought clover seed at $\$1\frac{6}{3}$ per bush. with the money; how many bushels of clover seed did he buy? $2\frac{1}{3}\frac{1}{2}\frac{1}{0}$bush.—Ans.

3 The circumference of a circle is $3\frac{1}{7}$times the diameter, what fraction of the circumference is the diameter? $\frac{7}{2}$—Ans.

4 The circumference of a circle is 8360yds., find the length of half the diameter. 1330yds.—Ans.

5 The circumference of a carriage wheel is 14ft. 6in., how many times will it revolve in 1mile 4fur.? $546\frac{6}{2}\frac{6}{9}$ times—Ans.

6 Edward is 960yds. south of the school, James is 640yds. west of it; Edward walks at the rate of 40yds. a minute; at what rate must James walk to arrive at the school at the same time that Edward does? $26\frac{2}{3}$yds. a minute—Ans.

7 Find the average of $6\frac{1}{2}$, $8\frac{1}{4}$, $3\frac{1}{5}$, $2\frac{1}{5}$ and $3\frac{1}{6}$. $4\frac{6}{1}\frac{9}{0}\frac{9}{0}$—Ans.

8 A man has $\$27\frac{3}{5}$; how often must he give away $\$2\frac{2}{4}\frac{5}{5}$ so that he may have $\frac{1}{3}$ of his money left? 9times—Ans.

9 Find the amount of the following bill of goods: 84 yds. of silk at $92\frac{1}{2}$cents per yd., $83\frac{1}{3}$lbs. of butter at 16 cents per lb., 43yds. of print at 12cents per yd., 36lbs. of rice at $3\frac{1}{2}$cents per lb., $15\frac{1}{2}$lbs. of tea at 58cents per lb.,

22lbs. of coffee at 33⅓cents per lb. $113.77⅔—Ans.

10 How many cubic ft. of brickwork in a wall 126ft. long, 16ft. high and 1ft. 6in. thick.? 3024cub. ft.—Ans.

11 Twenty men can do a piece of work in 18days, 6 men cease work when ¾ of the work is done; how long will it take the remainder of the men to finish the work? 6¾days—Ans.

12 A boy lost ⅓ of his money and then ⅔ of the remainder, and then had $⅘, how much had he at first? $5⅔—Ans:

13 If 8⅕lbs. of butter cost $1.64, what will 3⅓lbs. cost? 66⅔cents—Ans.

Senior Third Class—36.

1 Find the product of the sum and difference of ⅓ of ⅔ of $2\frac{1}{2}$ and ½ of 8½ of $\frac{3}{17}$. $\frac{4}{7}\frac{2}{8}\frac{5}{4}$—Ans.

2 Reduce 8miles 3fur. 2pe. 4yds. 2ft. to the fraction of 800ch. 66⅔links. $\frac{4}{5}\frac{4}{2}\frac{2}{8}\frac{5}{4}\frac{7}{4}$—Ans.

3 Simplify—

(1) $\dfrac{9 \text{ guineas}}{£3\ 3\text{s.}} \times \dfrac{3\frac{1}{3} \text{ of } 6 \div 3\frac{1}{3} \times 6}{9 + \frac{1}{2} + \frac{1}{8} \text{ of } \frac{1}{6}}$.

(2) $\left\{ \dfrac{\quad}{1\frac{1}{2} + \frac{1}{2} \times 3\frac{1}{3} - 1\frac{2}{3} + \frac{3}{4} \div (\frac{1}{2} + \frac{1}{6})} \right\}$

(1) $11\frac{5}{4}\frac{6}{6}\frac{7}{7}$; (2) 7¼—Ans.

4 What is the value of 83⅓fathoms of cable at 48½ cents a foot? $242.50—Ans.

5 A man paid $180 for a horse, ⅔ the cost of the horse for a carriage, $33 for harness, and $\frac{1}{12}$ the cost of the harness for a whip. He paid ⅓ of the amount, how much is he in debt? $223⅚—Ans.

6 Eight horses are worth as much as 24cows, and 18

are worth as much as 90sheep, and 800 sheep are worth $4800, find the value of 10horses and 12cows. $1260—Ans.

7 A drover bought a certain number of sheep for $800, he sold half of them for $9 per head, gaining thereby $\frac{1}{16}$ of the entire cost, and the remainder at a gain of 50cents per head, how many sheep did he buy, and how much did he gain? 100 sheep; $75 gain—Ans.

8 What will it cost to fence the four sides of a field 60rods long and containing 12½acres, at 2½cents per yd.? 25.66\frac{2}{3}$—Ans.

9 If $\frac{4}{5}$ of $\frac{10}{11}$ of 99yds. of calico are worth 12.12\frac{1}{2}$, what are $\frac{1}{9}$ of $\frac{18}{21}$ of 84yds. worth? 1.34\frac{3}{8}$—Ans.

10 How many yds. of paper ¾yd. wide will be required for the walls of a room which is 18 ft. long, 16ft. wide and 10ft. high, the parts not requiring to be papered amounting to 6sq. yds.? 92$\frac{2}{7}$yds.—Ans.

11 A boy bought 1lb. 3oz. of candy at 1½cents per oz., 4lbs. 2oz. of tea at 3⅓cents per oz., 8lbs. 4oz. of sugar at ¾cent. per oz., and gave in payment a five-dollar bill; how much change should he receive? $1.52½—Ans.

12 How many bushels of apples should be given in exchange for 90bush. 30lbs. of wheat, when 80bush. of wheat are worth 250bush. of apples? 282$\frac{3}{16}$—Ans.

Senior Third Class—37.

1 A house and lot are worth $1300, the house is worth $\frac{2}{3}$ of $\frac{9}{2}$ of $\frac{3}{4}$ of the lot; find the value of $\frac{1}{10}$ of $\frac{1}{5}$ of the lot. $8—Ans.

2 A clock gains 2$\frac{1}{3}$minutes in 6hours, how much will it gain from 6 o'clcok on Monday morning to 12 o'clock noon on Wednesday of the same week? 21min.—Ans.

3 How many times is the one-fifth of 13 contained in the $\frac{1}{3}$ of $62\frac{1}{2}$? $8\frac{1}{78}$—Ans.

4 How many times the product of $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{8}$ and $2\frac{1}{5}$, is their sum? $38\frac{1}{11}$ times—Ans.

5 Divide \$4600 between A and B, so that $\frac{2}{3}$ of A's money, together with $\frac{1}{4}$ of his money may be equal to B's money. A, \$2400; B, 2200.

6 Simplify—

(1) $\frac{1}{3}\frac{0}{0}\frac{0}{0}\frac{1}{3}$ of $1\frac{8}{1}\frac{8}{1}\frac{9}{1}$ of $1\frac{1}{1}\frac{1}{2}\frac{1}{1}$ of $\frac{1-\frac{1}{2}}{1-\frac{1}{4}}$.

(2) $\dfrac{\frac{1}{2}\text{ of }\frac{1}{3}+\frac{2}{5}\text{ of }\frac{1}{4}}{6\frac{1}{2}-5\frac{1}{4}} \div \dfrac{\frac{3}{5}}{\frac{6}{7}} \times \dfrac{\frac{1}{2}+1+\frac{1}{3}-\frac{1}{4}\times\frac{1}{2}}{3\div 1\frac{1}{2}+\frac{1}{3}\text{ of }3+\frac{1}{6}}$.

(3) £1 8s. 6d. $\div \frac{1}{3}$ of $\frac{4}{5}$ of $\frac{3}{12}+\frac{1}{3}$ of £9 4s. 3d. — 16s. 3d.

(1) $3\frac{1}{1}\frac{3}{0}\frac{3}{8}\frac{8}{9}$; (2) $\frac{3}{1}\frac{2}{9}\frac{2}{9}\frac{8}{5}$; (3) £23 12s. 8d.—Ans.

7 What fraction of a cord is a pile of wood $5\frac{1}{3}$ft. long, $3\frac{3}{4}$ft. wide and $2\frac{2}{7}$ft. high? $\frac{5}{14}$—Ans.

8 The top of a telegraph pole is 18ft. from the surface of the ground, the part in the ground is $\frac{2}{11}$ of the whole length; find the length of the pole. 22ft.—Ans.

9 How many bushels of oats at $\$\frac{3}{8}$ per bush. should be given in exchange for $99\frac{1}{8}$bush. of potatoes at $\$\frac{2}{3}$ per bush., 16bush. of wheat at $\$\frac{5}{4}$ per bush., and $3\frac{1}{6}$cords of wood at $\$3\frac{3}{4}$ per cord? $262\frac{2}{9}$bush.—Ans.

10 A boy spent $\frac{1}{4}$ of his money for apples and 36 cents for oranges, he gave $\frac{1}{5}$ of what he had at first to his brother and then had 52cents left; how much money had he at first? \$1.60—Ans.

11 If 4acres cost \$120, how many acres can be bought for \$35? $1\frac{1}{6}$ac.—Ans.

Senior Third Class—38.

1 A man bought a watch and chain for $150; $80 is $\frac{5}{4}$ of what he paid for the chain; how much did he pay for the watch? $86—Ans.

2 Seven-tenths of a farm are worth $200 more than $\frac{3}{5}$ of it, find the value of ¼ of it. $500—Ans.

3 A boy can walk 2½ miles per hour, how long will it take him to walk 26miles 2fur. 20per.? $10\frac{1}{4}\frac{1}{0}$hrs.—Ans.

4 How many village lots worth £26 15s. a piece are worth $\frac{4}{3}$ the value of 90sheep worth £2 10s. 6d. each? $11\frac{3}{1}\frac{5}{0}\frac{}{7}$lots - Ans.

5 John's age is double of Peter's age; 11years ago John's age was $1\frac{9}{3}\frac{}{0}$times what Peter's age is now; find their ages. John's 60yrs.; Peter's 30yrs.—Ans.

6 How many pounds of sugar worth half a cent an ounce can be bought for $36.40? 455lbs.—Ans.

7 Eight-ninths the length of a stick is 4ft. longer than $\frac{2}{3}$ of it, find the length of the stick. 18ft.—Ans.

8 Find the greatest number that will divide each of the following numbers exactly: $\frac{8}{1\,1}$, $\frac{1\,2}{2\,0}$, $\frac{1\,6}{3\,0}$ and 5⅓. $\frac{1}{1\,6\,5}$ —Ans.

9 How much greater is ½ of ⅓ than 8times $\frac{1}{8\,0}$? $\frac{1}{1\,5}$ —Ans.

10 Find the value of the following goods:

26	yds. of silk	at	$ .90
42	" print	at	12½
18	" linen	at	15
3	hats	at	2.25
12	pairs of gloves	at	.90
20	" shoes	at	1.50

$78.90—Ans.

11 A merchant bought 250yds. of cloth at 60cents a

yd., and sold $\frac{1}{5}$ of it at a gain of 20cents a yd., for how much a yd. must he sell the remainder so that his profit may be $1\frac{1}{3}$times his outlay? $1.45—Aus.

Senior Third Class—39.

1 One hundred and fifty soldiers have provisions for 20days, how many men must depart that the provisions may last the remainder 25days? 30men—Ans.

2 A man bought eggs at the rate of 4 for $3\frac{1}{2}$cents, and sold them at a gain of $\frac{1}{3}$ the cost, what did he get per dozen for them? 14cents—Ans.

3 Queen Victoria began to reign in the year 1837, at the age of 18, what part of her life had she reigned in the year 1882? $\frac{5}{7}$—Ans.

4 How many cord feet in a pile of wood $33\frac{1}{3}$ft. long, 16ft. wide, and $8\frac{1}{2}$ft. high, and what is it worth at 50 cents per cord foot? $283\frac{1}{3}$cord feet; $\$141.66\frac{2}{3}$—Ans.

5 How often can $\frac{2}{3}$ be taken from $320\frac{1}{2}$ and leave $\frac{1}{4}$ for remainder? $480\frac{3}{8}$times—Ans.

6 A laborer worked $35\frac{3}{4}$ days and after paying his expenses with $\frac{4}{5}$ of his money had $40 left, how much did he receive a day? $\$2\frac{2}{143}$—Ans.

7 Simplify—

(1) $$\left(\frac{\frac{1}{3}-\frac{1}{4}}{2\frac{1}{2}-1\frac{3}{8}} \div \frac{6\frac{1}{2}+1\frac{1}{3}}{9\frac{3}{10}-1\frac{3}{20}}\right) \times \frac{\frac{1}{2}\div\frac{2}{3}}{\frac{1}{2}\times\frac{2}{3}}$$

(2) $$\frac{(\frac{1}{3}+\frac{1}{2})\times(\frac{3}{8}\text{ of }\frac{1}{2}-\frac{1}{3}\text{ of }\frac{1}{2})\times 22\frac{1}{2}}{(1-\frac{1}{2})\times(3-2\frac{1}{2})\text{ of }(\frac{1}{2}+\frac{1}{3}+\frac{1}{4})}$$

(1) $\frac{163}{240}$; (2) $1\frac{33}{52}$—Ans.

8 If $23\frac{1}{3}$cords of wood last as long as $18\frac{3}{4}$tons of coal, how many cords of wood will last as long as 360tons of coal? 448cords—Ans.

9 Find the value of 18bush. 18⅓lbs. of wheat at $1.12½ per bushel. $20.60—Ans.

10 Find the value of a pine plank 18ft. long, 22in. wide and 3in. thick, at $22 per M. $$\$2\frac{89}{500}$$—Ans.

Senior Third Class—40.

1 What is the least number that will contain each of the following numbers exactly, ¾, ⅝, 1¼, $\frac{7}{12}$ and ½ of ¾? 26¼—Ans.

2 What fraction of 2days, 3hours, is 1minute? $\frac{1}{3060}$ —Ans.

3 Divide $33 between A and B, so that B may have ⅗ as much as A. A $20⅝; B $12⅜—Ans.

4 How many square yards in the walls of a room 26 feet long, 18½feet wide and 10¾ feet high? 106$\frac{11}{36}$sq. yds—Ans.

5 A man travelled ⅖ of a journey on Monday, ⅔ of the remainder on Tuesday and finished it on Wednesday by walking 30 miles; find the distance he travelled on Monday. 135miles—Ans.

6 The price of oats is ⅓ the price of wheat, 8 bushels of a mixture containing equal quantities of oats and wheat cost $4.80; find the value of a bushel of wheat. 90 cents—Ans.

7 What will it cost to carpet a room 18ft. long and 16½ft. wide, with carpet ¾ of a yd. wide and worth 90 cents a yd.? $39.60—Ans.

8 What will it cost to build a fence around a field 30 chains long and containing 18acres, at 25 cents a rod? $72—Ans.

9 How many lbs. of tea worth 33⅓ cents per lb. are worth as much as 9bushels of wheat at $1.00 per bushel? 72lbs.—Ans.

10 John and Edwin bought a quart of strawberries, John paid 4 cents and Edwin paid 6 cents; what part of the quart should each receive? John $\frac{2}{5}$, Edwin $\frac{3}{5}$—Ans.

11 Find the amount of the following bill of goods:

136 yds. of print	at $	10	
322 " linen	at	12	
140 " broadcloth	at	1.80	
210 lbs of tea	at	40	
320 " coffee	at	20	
18 barrels of flour	at	6.50	
600 lbs. of pork	at	12	
			$641.24—Ans.

Fourth Class - 1.

1 Write in words the following number: 3960843 ·0136. Three million nine hundred and sixty thousand eight hundred and forty-three and one hundred an thirty-six ten-thousandths—Ans.

2 Write in figures the following number: seventy-two and three hundred and eight hundred-millionths 72. ·00000308—Ans.

3 What decimal is equal to $\frac{\frac{2}{5} \text{ of } \frac{1}{2}}{\frac{1}{2}+\frac{1}{3} \text{ of } \frac{3}{4}}$? .4—Ans.

4 Find the value of $8{\cdot}25+3{\cdot}12-1{\cdot}5\times2.4+33\div.3$. 18·77—Ans.

5 A man has four fields. The first contains 13·215 acres, the second contains 2·28 acres more than the first, the third contains 18·18acres and the fourth contains 4 ·129 acres less than the third; how many acres in the four fields? .60·941acres—Ans.

6 Find the value of $\cdot0011\times\cdot0002\div\cdot009$. ·000024—Ans.

7 If ·25 of a farm cost $3600 what would ·305 of it cost? $4392—Ans.

8 Divide the product of 3·101 and ·0012 by the sum of 3·21+·016+·184. ·001091+—Ans.

9 Divide $3000 among A, B and C, giving A .245 of the amount, B .324 of it and C the remainder. A, $735; B, $972; C, $1293—Ans.

10 How many times must 1·0021 be taken from 10.3 so that the remainder may be ·25? 10·028+—Ans.

11 Reduce £98·325 to £. s. d. £98. 6s. 6d.—Ans.

12 A merchant bought 4800 bushel of wheat at $1.10 per bushel. He sold .3 of it at a gain of 5 cents per bushel, .2 of it at a gain of 7 cents per bushel and the remainder at a gain of .1 of the cost; how much did he receive for the wheat? $5683.20—Ans.

13 Find the value of 18·25 bushels of wheat at $1.01 per bushel; 36·36 bushels of barley at $·65 per bushel; 320·5 bushels of oats at $·33 per bushel; 3684·6 feet of lumber at $12 per thousand; 86·4 cords of wood at $3.50 per cord; 18·2 tons of hay at $7.50 per ton and 469·5 lbs. of flour at $3.20 per cwt. $645·9707—Ans.

Fourth Class—2

1 What fraction of £2. 4s. is 13s. 9 ½d.? $\frac{331}{1050}$—Ans.

2. Two-thirds of ½ of 4 is how many fifths of ⅓ of ¼ of ⅕ of 20? 4⅔ fifths—Ans.

3 Divide $800 between A and B so that A may have $60 more than 3⅔ times as much as B. A $641⅜, B $158⅝—Ans.

4 A field containing 14.035 acres is 51.275 rods long; how many chains wide is it? 10.948+chains—Ans.

5 If 2⅕ acres of land are worth $56¼; find the value of 25½ acres. 614\frac{41}{60}$—Ans.

6 A and B can do a piece of work in 4 days, B and C can do it in five days, A and C can do it in 6 days; in what time will A do it working alone.—$9\frac{3}{13}$—Ans.

7 Find the cost of plastering the 4 walls and ceiling of a room 18ft. long and 15ft. wide and 9ft. high at 8 cents a square yard. $7.68—Ans.

8 What will it cost to carpet a room 15ft. 4inches long, and 14ft. 8inches wide with carpet 28 inches wide and worth 70 cents a yard? $22.48\frac{8}{9}$—Ans.

9 The greatest common measure of two numbers is 20, their least common multiple is 38520, one of the numbers is 360; find the other number. 2140—Ans.

10 Twenty men in 12days of 9hours can do a piece of work; how many days of 10hours will it take 25 men to do twice as much work? $17\frac{1}{2}\frac{1}{0}$days—Ans.

11 A cistern has 3 pipes in it; by the first it could be filled in 6·5 hours, by the second it could be filled in 6·25 hours and by the third ·245 of it could be emptied in 4 hours; in what time will it be filled, if they are all opened together. $3\frac{2}{2}\frac{5}{0}\frac{1}{2}\frac{9}{7}$hours—Ans.

12 Sixteen men or 20 boys can do a piece of work in 30 days; how long will 32 men and 16 boys take to do it? $10\frac{5}{7}$ days—Ans.

Fourth Class—3.

1 A man bought ·328 of a mine at one time and ·2145 of it at another time. He then sold ·19864 of it; how much had he left? ·34386—Ans.

2 Reduce ·842, ·$\dot{3}\dot{1}\dot{4}$, 6·$\dot{1}\dot{2}\dot{4}\dot{3}$, ·$\dot{1}00\dot{1}$ to vulgar fractions. $\frac{421}{500}$, $\frac{311}{990}$, $6\frac{373}{3000}$, $\frac{1001}{10000}$.—Ans.

3 What decimal of 8ac. is 1ro. 20per. 4yds? .0469+ —Ans.

4 To a certain number ·25 of itself is added; what decimal of the sum must be subtracted to get the original number? ·2—Ans.

5 What decimal is $\frac{3}{5}$ of $\frac{1}{4}$ of $2\frac{1}{2}$ of 8; of $\frac{4}{5}$ of $\frac{10}{11}$ of $\frac{22}{25}$ 300? ·0173+—Ans.

6 Find the value of ·25 of 600ac. of land at $50·5 per acre, ·45 of 900 bushels of wheat at $1.12 per bushel, ·2 of 400 bushels of barley at 80 cents per bushel. $8092.60—Ans.

7 What decimal of a number is $33\frac{1}{3}$ per cent of it? ·3—Ans.

8 Five per cent of a certain number is 42·5; find the number. 850—Ans.

9 The roof of a house is 38ft. long, and each of the sides is 23ft. wide Allowing each shingle to be 4 inches wide and to lie 5 inches to the weather; how many shingles will be required to cover the roof? $12585\frac{3}{5}$ shingles—Ans.

10 A dishonest milkman adds a pint of water to every gallon of milk; what decimal of the mixture is water? ·1—Ans.

11 A cheese factory received 242320 pounds of milk in the month of June. It required 9.5 pounds of milk to make a pound of cheese; find the value of the cheese made in the month, it having been sold at $10\frac{1}{4}$cents per pound.. $2614.50\frac{10}{19}$—Ans.

Fourth Class—4.

1 A father gave $\frac{1}{4}$ of his money to his son Peter, $\frac{1}{5}$ of the remainder to his son Thomas, and the remainder to his wife; how much had he at first, supposing Thomas got $600? $4000—Ans.

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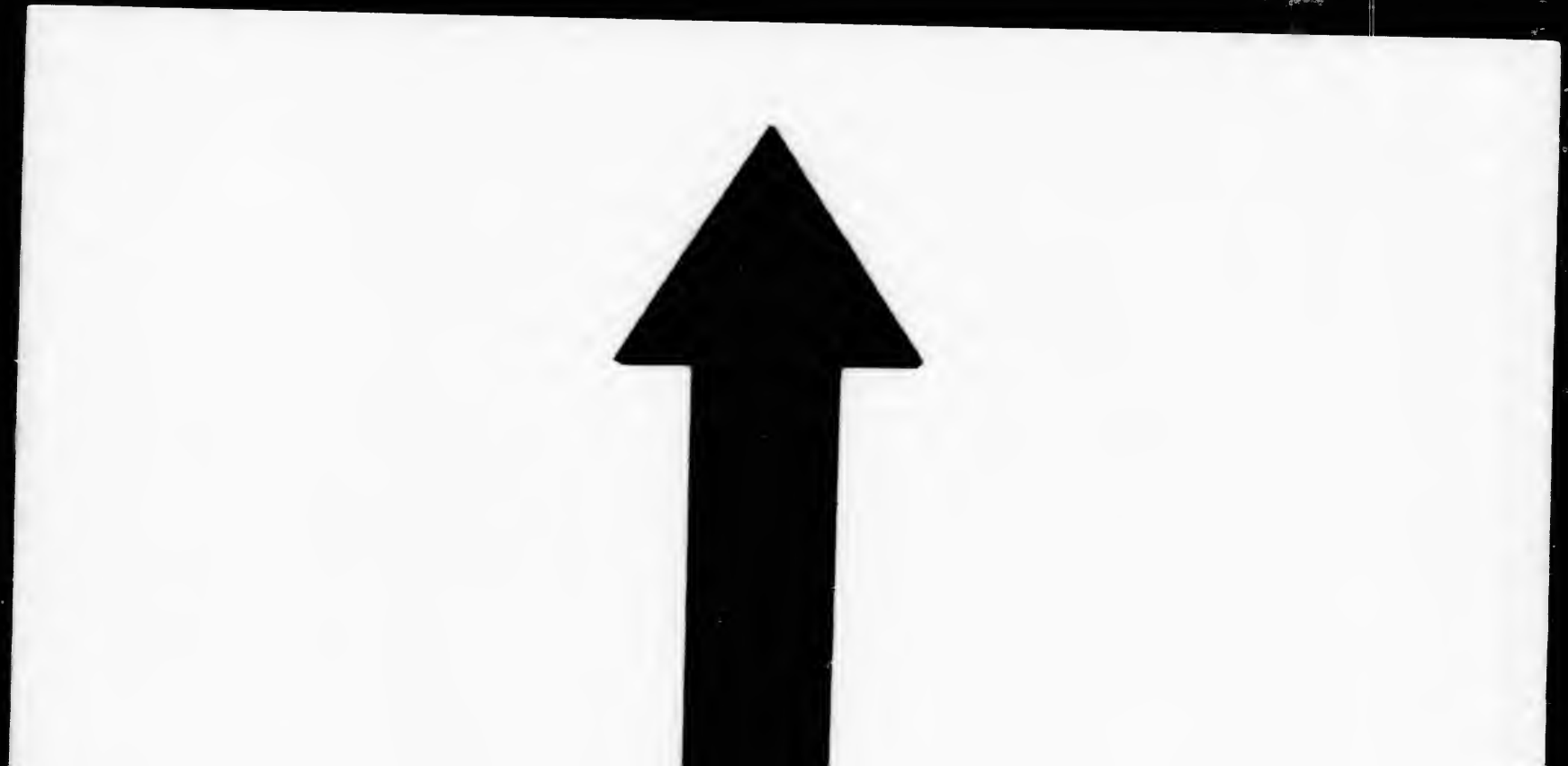

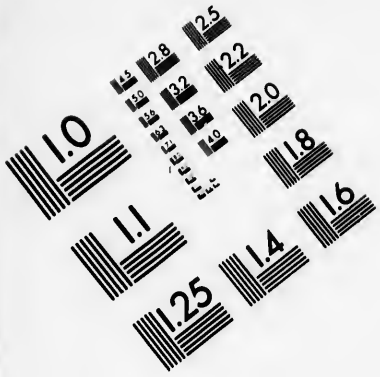

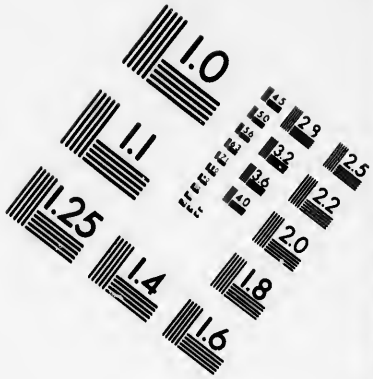

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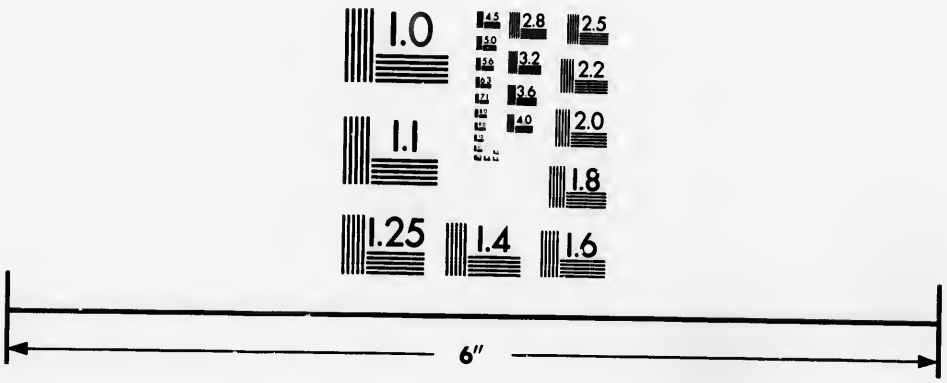

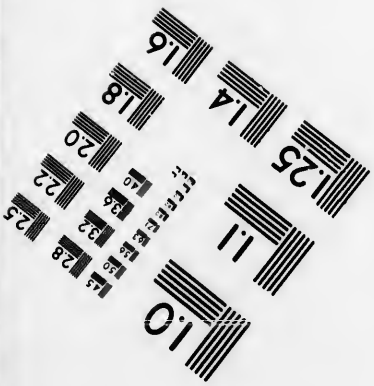

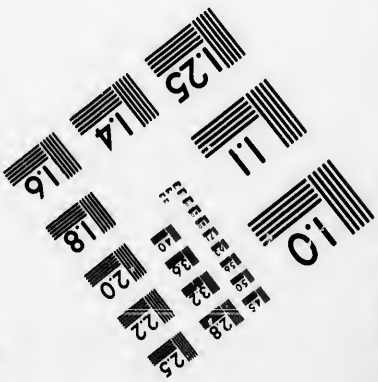

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2 Simplify—

(1) $\frac{2 \div \frac{02}{4} \times \frac{02}{0024} \times .03 \div 3}{11.9999995 \times .002 \times .003} = \frac{.002 \times .002 \times .003}{.0062}$.

(2) $\frac{2{\cdot}25 \times {\cdot}2}{\frac{4004}{1001} \text{ of } \frac{7}{9}} \div 3333\frac{1}{3}$.

(1) 2, (2) $19285\frac{5}{7}$—Ans.

3 Prove that $\frac{\frac{1}{3} \text{ of } \frac{2}{5}}{\frac{1}{8} \text{ of } \frac{16}{17}} \text{ of } \frac{\frac{3}{4} \div \frac{1}{4}}{\frac{1}{3} \div \frac{1}{8}} = \frac{.9009}{.1001} \text{ of } \frac{11}{90} + \frac{11}{40}$.

4 If 3ac. 3ro. 3 per. cost \$201, what will 36ac. 1ro. 20 per. cost at the same rate? \$1940—Ans.

5 Find the number from which if ·2134 be taken 2·0021 times the remainder will be 8.58511326.

9·0123614—Ans.

6 Ten cows or 30 sheep can eat as much as 12 horses; how many cows can eat as much as 270 sheep and 36 horses. 120cows—Ans.

7 A window contains 8 panes, each 14 by 18 inches; how many square feet in ·3 of the window? $4\frac{2}{3}$sq. ft.—Ans.

8 A grocer bought 12 chests of tea, and sold 3 of them for what 4 cost. He received \$300 for the tea; how much did he pay per chest for it? \$18.75—Ans.

9 A bankrupt pays ·425 of his debts, he owes one man \$2.25; how much does that man lose? \$1.29375—Ans.

10 The rope on a windlass is 42ft. long; how many turns will be required to wind half the rope, the axle being 22·5 inches in circumference? $11\frac{1}{3}$ turns—Ans.

11 The average of 6 numbers is 2·125, the average of 4 of them is 1·25, and the fifth is ·9; find the sixth number. 6·85—Ans.

12 What is the greatest possible remainder in dividing by 18·9999? 18—Ans.

Fourth Class—5.

1 Two boys run a foot-race, and one of them gains 2 yards in every 132ft.; how much will he have gained at the end of a quarter of a mile? 20yds.—Ans.

2 In how many hours will the minute hand of a watch have moved 100 times the distance moved by the hour hand in 1hour? $8\frac{1}{3}$hours—Ans.

3 How many pairs of boots at $2.50 should be given for 2 tons of hides at 8cents per pound? 128pairs—Ans.

4 How many yards of cloth $\frac{5}{6}$yd. wide will be required to line a buffalo robe 6ft. 4inches long and 5ft. 8inches wide? $7\frac{8}{45}$yards—Ans.

5 Find the total cost of;

$83\frac{1}{2}$ yds. of cloth	at	$ .345 per yard.
18 lbs. of butter	at	20 cts. per lb.
3 cwt. of beef	at	8 cts. per lb.
6 tons of hay	at	60 cts. per cwt.
84 sheep	at	$16 a pair.

$800.40\frac{3}{4}$—Ans.

6 If 2 men in 6days of 8hours can do a piece of work; how many hours per day must 3 men work to do twice as much work in 6days? $10\frac{2}{3}$hours—Ans.

7 A newspaper contains 48columns, each 30 inches long and 3inches wide; how many square yards will 10 copies of the newspaper cover? $16\frac{2}{3}$square yards.—Ans.

8 The imperial gallon contains 277·274 cubic inches. A boy fills five lamps out of an imperial gallon of coal oil and finds that the oil left exactly fills an oil can 4 by 4 inches, and 9 inches deep; how many cubic inches does each lamp contain? 26·6548cubic inches—Ans.

9 Find the value of 30ac. 3ro. 25per. at £20. 16s. 8d per acre, using aliquot parts. £643. 17s. $7\frac{1}{4}$d.—Ans.

10 How many square feet of lumber in 8 boards each 14.25ft. long and 16.75inches wide? $159\frac{1}{8}$ft.—Ans.

11 Find the cost of painting the wainscot of a school-room 34ft. by 26ft., at 5cents per square yard, the wainscot being 4ft. 4inches high, and there being two doors each 3ft. wide. $\$2.74\frac{4}{9}$—Ans.

Fourth Class—6.

1 What fraction of a number is equal to $45\frac{1}{2}$ percent. of it? What decimal is equal to $33\frac{1}{3}$ per cent? $\frac{91}{200}$, .3 —Ans.

2 A man has 250 acres of land. He sells $11\frac{1}{2}$ per cent of it; how many acres has he left? $221\frac{1}{4}$ac.—Ans.

3 How many times $3\frac{1}{2}$ per cent is $17\frac{1}{3}$ per cent? $4\frac{29}{51}$ times—Ans.

4 What per cent of 132 is 56? What is the difference between $\frac{1}{5}$ of $(18\frac{1}{2}+3\frac{1}{3}$ of $2\frac{1}{4})$ and 40 per cent of $(18\frac{1}{2}+3\frac{1}{3}$ of $2\frac{1}{4})$? $42\frac{14}{33}$ per cent; $5\frac{1}{5}$—Ans.

5 A man bought a farm for $4400 and sold it at a gain of 20 per cent; how much did he receive for it? $5280—Ans.

6 A merchant bought cloth at 80cents per yard; for how much per yard must he sell it in order to gain 30 per cent? $1.04—Ans.

7 A drover bought 500 sheep at $6 apiece and sold 20 per cent of them for $800, 30 per cent of them at a loss of 50 cents apiece and the remainder at cost. How much did he gain by the transaction? $125—Ans.

8 Sixty per cent of a number is $\frac{3}{5}$, find the number. 1—Ans.

9 A book was sold for $3.50 and a gain of 25 per cent realized; find the cost. $2.80—Ans.

10 Ten per cent of a number is added to itself, and 10 per cent of the sum is subtracted, leaving a remainder of 18; find the original number. $18\frac{2}{11}$—Ans.

11 A number increased by 120 per cent of itself amounts to 176; find the number. 80—Ans.

12 Sixty per cent of a number is greater than sixty-six by 264; find the number. 550—Ans.

13 Seventy-five per cent of a number is greater than 66 per cent of it by 99; what is the number? 1100—Ans.

Fourth Class—7.

1 Twenty per cent of a number increased by 30 per cent of another number amounts to 72 and the second number is greater than the first by 40; find the numbers. 120, 160—Ans.

2 The numerator of a fraction is 22 per cent of the denominator and the sum of the terms is 366; find the fraction. $\frac{66}{300}$—Ans.

3 The number of pupils in a school is 600 per cent of the number in the first class, and the number in the first class increased by 10 is 25 per cent of the whole. How many pupils in the school? 120 pupils—Ans.

4 An agent sold goods to the amount of $7000 and received a commission of 3 per cent; find his commission. $210—Ans.

5 Find the simple interest on $800 for 3 years at $4\frac{1}{2}$ per cent. $108—Ans.

6 Two quarts of water are added to 8gallons of wine; what per cent of the mixture is water? $5\frac{15}{17}$ per cent —Ans.

7 How many gallons of water must be added to 16 gallons of wine so that 80 per cent of the mixture may be wine? 4gallons—Ans.

8 What sum of money will amount to $999 in 2years, at $5\frac{1}{2}$ per cent, simple interest? $900—Ans.

9 A lady spent 25 per cent of her money and then 25 per cent of the remainder. She had $90 left; how much had she at first? $160—Ans.

10 How many barrels of flour can be made out of 800 bushels of wheat, when a bushel of wheat makes 51 pounds of flour? $208\frac{8}{49}$barrels—Ans.

11 The difference between two numbers is 20 per cent of their sum and $\frac{5}{6}$ per cent of their product; how many times their sum is their product? 24 times—Ans.

12 How much money will produce $260 interest in 2years at $6\frac{1}{2}$ per cent, simple interest? $2000—Ans.

Fourth Class—8.

1 Twenty men can do a certain job in 16days. At the end of 4days 10 men cease work and 16 boys begin work; how long will it take the boys and remaining men to finish the job if a man does twice as much work as a boy? $13\frac{1}{3}$ days—Ans.

2 A box of candies 10inches long, 4inches wide and 6inches deep is worth $1.80; find the value of a box 6 inches long, 4inches wide and $2\frac{1}{2}$inches deep, filled with the same kind of candies. 45 cents—Ans.

3 A coal dealer bought a quantity of coal at $6 per ton and sold it at 45cents per cwt, gaining thereby $33; how many tons of coal did he buy? 11tons—Ans.

4 At what rate per cent, simple interest, will the interest on $900 amount to $300 in 4years? $8\frac{1}{3}$ per cent —Ans.

5 At what rate per cent, simple interest, will $600 amount to $720 in 3years? 6⅔ per cent—Ans.

6 A brakesman runs at the rate of 117⅓yards per minute, on the top of a train, which is running at the rate of a mile in three minutes. At what rate is the brakesman moving, (1) when he runs in the same direction as the train, (2) when he runs in the opposite direction? (1) 24miles an hour, (2) 16miles an hour—Ans.

7 A ship with its cargo is worth $260000, ⅔ of the cargo is worth ⅓ of the ship; find the value of the cargo. $60000—Ans.

8 A man sold his farm for $6500 and gained 8 per cent of the selling price; what did the farm cost him? $5980—Ans.

9 A horse was sold for $144. Had he been sold for $153.60, eight per cent more would have been gained; find his cost price. $120—Ans.

10 If 144/5yards of ditching cost 71cents; what will 8 rods 2yds cost? $2.30—Ans

Fourth Class—9.

1 There are 10 cubic ft. in a hogshead; how many Imperial gal. are equal to 138·637hogsheads? 8640 Imperial gal.—Ans.

2 A cistern is 12ft. square and 10ft. deep; what decimal of the cistern is empty when there is a depth of 4ft. of water in it? ·6—Ans.

3 A laborer can excavate 9cub. yds. of a cellar in a day; how long will it take him to excavate a cellar 33ft. long, 27ft. wide and 6ft. deep? 22days—Ans.

4 What will it cost to floor a house 32ft. long and 26 ft. wide with lumber 1½in. thick and worth $22 per M.? $27.45⅜—Ans.

5 Deduct 20 per cent from $2500 and divide the remainder among A, B, and C so that A may have twice as much as B, and C $100 less than B. A $1050, B $525, C $425—Ans.

6 How many wine gals. are equal to 1000imperial gals.? 1200 $\frac{74}{231}$wine gals.—Ans.

7 A vat is 11ft. long, 7ft. wide and 3ft. deep; how many gals. of wine will it contain? 1728gals.—Ans.

8 How many ounces troy are equal to 875ounces avoirdupois? 960ounces—Ans.

9 There are 40scholars in a school room 30ft. long, 20ft. wide and 12ft. high, each breathing 17280cub. in. of air in a minute; in what time will they breathe as much air as the room contains? 18minutes—Ans.

10 What number increased by 30 per cent of itself equals $\frac{13}{35}$? $\frac{2}{7}$—Ans.

11 Divide a third of one-fifth by $\frac{1}{8}$ of $\frac{1}{3}$. $3\frac{1}{3}$—Ans.

12 Find the cost of carpeting a room 18ft. long and 15ft. wide, with carpet 2ft. 3ins. wide and worth 90cents per yard. $36—Ans.

Fourth Class—10.

1 Find the area of a road, 4rods wide, around the outside of a square mile. 32ac, 1ro, 24rods—Ans.

2 A man who owns $\frac{3}{5}$ of $\frac{1}{2}$ of a farm sells $\frac{3}{8}$ of his share for $990; find the value of the farm. $8800—Ans.

3 Sixteen bushs. of corn worth 75cts. per bush. are mixed with 14bushs. of oats worth 41cts. per bush.; find the value of $3\frac{1}{2}$bushs. of the mixture. 2.06\frac{2}{3}$—Ans.

4 A merchant marked his goods so as to gain 40 per cent if sold for cash, and 50 per cent if sold on credit. An article is marked $33 credit; find its cash price? $30.80—Ans.

5 Find the amount of $40 at 5½ per cent, simple interest, for 2yrs. and 4months. $45.13⅓—Ans.

6 Mary's age is 40 per cent of Jane's age, and in two years from now the sum of their ages will be 32yrs; find their ages. Mary's 8yrs; Jane's 20yrs.—Ans.

7 A slate pencil, by falling, was broken into three pieces; the middle piece was 2ins. long, one of the remaining pieces was as long as the other and half the middle piece, and the shortest piece was ·25 the length of the middle piece; find the length of the pencil. 4ins. —Ans.

8 A man spent ·2 of his money in buying a house, ·525 of it in buying a farm; he had $1210 left, how much had he at first? $4400—Ans.

9 Find the cost of ploughing a field 20chains 10links long, and 15chains 2rods 5yds wide, at $2 per acre. 63.22\frac{4}{11}$—Ans.

10 What o'clock is it, when the time past 6, is ⅓ of the time past 5? Half-past six—Ans.

Fourth Class—11

1 Find the interest on $1300 from Dec. 21, 1881, to June 29, 1882, at 6 per cent, simple interest. 40.60\frac{2}{7}$ —Ans.

2 Sixty bushs. of wheat and oats were sold for $41.50, the wheat at 90 cents, and the oats at 40cents per bush.; how many bushs. of each were sold? 35bushs, wheat, 25bushs. oats—Ans.

3 Reduce a wine gallon to the decimal of an imperial gal. ·8331109+—Ans.

4 How many yds. of cloth worth 18cts. per yard should be given in exchange for 42barrels of flour at 4½cts per pound? 2058yds.—Ans.

5 A watch which gains 3minutes per hour, shows correct time at 12 o'clock, noon on Monday; what is the correct time when it shows 12o'clock, noon on Wednesday of the same week? $42\frac{6}{7}$mins. past 9—Ans.

6 The *Stratford Beacon* contains 40columns each 2ft. 9ins. long and $2\frac{1}{2}$ ins. wide; how many copies will cover the floor of a room 18ft. 4ins. long and 12ft. 6ins. wide? 20copies—Ans.

7 Find the average of $6\frac{1}{2}$, 3, 4·5, 21 and ·9. 7.18—Ans.

8 Gold is $19\frac{1}{2}$ times heavier than water, how many cubit ft. of gold will weigh as much as the amount of water required to fill a cistern 10ft. square and 19ft. 6ins. deep? 100cubic ft.—Ans.

9 Find the total cost of the following:—A pile of wood 22ft. long, 16ft. wide and 6ft. high, at $3.50 per cord, 98bush. 40lbs. of wheat at $1.20 per bush., 3000 lbs. of hay at $18 per ton, 7000lbs. of flour at $2.80 per cwt., 40lbs. of coal at $8 per ton, 300bush. of potatoes at 20cts. per peck. $639.31—Ans.

10 Find the value of a field 20chains long and 18 chains wide at $10 per rood. $1440—Ans.

Fourth Class - 12.

1 How long will it take a man to walk round a block of land 22miles long and 18miles wide, if he walks $3\frac{1}{2}$ miles an hour and 8hours each day. $2\frac{6}{7}$days—Ans.

2 The greatest common measure of two numbers is $\frac{24}{175}$, their least common multiple is $4\frac{4}{5}$, one of the numbers is $\frac{24}{25}$; find the other number. $\frac{24}{35}$—Ans.

3 A four ounce watch-case is made of sterling silver $\frac{925}{1000}$ fine; find the weight of pure silver in the case. $3\frac{7}{10}$ounces—Ans.

4 If 20men or 30boys can perform a piece of work in 12dys. of 8hrs. ; in how many dys. of 10hrs. will 15men and 18boys do the same work? $7\frac{1}{9}$dys.—Ans.

5 How many rolls of wall-paper each 22yds. long and $\frac{3}{4}$yds. wide, will cover the four walls of a room 16ft. long, 12ft. wide and 10ft. high, the parts not required to be covered amounting to 12 square yds? $3\frac{13}{70}$rolls—Ans.

6 Divide $\frac{8}{9}$ into two parts, so that one part may be greater than the other by $\frac{1}{3}$. $\frac{5}{18}$ and $\frac{11}{18}$—Ans.

7 A watch and chain cost $80, the chain cost $\frac{1}{3}$ as much as the watch ; find the cost of the watch. $60 =Ans.

8 By what number must $\frac{1}{3}$ of $\frac{1}{2}$ be multiplied, in order to give the same product as $\frac{2}{5}$ multiplied by $\frac{8}{9}$? $2\frac{2}{15}$ —Ans.

9 A and B can perform a piece of work in 12days when they work 8hrs. a day ; A by himself can do the work in 15dys. of 10hrs. In how many days of 9hrs. can B do it? $29\frac{1}{2}\frac{7}{7}$dys.—Ans.

10 In a mixture of wine and water $\frac{1}{2}$ of the whole minus 50quarts is water, but $\frac{1}{5}$ of the whole plus 125 quarts is wine ; how many quarts are there of each? 75 water, 175wine—Ans.

Fourth Class—13.

1 A crew can row down stream at the rate of a mile in 5mins. and up stream at the rate of half a mile in $3\frac{1}{2}$ mins. After rowing down stream for 16mins., how long will it take them to row back $\frac{2}{3}$ the distance? $14\frac{14}{15}$ mins.—Ans.

2 An army was reduced 5 per cent, then 6 per cent and then numbered 44650 ; how many were in the army at first? 50000—Ans.

3 Two oarsmen row a race of 5miles; the first rows the first half of the course at the rate of 12miles an hour, and the last half at the rate of 10miles an hour, the second rows $\frac{2}{3}$ of the course at the rate of 12miles an hour, and the remainder at the rate of 8miles a hour; which wins, and by how much? The first by $1\frac{2}{3}$mins. —Ans.

4 A man bought a horse and a cow, paying twice as much for the horse as for the cow. Had he paid 5 per cent more for the horse, and 10 per cent more for the cow, they would have cost $192; what did they cost? $180—Ans.

5 Three men start at the same point in the circumference of a circular island, and travel round in the same direction; the first makes $\frac{4}{5}$ of a revolution in a day, the second $\frac{6}{7}$, and the third $\frac{12}{13}$. In what time will they all be together at the point of starting? $227\frac{1}{2}$days—Ans.

6 A man lent $800 at 6 per cent on the first of August, and $600 at 5 per cent on the first of October; how much interest should he receive at the end of the year? $27\frac{17}{30}$—Ans.

7 The driving wheels of a locomotive are 19ft. in circumference and make 5revolutions in 2seconds; how long will the locomotive be in running 60miles? 1hr 51mins. $9\frac{9}{19}$secs.—Ans.

Fourth Class—14.

1 A man bought a horse and carriage for $220, $\frac{2}{3}$ the cost of the carriage plus $40 is equal to $\frac{2}{3}$ the cost of the horse; find the cost of each. Horse $140, carriage $80 —Ans.

2 Find four fractions whose numerators shall be 7, 8, 9 and 11, respectively, and their sum equal to 1. $\frac{7}{35}$, $\frac{8}{35}$, $\frac{9}{35}$ and $\frac{11}{35}$—Ans.

3 Find the least number which, divided by 27, 30, 35 and 40, will give 9 for remainder in each case. 7569—Ans.

4 If the strength of a mixture of 20gals. of wine and 5gals. of water be represented by $\frac{2}{3}\frac{2}{5}$; what number will represent the strength of a mixture of 22gals. of wine and 6gals. of water? $\frac{1}{1}\frac{2}{4}\frac{1}{0}$—Ans.

5 Thirty-three per cent of a number diminished by $\frac{2}{2}\frac{2}{5}$ of the number is 2500; find the number. 10000—Ans.

6 Divide $2000 among A, B, and C, so as to give B $300 more than A, and $200 less than C. A $400, B $700, C $900. —Ans.

7 What decimal of 3ounces troy is $\frac{3}{4}$ of a dwt? ·0125 —Ans.

8 Find the cost of pulling a field of flax 16chains 3 rods long and 14chains 2rods wide, at $4.20 per acre. 102.00\frac{3}{4}$—Ans.

9 A drover bought a number of cattle at $30 a head and sold 30 per cent of them for $2400, gaining thereby $600; find the number of cattle bought. 200 cattle —Ans.

10 If 300 men can perform a piece of wo[illegible]n 40 days; how long will it take half as many men to do 2·225 times as much work? 178days—Ans.

11 A clock which gains 2mins. in an hour showed correct time at 6 o'clock Monday morning; what time will it show at half-past three the same day? 11mins. to 4—Ans.

Fourth Class—15

1 What principal will amount to $1848.75 in 2yrs. 6 mos. at 3$\frac{1}{2}$ per cent, simple interest? $1700—Ans.

2 A man walks 22yds. 2ft. in 18secs.; how many miles per hour is his rate? 2$\frac{1}{2}\frac{9}{3}$miles—Ans.

3 What length of a stick of timber $1\frac{1}{2}$ft. square, will make a cord of wood? $56\frac{8}{9}$ft.—Ans.

4 If it costs \$2.50 to paint a floor 15ft. long and 12ft. wide, how much will it cost to paint the floor of a room whose four walls aggregate 64ft., the length being 4ft. more than the width? \$3.50—Ans.

5 A cistern has two pipes; by one it can be filled in 2hrs. 40mins., by the other it can be emptied in 4hrs.; if the cistern be empty, in what time can it be filled by both pipes being opened at the same time? 8hrs.—Ans.

6 A table is 6ft. 4ins. long and 3ft. 6ins. wide; how many books 6ins. long and 4ins. wide will exactly cover it? 133books—Ans.

7 A king began to reign at the age of 22, and reigned $\frac{16}{27}$ of his life; how old was he when he died? 54yrs. —Ans.

8 A grocer bought 3600lemons, 3 per cent of which were bad, he sold the remainder at 5cents apiece, gaining \$2 on the entire cost; what did the lemons cost per doz? $57\frac{8}{15}$cts.—Ans.

9 Find the cost of the following:—

50 barrels of flour	at	\$3 per cwt.
10 barrels of pork	at	7cents per lb.
18 tons of hay	at	90cents per cwt.
30 fathoms of cable	at	40cents per foot.
125 lbs. of sugar	at	\$9 per cwt.
132 feet of ditching	at	60cents per chain.
8 lbs. 4ozs. of candy	at	2cents. per oz.

\$845.09—Ans.

Fourth Class—16.

1 Reduce 8s. $3\frac{1}{2}$d. to the decimal of 8 guineas. .493551+—Ans.

2 Find the value of 6acs. 3ro. 20per. of land at £9, 18s, 6d per acre. £68, 4s, 8¼d—Ans.

3 What will it cost to build a wall 80ft long, 6ft. high, and 1ft. 6ins. thick at 2½cents per cubic foot? $18—Ans.

4 A, B, and C can do a piece of work in 16, 18 and 20 days respectively; they work together at it for 4days, when A and B leave; how long will it take C to do the remainder of the work? 6⅔days—Ans.

5 If 8 men in 16days of 9hrs. can dig 8 rods of a trench; how many rods can 10 men dig in 20days of 8 hrs? 11⅓rods—Ans.

6 A book was sold for 40 per cent more than it cost; the sum of the buying price and selling price is $1.92; find the buying price. 80cents—Ans.

7 How many bricks 8ins. long, 4ins. wide, and 2ins. thick, are required to build a wall 30ft. long, 15ft. high and 16ins. thick? 16200bricks—Ans.

8 A telegraph pole casts a shadow which is ¼ of itself longer than the pole. The length of the pole and shadow is 49ft.; find the length of the pole. 21ft—Ans

9 A telegraph pole stands 4ft. in the ground, a sign-board is nailed on it (12ft. from the ground), which is ⅓ the length of the pole from the top; find the length of the pole. 24ft.—Ans.

10 When cheese is selling at 11½cts. per pound; how much can be bought with the money received for 20bus. 30lbs. of wheat sold at $1.60 per cwt.? 171⅔lbs—Ans.

Fourth Class—17.

1 A grocer mixed 20lbs. of tea at 40cts., 30lbs. at 45 cts., 25lbs. at 50cts., and 80lbs. at 35cts., and sold it at 55cts.; how much did he gain by the transaction. $23.25 —Ans.

2 A man's money, plus $\frac{1}{3}$ of his money, is greater than $\frac{1}{6}$ of it by $34; find the amount of his money. $30—Ans.

3 How often can a man give away $\frac{3}{20}$ of his money and have $\frac{1}{4}$ of it left? 5 times—Ans.

4 The fare on a certain railroad is $2\frac{1}{2}$cts. per mile, a passenger travels 4hrs. and 20 mins. at the rate of 33 mls. an hour on this road; how much did he pay for his ticket. 3.57\frac{1}{2}$—Ans.

5 The interest on a certain amount of money is $46; six per cent had been paid for the money for 6 months and 7 per cent for 8 months; find the amount of money lent. $600—Ans.

6 How many flag stones, each 4ft. long and 3ft. wide, will pave a walk 8ft. wide on both sides of a street $\frac{1}{4}$ of a mile long? 1760—Ans.

7 In what time will a sum of money double itself if put on interest at 8 per cent, simple interest? $12\frac{1}{2}$yrs. —Ans.

8 The inside of a trunk is 2ft. 6ins. long, 15ins. wide, and 15ins. deep; how many square ft. of paper will line it? $15\frac{5}{8}$sq. ft.—Ans.

9 A is twice as old as B, but only half as old as C, the sum of their ages is $94\frac{1}{2}$yrs; find their ages. A's 27, B's $13\frac{1}{2}$, C's 54.—Ans.

10 If 9 tons are carried 40mls. for $30; what will it cost to carry 27tons 120mls? $270—Ans.

11 A man lost a five dollar bill; the remainder of his money is $\frac{26}{27}$ of what he had at first; how much money had he at first? $130—Ans.

Fourth Class 18.

1 Find the simple interest on £800 for 219dys. at $3\frac{1}{2}$ per cent. £16. 16s.—Ans.

2 A garrison of 18000 men had provisions for 40dys; at the end of 30dys. the garrison is reinforced by 2000 men; how long will the remaining provisions last? 9 dys.—Ans.

3 A horse and carriage cost $450; had $40 more been paid for the horse he would have cost twice as much as the carriage; find the cost of each. Horse $286\frac{2}{3}$, carriage, $163\frac{1}{3}$—Ans.

4 The divisor is 20 per cent of the dividend, the remainder is 25 per cent of the divisor, and the sum of the three is 625; find the dividend. 50625—Ans.

5 A customer in paying for goods gave a ten-dollar bill, which was 50cts. less than 40 per cent more than the price of the goods; how much change should he receive? $2.50—Ans.

6 A man's age is double his son's and half his father's age, and the sum of their ages is 161yrs.; find the age of the grandfather. 92yrs—Ans.

7 How many bushels of oats at 40cts. per bus. must be mixed with 30bus. of barley at 60cts. per bus. to make the entire mixture worth $26? 20bus.—Ans.

8 What length must be cut off a board 18ft. long and 18ins. wide, so as to leave 12ft. of lumber? 10ft—Ans.

9 Seven horses are worth as much as 28cows, and 3 cows are worth as much as 5sheep; how many sheep are worth as much as 3horses? 20sheep—Ans

Fourth Class 19.

1 William, John and Edward bought 100 apples, William paid 5cents, John 12cents, and Edward 8cents;

how many apples should each receive? William 20, John 48, Edward 32—Ans.

2 Divide two hundred and twenty-five thousandths by five tenths and multiply the quotient by two ten thousandths. ·0009—Ans.

3 If 30 per cent of the number of letters in a word be taken away there will be 3 letters on each side of the middle one in the remainder; how many letters in the word? 10letters—Ans.

4 A snail can climb 20ft. during the 12hrs. of night, but slips down 14ft. during the 12hrs. of day; how long will the snail take to reach the top of a pole 74ft. high? 9dys, 12hrs.—Ans.

5 If a certain fraction be multiplied by $\frac{3}{7}$ and the product divided by seven tenths, the quotient will be $\frac{22}{53}$, find the fraction. $\frac{53}{70}\frac{2}{5}$—Ans

6 A grocer mixes 140lbs. of tea at 40cts. a lb. with tea at 50cts. a lb; he sold the mixture for $105.60 being a gain of 10 per cent of the cost; how many pounds did he buy at 50cts? 80lbs.—Ans.

7 A house, which costs $45 annually for repairs and rents for $12 a month, can be sold for $1000 cash. If money be worth 9 per cent, how much per annum would the owner of the house gain or lose by selling it? He would lose $9—Ans.

8 A man sold a farm for $\frac{7}{5}$ of what it cost and gained $1800; how much did he give for the farm? $4500—Ans.

9 How many ties 6ins. wide and laid 2ft. apart are required for 1mile of railroad? 2113ties—Ans.

10 Pens were bought at $1 per gross and sold at $\frac{3}{4}$ cts each, find the gain on 100pens. $5\frac{5}{9}$cts.—Ans.

Fourth Class—20.

1 A farmer sold his wheat at $1.20 per bush. ; had he sold it at $1.22 per bus. he would have received $10 more ; how much wheat had he? 500bus.—Ans.

2 A field 30rods long and 20rods wide, produced 30 bus. of wheat per acre ; how many bus. did the field produce? 112½bus.—Ans.

3 A man put $1600 on interest at 6 per cent on the first of January. He saved $500 during the year ; how much was he worth at the end of the year? $2196—Ans.

4 Ten feet of a certain kind of wire weigh a pound ; find the weight of one inch of the wire. $2\frac{2}{17}$drams—Ans.

5 A clock, which gains 20mins. per day is 30mins. too fast at 9 o'clock in the morning ; how much too fast is it at 9 o'clock in the evening? 40mins.—Ans.

6 A grocer mixed 90lbs. of tea at 50cts per lb. with 80lbs. at 60cts. per lb. ; for how much per lb must he sell the mixture in order to gain 30 per cent on the first kind of tea and 40 per cent on the other? $73\frac{6}{17}$cts.—Ans.

7 What is the least sum of money, with which postage stamps of the denominations of ½ ct., 1ct., 2cts., 3cts., or 5cts, can be bought? 30cts.—Ans.

8 Find the amount of the following bill of goods :—

20yds. of cloth	at $1.12½ per yd.
30bus. 20lbs. of wheat	at 90cts. per bus.
3cwt. of beef	at 8cts. per lb.
1cwt. of flour	at $6 per brl.

$76.86\frac{6}{49}$—Ans.

9 The product of two numbers is 450, one of the numbers is five thirds of 15; the other number is $\frac{3}{5}$ of what number? : 0 – Ans.

Fourth Class - 21.

1 For what sum must a cargo worth $18000 be insured at 10 per cent so that, in case it is lost, the owner may receive both its value and the premium paid? $20000 —Ans.

2 An agent received $4000 with instructions to invest it in tea after deducting his commission at 3 per cent. What sum did he invest? 3883.49\frac{53}{103}$—Ans.

3 An agent sold 600 barrels of flour at $8 per barrel and received a commission of 2 per cent; find the amount of his commission. $96—Ans.

4 $80 commission was received for selling flour at $7 per barrel; how many barrels were sold, the agent's commission being 2 per cent? 571$\frac{3}{7}$barrels—Ans.

5 A broker sells a bill of exchange worth $900; find his brokerage at $\frac{1}{2}$ per cent. $4.50—Ans.

6. A man paid a premium of $8 for insuring his house at $1\frac{1}{2}$ per cent; for how much was the house insured? 533\frac{1}{3}$—Ans.

7 An agent received $2000 with instructions to invest in sugar, after deducting his commission at 2 per cent. He put the money on interest for 1 month at 6 per cent; find the sum of the interest and commission. 49.21\frac{29}{51}$ —Ans.

8 Find by "practice" the value of 8bus. 25lbs. of clover seed at £1. 16s. 8d. per bus. £15. 8s. 7$\frac{1}{5}$d.—Ans.

9 A watch and chain cost $90, the watch cost $11.50 more than the chain; find the cost of the chain. $39.25 —Ans.

10 The population of a city increased 40,000 in ten years, and this increase is 40 per cent. of what the population was at the end of the ten years; what was the population before it was increased? 60000—Ans.

Fourth Class—22.

1 A certain number, increased by 120 per cent. of itself, amounts to 1980; find the number. 900—Ans.

2 One-fifth of a number, increased by $\frac{1}{6}$ of it, is equal to 40 per cent. of another number, the sum of the two numbers is 5750; find the numbers. 3000 and 2750—Ans.

3 The value of 4horses and 7cows is $570, and the value of 6horses and 9cows is $810; how much is a horse worth? $90—Ans.

4 If $\frac{3}{5}$ of a bush. of wheat be worth $\frac{3}{4}$ of a bush. of barley, and barley be worth $\$\frac{2}{3}$ per bush.; how many bush. of wheat can be bought for $30? 36bush.—Ans.

5 If wire fencing cost 20cents per yard, what will it cost to fence the four sides of a field 40rods long and containing 8acres? $158.40—Ans.

6 At a certain examination $\frac{1}{3}$ of the candidates failed in grammar, $\frac{1}{5}$ of the remainder in arithmetic, and 40 passed; find the number of candidates. 90—Ans.

7 A father divided his land among his three sons; the first got 75acres, the second $\frac{2}{7}$ of the whole, and the third as much as the other two; how much land was divided? 350acres—Ans.

8 A merchant lost $\frac{2}{3}$ of his capital, afterwards he gained $800 and was then worth $3800; how much did he lose? $6000—Ans.

9 A man, after paying a tax of 3cts. on the $ on his income, had $970 left, what was his income? $1000—Ans.

Fourth Class—23.

1 A flag-staff 60ft. high was broken into two parts by the wind, ·38 of the longer part was equal to $\frac{3}{5}$ of the shorter part; find the length of each part. $36\frac{3}{4}\frac{6}{9}$ft.; $23\frac{1}{4}\frac{3}{9}$ft.—Ans.

2 Divide $880 between B and C, so that B's share may be to C's share as $\frac{2}{3}$ is to $\frac{1}{5}$. B $400, C $480—Ans.

3 A pile of wood 60ft. long, 24ft. wide and 12ft. high is made into piles 12ft. long, 8ft. wide and 4ft. high; how many piles will it make? 45piles—Ans.

4 A man spent 8 per cent. of his money and had $65 more than 40 per cent. of it left; how much had he at first? $125—Ans.

5 A watch and chain weigh 14ounces avoirdupois, the chain weighs 6ounces troy; find the weight of the watch in ounces avoirdupois. $7\frac{7}{1}\frac{3}{7}\frac{3}{5}$ ounces—Ans.

6 On a map of a town 1mile is represented by 18ins.; find the length of a street represented by 4ft. on the map. $2\frac{2}{3}$miles—Ans.

7 A man earns $40 a month; how much of this must he spend so that he may save $21\frac{1}{2}$ per cent of it? $31.40—Ans.

8 A merchant sold a hat at a gain of 30 per cent of the cost price, but lost 20 per cent of the selling price, by selling to a dishonest customer; find his actual gain per cent of the cost price? 4 per cent—Ans.

9 If $\frac{3}{5}$ of a bus. of wheat costs 60cts; what part of a bus. can be bought for 45cts? $\frac{9}{2}\frac{}{0}$—Ans.

Fourth Class—24.

1 How much copper is there in a bell, which weighs 6tons, bell-metal consisting of 3 parts copper to 1 of tin? 4tons 10cwt.—Ans.

2 A man filled $\frac{1}{5}$ of a cask with wine, then poured in twice as much water, and then poured in 6gals. of wine, which filled the cask; how much does the cask hold? 15gals.—Ans.

3 A grocer exchanged butter for 500lbs. of tea. He gave 1lb. of butter and 25cts. cash for every lb. of tea. The tea cost him $225; how much per lb. did the butter cost him? 20cts.—Ans.

4 How many feet of inch lumber in a scantling 14ft. long and 3ins. by 5ins? $17\frac{1}{2}$ft.—Ans.

5 A house 36ft. long, 25ft. wide and 17ft. high contains a room 12ft. by 10ft. and 9ft. high; what part of the house is this room? $\frac{6}{85}$—Ans.

6 A man sold a horse at 30 per cent gain and with the money bought another horse, which he sold for $124.80 and lost 20 per cent; find the cost of the first horse. $120—Ans.

7 An agent sold wheat on a commission of 2 per cent and invested the net proceeds in tea at 3 per cent commission. His whole commission was $\$97\frac{8}{103}$; find the value of the wheat. $2000—Ans.

8 A person bequeathed $20000 to a college to become available when the principal and interest amounted to $35000. The money was lent at 8 per cent, simple interest; in what time was the bequest available? $9\frac{3}{8}$yrs. —Ans.

Fourth Class—25.

1 A, B and C rent a pasture field for $80. A put in 10sheep, B, 14sheep, and C paid $32 as his share of the rent; how much rent did A and B pay, and how many sheep did C put in? A $20, B $28, C 16sheep—Ans.

2 If I gain 20 per cent by selling sugar at $12 per

cwt.; what per cent would I gain by selling it at $11 per cwt.? 10 per cent—Ans.

3 A merchant bought 200yds. of cloth for $120, and sells 40 per cent of it at 90cts. per yard and the remainder, which was damaged, at 50cts. per yard; find how much per cent he gained or lost. Gained 10 per cent.—Ans.

4 At what price per bushel must wheat be bought so that it may be sold at $1.17½ per bus., and a gain of 20 per cent may be realized? 98cts.—Ans.

5 How many fifths of a pint in a measure which holds ⅜ of a gallon? 15—Ans.

6 A woodshed is 22ft. long, 16ft wide and 12ft high; how many cords of wood will fill it? 33cords—Ans.

7 If pure gold is worth $240 per pound; find the value of the alloy in 20lbs. of standard gold, which is 22 carats fine, and worth $4500? $100—Ans.

8 A stick of timber 36ft. long, and 20ins. by 18ins., weighs 3600 pounds; what must be the length of another stick of the same kind of timber which is 12ins. by 8ins., and weighs 1200 pounds? 45ft.—Ans.

Fourth Class—26.

1 A man lent $1100 at 8 per cent, simple interest, to one person and, at the same time, $1200 at 7 per cent, simple interest, to another person; what was the difference between the amounts at the end of 2yrs. 6mos.? $90—Ans.

2 If 84bls. of flour cost $672; what will ½ cwt. cost at the same price? $2 4/9—Ans.

3 A lady spent 1/12 of her money and had $99.40 more left than she spent; how much money had she at first? $119.28—Ans.

4 Ten horses are worth as much as 100sheep, and 5 sheep are worth as much as a cow; find the value of 60 horses when a horse and a cow are worth $150? $6000—Ans.

5 Coal is bought at $9 per ton and sold at a gain of 20 per cent. At how much per cwt. is it sold? 54cts.—Ans.

6 A and B fire 40 rounds each at targets, A fires 4 times in 5mins. and B twice in 90secs.; how many rounds will A have to fire, when B has finished? 16 rounds—Ans.

7 A stationer bought pens at 60cts. a gross, and sold them at a gain of $\frac{1}{4}$ cent each; find the selling price. $\frac{3}{5}$ cent each—Ans.

8 A man bought a farm with 60 per cent of his money, and spent $\frac{1}{10}$ of it in making improvements. He had $2700 left; how much had he at first? $9000—Ans.

9 What is the value of an inch board 18ins. long and $4\frac{1}{2}$ins. wide at $18 per thousand? $1\frac{1}{80}$cts.—Ans.

Fourth Class—27.

1 A man sold his farm at a gain of 8 per cent of what he paid for it; the sum of the buying price and the selling price is $11648; find the buying price. $5600—Ans.

2 The passengers and crew on a certain steamer amount to 320. The passengers are 40 more than four times the crew; how many passengers were there? 264 passengers—Ans.

3 A yard stick is broken into two parts such that $\frac{4}{9}$ of one is double the other; find the length of the longer part. $29\frac{5}{11}$ inches—Ans.

4 A person bought a farm for $6000 and paid $2000 down. Of the remainder he paid $500 yearly with interest at 6 per cent on the money to be paid; how much did the principal and interest amount to when the farm was paid? $7080—Ans.

5 A stick of oak 40ft. long and 18ins. wide, weighs 4500; find the thickness of the stick, given that a cubic foot of oak weighs 60pounds. 15ins. Ans.

6 Find the amount of the following bill of goods:—

36yds. of silk	at 90cts. per yd.
88yds. of linen	at 20cts. per yd.
20yds. of broadcloth	at $2.50 per yd.
20lbs of coffee	at 18cts. per lb.
2cwt. of pork	at $2 per quarter.
600lbs. of hay	at $8 per ton.
$2\frac{1}{2}$ lbs. of 3-inch nails	at $3\frac{1}{2}$cts. per lb.
3pks. of wheat	at $\$\frac{9}{11}$ per bus.
$\frac{4}{5}$lb. of Paris green	at $\$\frac{4}{5}$ per lb.

$\$123.15\frac{255}{308}$—Ans.

Fourth Class—28.

1 A merchant bought 2000pounds of tea at 42cts. per lb. He sold 30 per cent of it at cost; at how much per pound must he sell the remainder in order to gain 10 per cent on the whole cost? 48cts.—Ans.

2 An agent bought 1600lbs. of tobacco at 30cts. per lb., after deducting his commission at 2 per cent; find the amount of money sent him. $489.60—Ans.

3 The value of a house and its furniture is $2900. The value of the house is to that of the furniture as $3\frac{1}{2} : 1\frac{1}{3}$; find the value of the house. $2100—Ans.

4 The divisor is three times the quotient. Six times their sum is greater than four and a half times their sum by 480; find the dividend. 19200—Ans.

5 A merchant's capital increased 40 per cent the first year he was in business, 20 per cent the second year and 45 per cent the third year. He then had $1400; how much had he when he commenced business? $574 $\frac{6}{87}$—Ans.

6 If 8½bus. of wheat cost $10; how many bus. can be bought for $560? 476bus.—Ans.

7 Find the value of 86lbs. avoirdupois of butter at 12 cts. per lb. troy. 12.54\frac{1}{6}$—Ans.

8 A man digs a ditch at 14cts. per rod. He earned $28 in 15days; how many rods did he dig per day? 13$\frac{1}{3}$rods—Ans.

Fourth Class - 29.

1 Divide $4000 among A, B and C, so that B may receive $100 less than twice A's share, and C twice as much as A and B. A 477\frac{7}{9}$, B 855\frac{5}{9}$, C 2666\frac{6}{9}$—Ans.

2 A man who owns ·475 of a steamboat sells ·3 of his share for $5700; find the value of 45 per cent of the boat. $16200—Ans.

3 A can do $\frac{3}{5}$ of a piece of work in 18days, B$\frac{3}{4}$ of it in 20days, and C$\frac{4}{9}$ of it in 12days; in what time will A, B and C working together do $\frac{233}{2160}$ of the work? 1day—Ans.

4 A bankrupt's debts are $550, and his assets are $350; he owes one creditor $90; how much will that creditor lose? 32.72\frac{8}{11}$—Ans.

5 A man gave his note for $600, at five per cent, simple interest, on the first day of January. At the end of 6mos. he paid $215, part of which was to pay the interest then due; how much would redeem his note at the end of the year? $410—Ans.

6 The interest on $6000 for two days is $3; find the rate per cent per annum. $9\frac{1}{8}$ per cent—Ans.

7 How often can a man give away $\frac{1}{11}$ of his money and have $55\frac{5}{11}$ per cent of it left? 5 times—Ans.

8 A clerk put $800 on interest at 8 per cent for 2 yrs. At the end of the first year he received the interest then due, which he put on interest at the same rate; how much should he receive at the end of the second year? $933.12—Ans.

Fourth Class—30.

1 Eighty times a certain number increased by 60 per cent. of it amounts to 40300; find the number. 500—Ans.

2 A man sold a farm for $4500, gaining thereby 16 per cent of the cost; how much did he pay for it? $3879\frac{2}{29}$—Ans.

3 An agent receives a commission of $\frac{1}{100}$ of the money he invests. He bought 550horses at $90 a head; find the amount of his commission. $495—Ans.

4 If $\frac{2}{5}$ of a farm be worth $2500; find the value of 8 per cent of the remainder. $300—Ans.

5 Find the cost of papering the four walls of a room 22ft. long, 18ft. wide and 9ft. high, at 18cts. a square yard. $14.40—Ans.

6 If 800 oranges be sold for what 1000 cost; what is the gain per cent on the cost, the buying price being 36 cts. per dozen? 25 per cent—Ans.

7 By selling a house for $6000 ten per cent is lost; what selling price would have gained ten per cent? $7333.33\frac{1}{3}$—Ans.

8 What sum of money will amount to £454 in 2yrs., 3 mos. at 6 per cent, simple interest? £400—Ans.

9 Twelve lbs. of tea at 50cts. per lb. are mixed with 20lbs. at 40cts. per lb.; what per cent of the mixture is worth 70cts.? 5 per cent.—Ans.

10 If the double of a certain number be increased by 864, the sum will be eight times the number; find the number. 144—Ans.

Fifth Class—1.

1 Two thirds of $\frac{1}{2}$ is how many times $\frac{1}{15}$? 5times—Ans.

2 Three tenths of a fifth is how many eighths of a tenth? $4\frac{4}{5}$—Ans.

3 Three fifths of twenty-five is five sevenths of how many tenths of forty? $5\frac{1}{4}$—Ans.

4 Subtract the square root of 50625 from the square of 24 and multiply the remainder by the cube of 4. 22464—Ans.

5 What is the discount on a note for $600 due in two years, money being worth 6 per cent? $64.28\frac{4}{7}$—Ans.

6 A note for $800, due in 70days, is bought by a banker; find the amount given for the note, money being worth 7 per cent? $788.80—Ans.

7 What is the difference between the third power of $(1216-20\times36)$ and the fifth power of $(1200+16-20\times36)$? 246016—Ans.

8 $9801 was paid for a certain number of horses, the price of a horse in dollars being equal to the number of horses bought; how much was paid for each horse? $99—Ans.

9 A square pyramid of cannon-balls has 15 on each side at the base; how many balls in the pyramid? 1240 balls—Ans.

10 Five hundred and seventy-six soldiers are formed into a solid square; how many men are there in the outside row on one side? 24men—Ans.

11 A certain number multiplied by its square gives 1728; find the number. 12—Ans.

12 A square plank 2ins. thick contains $4\frac{1}{2}$ft. of inch lumber; find the length of one side of it. 1ft. 6ins.—Ans

Fifth Class 2.

1 The square of a certain number increased by 136 amounts to 761; find the number. 25—Ans.

2 Add the cube root of 4096 to the cube of 22, and from the sum subtract the square root of 20736. 10520—Ans.

3 Extract the square root of two hundred and eighty-nine ten thousandths and give your answer in the form of a vulgar fraction. $\frac{17}{100}$—Ans.

4 The value of 5bus. of wheat and 6bus. of oats is \$6.80, and the value of 6bus. of wheat and 8bus. of oats is \$8.40; how many bus. of oats are worth as much as 12bus. of wheat? 40bus.—Ans.

5 By selling oranges at 48cts. per dozen, 20 per cent was gained; what selling price would have gained 30 per cent? 52cts. per doz.—Ans.

6 A can do $4\frac{1}{4}$ per cent of a piece of work in a day, B can do $5\frac{1}{2}$ per cent of it in a day, and C can do the work in 30days; in what time can the three, working together, do it? $7\frac{101}{157}$days—Ans.

7 A ladder 50ft. long is placed against a wall 30ft. high, the top of the ladder just reaches the top of the wall; how far from the wall is the other end of the ladder? 40ft. Ans

8 An agent sold apples on a commission of 2 per cent and bought sugar with the proceeds on a commission of $1\frac{1}{2}$ per cent. His commission for both transactions was \$350; he paid 10cts. per lb. for the sugar; how many pounds did he buy? 98000pounds—Ans.

Fifth Class—3.

1 Three fifths of a farm is worth \$976 less than $\frac{7}{5}$ of it, find the value of $\frac{1}{3}$ of $\frac{3}{5}$ of $\frac{10}{11}$ of it. $\$221\frac{9}{11}$—Ans.

2 Find the value of (1) $3^2+\sqrt{36}-2^2+\frac{1}{3}$ of $\sqrt{\frac{9+7}{\sqrt{21+4}}}$

(2) $(4+\sqrt{8\times 2}+9)^2+(6+\sqrt{\frac{81}{100}}+1\frac{1}{10})^2\sqrt{\frac{1}{16}}$.

(1) $11\frac{4}{15}$, (2) $352\frac{3}{4}$.—Ans.

3 Divide \$3000 among A, B, C and D, so that A may have twice as much as B, B \$100 less than C, and D as much as A and B together. A $\$828\frac{4}{7}$, B $\$414\frac{2}{7}$, C $\$514\frac{2}{7}$, D $\$1242\frac{6}{7}$.—Ans.

4 John is 90rods east of Peter, James is 90rods south of John, and Thomas is 90rods east of James; how far apart are Peter and Thomas? 201.24+rods.—Ans.

5 A globe 37ins in diameter is how many times greater than one 13ins. in diameter? $23\frac{122}{2197}$times—Ans.

6 A man invested \$8000 in Bank Stock at 112, which yields a dividend of 8 per cent per annum; how much greater would his income have been at the end of 2yrs. 4mos., had he lent his money at 8 per cent, simple interest? \$160—Ans.

7 The G. C. M. of two numbers is $\frac{1}{75}$, their L. C. M. is 1·2, one of the numbers is $\frac{3}{25}$; find the other number. $\frac{2}{15}$—Ans.

8 From a certain number $\frac{1}{10}$ of itself is taken and $\frac{5}{12}$ of the remainder is 180; find the other number. 480—Ans.

9 The average of 16 results is 20, that of the firs three being 8, and of the next nine 12; find the average of the last four? 47—Ans.

10 A banker paid $133 for a note of $140, which was legally due in 8mos.; find the rate per cent discount. $7\frac{1}{2}$per cent—Ans.

Fifth Class—4.

1 An agent received a commission of 2 per cent on the proceeds of 600bls. of flour. His commission amounted to $72; how much did he receive per barrel for the flour? $6—Ans.

2 Find the compound interest on $800 for 2yrs. at 5 per cent, payable half-yearly. $83·0503125—Ans.

3 Sixty men have provisions to last them 30 days; how long will the provisions last if 30 per cent of the men leave? $42\frac{6}{7}$days—Ans.

4 A monument is 30ft. high, its shadow is 120ft. long; find the distance from the top of the monument to the farthest end of the shadow. 123·69+ft.—Ans.

5 $\frac{24}{25}$ per cent is added to a certain number; what per cent must be taken from the sum to give the original number? $\frac{600}{631}$ per cent—Ans.

6 A train 200ft. long runs over a bridge 120ft. long, at the rate of a mile in 3mins.; how long will the train be in crossing the bridge? $10\frac{10}{11}$secs.—Ans.

7 The divisor is 30 per cent of the dividend, the quotient is 3, and the sum of the three is 1173; find the remainder. 90—Ans

8 A man invests $1200 in Bank Stock paying 4 per cent. How much must he pay for the stock per hundred in order to receive 6 per cent on his money. $66\frac{2}{3}$ —Ans.

9 What is the diagonal of a square containing 10acres? 56 5+rods.—Ans.

10 A merchant sold silk at $1.06\frac{2}{3}$ per yd., gaining thereby 20 per cent of the cost; what did he pay per yd. for the silk? 89cts.—Ans.

Fifth Class—5.

1 An agent sold 200brls. of flour at $8 per brl. and received a commission of 2 per cent; find the amount of his commission. $32—Ans.

2 An agent received $1020 with instructions to deduct a commission of 2 per cent and invest the proceeds in tea at 40cts. per lb.; how many pounds of tea did he purchase? 2500lbs.—Ans.

3 A store-keeper sells 12yds. of flannel for what 13 yds. cost; find his gain per cent? $8\frac{1}{3}$—Ans.

4 A and B enter into partnership, A contributes $9000 and B $6000. At the end of 9 months A withdraws his capital and B continues the business until the end of the year. The gain during the year was $3000; find A's share of the gain. $1588\frac{4}{11}$—Ans.

5 Find the compound interest of $3000 for 2 years at 9 per cent, payable half yearly. $376.52643—Ans.

6 Sold $\frac{3}{4}$ of a brl. of flour for what the whole brl. cost; what per cent did I gain on the part sold? $33\frac{1}{3}$ per cent—Ans.

7 What is the edge of a cube whose entire surface is 16sq. ft. 96 sq. ins.? What is its volume? 20ins., 8000 cub. ins.—Ans.

8 There is a rectangular garden-plot whose length is to its breadth as 4 is to 3. Around it is a walk 10ft. wide, which contains 14400sq. ft.; find the dimensions of the plot. 400ft. by 300ft.—Ans.

Fifth Class—6

1 Define, Ad Valorem Duty, Specific Duty, Invoice, Carat and Stock.

2 Write in words $1\frac{789}{1000}$, ·3 and 1.218.

3 A merchant marked a piece of cloth 40 per cent above cost; when selling it he made a reduction of 10 per cent of the marked price and gained $20\frac{4}{5}$cts. per yd; how much did the cloth cost per yd.? 80cts.—Ans.

4 In a mixture of wine and water 70 per cent of the whole is wine; 11gals. more water are added, and now only $63\frac{7}{11}$ per cent is wine; how many gallons of wine were there at first? 77gals.—Ans.

5 A man gave his note for 8months at 6 per cent. He paid $900 to redeem it when due; what was the face of the note? $\$865\frac{5}{13}$—Ans.

6 If a certain number be increased by 47, $\frac{3}{10}$ of $\frac{20}{21}$ of the sum is $54\frac{6}{7}$; find the number. 145—Ans.

7 The length of a field, containing 2acs. 2ro. 5sq. rods, is 5times its width; find the length of the field. 45rods—Ans.

8 A merchant bought 500yds. of silk at $1.10 per yd; he paid a specific duty of 30cts. per yd. and an ad valorem duty of 10 per cent. At what price per yd. must he sell it so as to gain 40 per cent on the entire cost? $\$2.11\frac{2}{5}$—Ans.

9 Eighteen per cent of 360 is ·5 per cent of what number? 12960—Ans.

Fifth Class—7

1 A tree 80ft. high was broken into two parts by falling; $\frac{2}{13}$ of the longer part is equal to $\frac{2}{3}$ of the shorter part; find the length of the longer part. 65ft.—Ans.

2 An agent sold flour on a commission at 5 per cent and invested the net proceeds in silk on commission at 4 per cent. His whole commission was $\$69.23\frac{1}{13}$, and the price of the silk was \$1 per yd ; find the value of the flour and the number of yards of silk bought? \$800 ; $730\frac{10}{13}$yds.—Ans.

3 What is the difference between the true and bank discount on \$636 for 1yr. at 6 per cent. $\$2.47\frac{133}{365}$—Ans.

4 Five times the square of a certain number is greater than three times its square by 1250 ; find the number. 25—Ans.

5 How many cubic feet of timber in a log 14ft. long and 2ft. in diameter. (Diameter$\times 3\frac{1}{7}$=circumference)? 44 cub. ft.—Ans.

6 A field in the form of a right-angled triangle has two sides 30rods long ; find the length of the other side. 42.42+feet—Ans.

Fifth Class—8.

1 A Canadian cent is placed on a penny so that their centres coincide. The penny is $1\frac{1}{3}$ins. in diameter ; find the area of the uncovered part of the penny ($d\times 3\frac{1}{7}=c$). $\frac{11}{18}$sq. ins.—Ans.

2 A refiner has 20 ounces of gold 21 carats fine and melts it with 10 ounces 20 carats fine ; how much pure gold must be added to make the mixture 22carats fine? 20ounces—Ans.

3 A company took a risk at 2 per cent and re-insured $\frac{3}{4}$ of it in another company at $2\frac{1}{2}$ per cent. The premium received by the company was \$8 more than that paid ; on how much more was a premium received than paid? \$1600—Ans.

4 A merchant bought 300lbs. of tea for $180; he paid 50cts. per lb. for a part of it and another price for the remainder; had he paid 50cts. per lb. for the second quantity and the second price for the first quantity, he would have paid $30 more. What was the price per lb. of the second quantity? 80cts.—Ans.

5 Simplify $(\frac{1}{12})^2+\sqrt{(\frac{98}{156}-\frac{17}{12})}$. $\frac{109}{144}$—Ans.

6 The triangular gable of a building has a base of 38 feet and an altitude of 16feet. What will it cost to cover the two gables with half-inch lumber at $20 per thousand inch measure? $12.16—Ans.

Fifth Class—9.

1 A horse and carriage cost 320; had $20 more been paid for the horse, and the cost of the two remained the same, he would have cost $2\frac{1}{5}$ times as much as the carriage; find the cost of the horse. $200—Ans.

2 If the diameter of a half-penny be to that of a penny as 3:4; how many times the thickness of the half-penny is the thickness of the penny? $1\frac{1}{8}$times—Ans.

3 A ruler is 1in. in diameter and 22ins. long; how many cubic inches in $\frac{5}{11}$ of it? $7\frac{6}{7}$cub. ins—Ans.

4 A and B engage in trade and gain $420; A owns $200 more than $\frac{2}{3}$ of the stock and B's share of the gain is $100; find A's stock. $1600—Ans.

5 The amount is $800, the principal is three times the interest, the time is 5yrs; find the rate per cent. $6\frac{2}{3}$per cent—Ans.

6 In a right angled triangle the base is 40 rods and the perpendicular is 30 rods; find the area of the triangle whose base is the line joining the points of bisection of the perpendicular and hypothenuse. 150sq. rods. —Ans.

Fifth Class—10.

1 A and B engage in trade, A puts in $800 and B $600. At the end of 6mos. A puts in $400 more and at the end of 8mos. B puts in $500 more. At the end of the year their assets are $3000; find A's share of the gain. 396\frac{12}{23}$—Ans.

2 Simplify $\frac{\sqrt{(1-\frac{7}{16})}\ \sqrt{(2-1\frac{13}{49})}}{\sqrt{(1-\frac{9}{25})}\ \sqrt{(2-\frac{40}{121})}} \div \frac{3\frac{1}{3}\frac{5}{2}}{}$—Ans.

3 A man bought a number of sheep for $1800; he sold $\frac{2}{3}$ of them at $7 apiece, gaining 16$\frac{2}{3}$ per cent of what they cost. How many sheep did he buy? 300sheep—Ans.

4 When gold is quoted at 110; what is the value in gold of $100 in greenbacks? 90\frac{10}{11}$—Ans.

5 A man buys a house to be paid for as follows: $\frac{1}{3}$ down, and $\frac{1}{6}$ every four months until the whole is paid. When might the whole be paid at once? 8mos.—Ans.

6 Find the number of acres in a rectangular field whose perimeter is 480 rods and whose length is five times its width. 50acres—Ans.

Fifth Class - 11.

1 What is the present worth of a note of $20, payable in 1 year at 6 per cent discount? 18.86\frac{2}{53}$—Ans.

2 If a certain number be increased by $\frac{1}{2}$ of its square the sum will be 220, but if it be increased by $\frac{1}{5}$ of its square the sum will be 100; find the number. 20—Ans.

3 The cube root of the square of a number is 16; find the number. 64—Ans.

4 A man sold his farm for 20 per cent more than 90 per cent of what it cost, and gained $800; find the cost of the farm. $10000—Ans.

5 Two watches show correct time on Monday at noon. One gains 2mins. per day and the other loses 20secs. every hour; what difference will there be between the two watches at noon on Saturday of the same week? 50 mins.—Ans.

6 The base and perpendicular of a right angled triangle are 40 and 30 respectively; find the area of the triangle whose sides are the base, the perpendicular from the right angle upon the hypothenuse and the segment adjacent to the base. 384—Ans.

Fifth Class—12.

1 A man in Montreal owes a person in London £900 sterling. In paying this debt how many dollars will he have to give for a bill of exchange; exchange at 110 and commission $\frac{3}{4}$ per cent? $4430—Ans.

2 A person has an annual income of $500 from Bank Stock which pays 5 per cent dividend and sells at 120. What would his annual income be if he sold out and invested in Railway Stock at 140, which pays a half-yearly dividend of $3\frac{1}{2}$ per cent? $600—Ans.

3 John is 32yrs. old and Thomas is 14yrs.; in how many years will John be twice as old as Thomas? 4yrs. —Ans.

4 A merchant sold goods allowing his customers a year's credit or a reduction of 10 per cent for cash. A customer bought goods to the amount of $300 and paid cash. How much did he save, money being worth 8 per cent per annum? $8.40—Ans.

5 The perimeter of an equilateral triangle is 120rods. Find the length of a line drawn from one of the angles to the middle of the opposite side. 34.64+rods.—Ans.

6 What quantities of tea at 45 and 60cts. per pound, must be mixed together so that the mixture may be worth 48cts. per pound. 3lbs. at 60cts., 12lbs. at 45cts.—Ans.

Fifth Class—13.

1 The state of a railway company's affairs would justify a dividend of 4 per cent but for the fact that $1500000 of the stock consists of preference shares which are guaranteed a half-yearly dividend of $2\frac{1}{2}$ per cent. The ordinary shareholders receive only $1\frac{1}{2}$ per cent half-yearly; what is the whole amount of stock? $3000000 Stock—Ans.

2 If 10bus. of wheat be worth 20bus. of peas, and 5 bus. of peas be worth 10bus. of oats, and 20bus. of oats be worth 15bus. of barley, how many bus. of barley are worth 200bus. of wheat? 600bus.—Ans.

3 A person sold 50bus. of grain for $42, some at 77 cents per bus. and the remainder at $94\frac{1}{2}$cts. per bus.; he gained 10 per cent on the first kind and 5 per cent on the second. Find the entire gain. $3—Ans.

4 If 10men, 12women, 15boys or 20girls, can perform a piece of work in 30days; how long will it take 2men, 2women, 2boys and 2girls to do the same work? 50days —Ans.

5 In what time will $300 triple itself at 10 per cent, simple interest? 20yrs.—Ans.

6 Find the diagonal of a rectangle whose area is $7\frac{1}{2}$ acres and whose base is $1\frac{1}{3}$ times its perpendicular. 50 rods—Ans.

Fifth Class—14.

1 The minute hand of a clock moves 6 per cent too fast and the hour hand 5 per cent too slow. The hour

hand is at 2 and the minute hand at 6; in how many minutes will they be together? $40\frac{9}{11}\frac{8}{11}\frac{0}{7}$mins.—Ans.

2 A farmer sold a cow at a gain of 30 per cent; if he had sold her for $4 less he would have gained only 20 per cent. How much did he get for the cow? $52—Ans.

3 Of two kinds of flour the first is worth 50cents per brl. more than the second, and 11brls. of the first are worth as much as 12brls. of the second; find the price of the first kind per barrel. $6—Ans.

4 At how much per hundred must a person buy Bank Stock which pays a half-yearly dividend of $2\frac{1}{2}$ per cent in order that he may receive 6 per cent for his money? $83\frac{1}{3}$—Ans.

5 A man receives $1.60 for every day he works and forfeits 50cts. every day he is idle. He earns $59 in 50 days; how many days did he work? 40days—Ans.

6 A safe is 2ft. 8ins. long, 2ft. 6ins. wide and 3ft. high in external dimensions and the metal of which it is composed is 8ins. thick; find the capacity of the safe. $2\frac{16}{27}$ cubic feet—Ans.

Fifth Class—15.

1 A and B enter into partnership. A contributes 60 per cent of the joint capital for 8mos., and B receives 30 per cent of the gain; how many months was B's capital in the investment? $5\frac{1}{7}$months—Ans.

2 A merchant bought a quantity of tea for $34.40; after selling 6lbs. at cost, he sold 30 per cent of the remainder for $10.56, gaining 10 per cent; how many pounds did he buy? 86pounds—Ans.

3 The hour hand of a clock moves 20 per cent too fast and the minute hand moves 20 per cent too slow;

they will be together in 20mins. (true time); how many spaces are they apart? 14spaces—Ans.

4 A invested $4000 in Bank Stock at 110 paying a yearly dividend of 5 per cent, B invested $3500 in 3 per cent stock at 90; find the difference between their annual incomes. $65\frac{5}{33}$—Ans.

5 A man insured his house at $\frac{3}{4}$ per cent, the policy covering both the value of the house and the premium. The premium was $30; find the value of the house. $3970—Ans.

6 In a circle a straight line joining the extremities of two radii, at right angles to each other, forms with them a triangle whose area is 98; find the area of the circle. 616—Ans.

ERRATA.

Page 5, Ex. 5—for "328" read "326."

Page 7, Ex. 4—for "it" read "is."

Page 22, Ex. 2—for "greater is" read "greater than"

Page 25, Ex. 9—for "2grs." read "2qrs."

Page 32, Ex. 4—for "was" read "were."

Page 35, Ex. 9—for "81352" read "813152."

Page 36, Ex. 8—for "5×20+30" read "5+20×30."

Page 54, Ex. 6—omit "common."

Page 56, Ex. 5—for "2" read "$2\frac{1}{2}$" and omit "$\frac{1}{2}$" after "of."

Page 57, Ex. 12—for "3643" read "3463" and omit "cents" after $1.12\frac{1}{2}$

Page 61, Ex. 9—for "$3051" read "$3015."

Page 65, Ex. 6 (1)—for "$6667\frac{2}{3}$" read "$666\frac{2}{3}$"

Page 69, Ex. 5, Ans—for "2sq rods" read "20sq. rods."

Page 70, Ex. 5 Ans.—for "times" read "time."

Page 71, Ex. 1 (3)—for first "+" read "×" and insert ")" after the second "$\frac{1}{4}$."

Page 72, Ex. 9—for "wheat at $\$\frac{3}{4}$" read "wheat at $5.4."

Page 76, Ex. 6—for "18 are worth" read "18 cows are worth."

Page 79 Ex. 2—for "are" read "is."

Page 82, Ex. 4—for "33 read "3·3."

Page 92, Ex. 8—for "960oz." read "$797\frac{101}{192}$oz."

Page 102, Ex. 2, Ans—for "·0009" read "·00009."

Page 108, Ex. 3—for "sells" read "sold."

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