

SECOND DIVISION—TIME: THREE HOURS.

1. JUNIORS—Find cost of 3 tons 18 cwt. coal at \$5.87½ per ton.
SENIORS—How many tons, cwt., &c., could be bought for \$95.20.

2. JUNIORS AND SENIORS—Divide \$340 among A, B, and C, giving A \$2 as often as B gets \$3, and C \$4 as often as B gets \$1.

3. JUNIORS—What is the L. C. M. of 13, 17, 26, 34, 52, 68, 156?
SENIORS—Take the additional two numbers, 340 and 364.

4. JUNIORS—If 4 men, or 7 boys, or 10 girls, can do a piece of work in 5 days, how long would it take 2 boys and 2 girls to do it?
SENIORS—How many girls would be required to assist 4 boys to finish it in 3½ days?

5. JUNIORS—A man has \$304.30½ to give away among some poor boys. If he gives 30½ cents to each, how many will partake of his bounty?

SENIORS—Express ¾ of a guinea as the decimal of \$14.25½.

6. JUNIORS—A cistern has three supply pipes that will fill it in 3, 4 and 5 hours respectively, and two pipes that will empty it in 2 and 6 hours respectively. If all the pipes are opened at the same time, in what time will the cistern be filled?

SENIORS—What sum will pay a debt of \$1268.75 which has been at interest for 3 years and 5 months at 7½ per cent.?

7. JUNIORS—How long would it take you to walk from Toronto to Hamilton (40 miles) if you take 10 steps a minute, and each step is 2½ feet.

SENIORS—Find the number of rolls of paper required to paper a room 24 feet long, 16 feet wide and 14 feet high, if the paper is 18 inches wide and has 7 yards in a roll.

8. SENIORS AND JUNIORS—Find the sum of the following numbers, beginning with 45678932, 56789824, and so on, inverting one figure at a time until all are inverted.

THIRD DIVISION—TIME: THREE HOURS.

1. JUNIORS—Simplify $9768 - 987 + 8679 - 4455 - 5432 + 8769 + 9999 - 7896 + 45978$.

SENIORS— $13495 \times 3 - 768 \times 9 + 473 \times 2 \times 3 - 786 \div 2 - 430 \div 5 + 7869 \times 7$.

2. JUNIORS—Forty-seven boys combined to have a pic-nic. They purchased 94 oranges at 3c. each; 38 lemons at 2c. each; 4 lbs. sugar at 12c. per lb., and spent \$1.58 for cakes. How much had each boy to pay?

SENIORS—If the boys bought ice-cream too, and then each one had to pay 16c., how much was paid for the ice-cream?

3. JUNIORS—A little English boy came to Toronto and he had just £1 1s. 4½d., which he changed for our money. How much did he get?

SENIORS—If he got \$13.56, how many £ s. and d. had he?

4. JUNIORS—A man divided \$12600 between his son and daughter, giving his son \$724 more than his daughter. How much did he get?

SENIORS—If there were two sons and each got \$724 more than the daughter, how much did each get?

5. JUNIORS—If you subtract 23 from 352 fifteen times, how many will you have left?

SENIORS—How many times may 27 be subtracted from 3300?

6. JUNIORS—A doctor bought 12 lbs. of medicine and made it up into powders, each having 4 scruples in it. How many powders?

SENIORS—If the medicine cost \$2 per lb., and he sold the powders for 5c. each, how much did he gain or lose?

7. JUNIORS—If it is 720 miles from B to A, and Tom starts from B and goes 4 miles an hour, and at the same time Frank starts from A and goes 6 miles an hour, how far from A will Tom meet Frank?

SENIORS—How far from A will they meet on the return journey?

8. JUNIORS—Hanlan won \$6000 by rowing 5 miles at Washington. If his shell went 20 feet for every pull, how much did he get for each pull?

SENIORS—What is the smallest sum of money with which I can buy sheep at \$5, cows at \$22, or horses at \$75 each? How many of each can I buy?

MENTAL ARITHMETIC.

FIRST DIVISION—TIME: TWENTY-FIVE MINUTES.

N.B.—Write nothing but the answer opposite the sign =.

1. Find result of $34562 - 34372 =$

2. What number will contain 245 just 245 times? =

3. Toronto ships flour to Montreal with instructions to deduct both commissions and invest proceeds in tea. The commissions are 2 per cent. and 3 per cent. respectively, and amount to \$375. Find value of the flour. =

4. A boy has just 5 hours at his disposal. He desires to know how far he may ride at the rate of 8 miles an hour and walk back at the rate of 3, and be in time? =

5. Two men entered into a speculation by which they made \$2700. The one put in \$4800, the other, \$6000. How should the profit be divided? =

6. A can do a piece of work in 5 days, B can do it in 6, and C in 8. How long will it take, if all work together? =

7. How many yards of 27-inch carpet will be required for a room 18 feet wide and 25 feet 6 inches long? =

8. If ¾ of a yard of cloth cost \$¾, how much will 1½ yds. cost? =

SECOND DIVISION—TIME: TWENTY-FIVE MINUTES.

N.B.—Write nothing but the answer opposite the sign =.

1. Multiply 4679 by 25. =

2. Multiply 3456 by 17. =

3. Divide \$236 between A and B, giving B. \$16 more than A. =

4. ¾ of 27 is ¼ of what number? =

5. Willie can eat a pie in 3 hours, Tom, in 4 hours, Sam, in 6 hours. How long will it take all of them? =

6. If I pay \$2.25 a barrel for apples, how many can be bought for \$9.75? =

7. A man gave away ¼ of his money and then spent ½ of the balance and had \$93 left. How much had he at first? =

8. Find the cost of 15 doz. of eggs at 1½d. each. =

ALGEBRA.

Values.

FIRST DIVISION—TIME: TWO HOURS.

5 1. Write in words the meaning of the expression $(abc + xy)^2$.

5 2. Add together $5m + 3n + p$, $3(m + n + p)$ and $5p + 3n + m$, and obtain the numerical result when $p = \frac{n}{10} = \frac{m}{100} = 1$.

5 3. Add together $(a+b)x + (a+c)y$, $(b+c)y$, and $(c-a)x + (b-a)y$.

4. Prove that $c - (a - b) = c - a + b$.

10 5. Simplify $16 - \left\{ \frac{5}{4} - x - -\frac{1}{4} \left(3 - \frac{x}{2} \right) \right\}$.

15 6. Prove that $a^4 \times a^3 = a^7$, and multiply $x^4 + 2x^3y + 4x^2y^2 + 8xy^3 + 16y^4$ by $x - 2y$.

15 7. Prove that $a^6 \div a^3 = a^3$, and divide $(x^3 - 9x^2y + 23xy^2 - 15y^3)(x - 7y)$ by $x^2 - 8xy + 7y^2$.

10 8. Resolve the following expressions into factors:—
 $81x^4 - 1$, $(4x + 3y)^2 - (8x + 4y)^2$, $12x^3 - 14x + 2$.

10 9. Solve the following equations:—

(i.) $13x - 21(x - 3) = 10 - 21(3 - x)$.

(ii.) $(2 + x)(a - 8) = -4 - 2ax$.

10 10. A and B play together for \$5; if A win, he will have thrice as much as B, but if he lose he will have only twice as much. What has each at first?

20 11. Reduce to its lowest terms

$$\frac{y^3 - (2a + b)y^2 + (2ab + a^2)y - a^3b}{3y^3 - (4a + 2b)y^2 + 2ab + a^2}$$

10 12. Find the L. C. M. of $4(a^3 - ab^3)$, $12(ab^3 + b^3)$, $8(a^3 - a^2b)$.

10 13. Prove that $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$.

10 14. Explain fully the method of solving a quadratic equation, and solve

$$\frac{5x}{x+4} - \frac{8x-2}{2x-3} = 2.$$

10 15.
$$\begin{cases} xy = z + y \\ xz = 2(x + z) \\ yz = 3(y + z) \end{cases}$$