Prize Competition.

ARITHMETICAL PROBLEMS.

FOR CANADA SCHOOL JOURNAL COMPETITION PRIZES—FOURTH CLASS.

BY MIGMA.

1. Nine cords of hard wood have the same heating capacity as 5 tons of coal. A farmer burns 30 cords of wood in a year, for which he paid $3.50 per cord. How much will he save (if anything) by changing to coal, which he can buy for $5.75 per ton. Ans. $9.16¾ in favor of coal.

Solution. 9 cords, 30 cords, 5 tons, 16⅔ tons.
So that 16⅔ tons of coal=30 cords of wood
30 cords @ $3.50=$105.00
16⅔ tons @ $5.75= $95.83⅓

$9.16⅔ in favor of coal.

2. A school-house lot contained a quarter of an acre, and was 90 feet wide. The trustees proposed to add another quarter of an acre, by increasing the width 30 feet. How much had the length to be increased? Ans. 60½ feet.
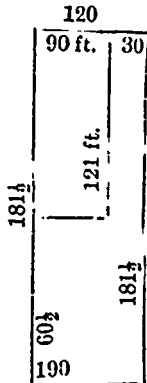
Sol.: ¼ Ac=10890 sq. ft. ÷90=121 ft. length.
½ Ac=21780÷(90+30)=181½ ft. length of the half acre, and
181½ - 121 = 60½ ft. Ans.

3. A Kingston money-lender borrowed money in Scotland at 3% int. payable yearly, and lent the same money in Kingston and vicinity at 8% the interest payable half-yearly; find his yearly income from a Scottish loan of $50,000. Ans. $2,580.

Solution :— $1 for 1 year at 3% amounts to $1.03
$1 @ 8% payable half-yearly=(1.04)²=$1.0816,
and $1.0816-$1 03 = 0516 gained on $1,
and $50,000 × 0516 = $2,580.00 Ans.

4. A farmer was assessed at $3,250. The R. R. tax was five-eighths of a mill on $. The H. S. tax was six-a-hundredths of a mill on $. The P. S. tax was 4⅗ mills on $. The township tax was one-tenth of a mill on $ The county tax was one and seven-a-thousandths of a mill on $. The interest on Co. debt was one and four-a-hundredths of a mill on $. Find the total tax.
Ans. $24.154.

Solution :—$3250 × 0005⅝=$ 2031¼ =Railroad tax
$3250 × 0006= 95 =High School tax
$3250 × 004⅗=14·95 =Public School tax
$3250 × 0001= 325 =Township tax
$3250 × .001007 =3·272⅞ =County tax
$3250 × 00104 =3·38 =County debt tax
$24·154 Ans.

5. How much lumber will put up 100 rods of a running board fence. The bottom board being 10 inches wide, the second 8 inches, the third 8 inches, the fourth 6 inches, and the one along the top 8 inches. The pickets set 6 feet apart, and faced with lumber 8 inches wide, sawn to suit the pickets which were 4½ feet high. Ans. 6,328 square feet.

Solution :—10+8+8+6+8=40 in.=width of boards.
100 × 16½ × 4⁰/₁₂ =5500 sq. ft. in running boards.
(100 × 16½÷6)+1=276, number of pickets.
276 × 4½ × ⁸/₁₂ =828 sq. ft. facing pickets.
and 5500+828=6,328 sq. ft. Answer.

6. How many acres in 46 chains, 64 links of a forty-foot road? Ans. 2 acres, 3 rods, 12 perches. 8 yards.

Solution :—46 ch. 64 links × 66=3,078·24 × 40=123,129.6=2 acres, 3 rods, 12 perches, 8 yards.

7. Cheese is quoted in Liverpool at 71s. 6d. per cwt.; and sterling exchange at 9⅜; find the price per lb. of cheese in cents. Ans. 15,552 cents or a little, or 15½ cents per lb.

Solution :—71s. 6d. cy. × 20=$14.30, and $14.30 increased by ⅛ of $14.30=$14.30+1·58⅜=$15.88⅜ × $1.09⅜= $17,4181944=71s. 6d. sterling, and $17,4181944÷112 lbs. (long cut)=15½ cents nearly.

8. How many feet of inch lumber in 200 joists 21 feet 6 inches long and 4½ by 9 inches? Ans. 14,512½ square feet.
Solution :—200 × 21½ × ⁹/₁₂ × 4½=14,512½ board measure.

9. A farm was known to be 37 rods and 1 yard wide. How many chains in length of it will contain 25 acres. Ans. 26.89½ chains.

Solution. 25 × 4 × 40 × 30½ × 9 = 1,089,000 sq. ft. in 25 acres.
37 × 16½+3 ft.=613½ ft. width of farm.
1,089,000÷613½=1775.07÷66=26 ch. 89½ links. Ans.
Or, 37⁶/₁₁+4=9.29½½ ch. width of farm,
and 25 × 100,000=2,500,000 square links, and
2,500,000÷9.29½½=26.89½ chains. Ans.

10. In 1884 there were put into "Pine Grove Cheese Factory" 797,498 lbs. of milk, from this were made 80,170 lbs. of cheese. This cheese was sold for $8,287.82. The charges for making were 1¼ cents for each pound of cheese, and the salesman received 1 per cent. for selling. Find what the patrons got per ton for milk?
Solution :—80,170 × 1¼=$1002.12 making
$8237.82 × ·001= 82.38 salesman's commission.

$1084.50 total charges.
$8237.82 – $1084.50=$7153.32÷797498= ·0089,697 lbs. and
·0089,697 × 2,000=$17.9394 per ton. Ans.

11. A meadow was 40 rods long, 25 rods wide. A mowing machine was driven round it 18 times, cutting a swarth 4 ft. 6 inches wide; find how much it cut, and how much was left uncut.
Ans. 3 A, 1 R, 21 P, 23¾ yds. cut,
2 A, 3 R, 18 P, 6½ yds. uncut.
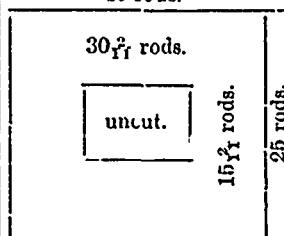
Solution :— 18 × 4½ × 2= 18½ ft.=9²/₁₁ rods, which the meadow is decreased in both length and width, leaving a rectangle 30³/₁₁ rods by 15²/₁₁ rods (40 – 9 =30³/₁₁ and 25 – 9²/₁₁=15²/₁₁ rods), and 30³/₁₁ × 15²/₁₁÷40÷4=2 A, 3 R, 18 per, 6½ yds.
Remaining uncut—
40×25÷160= 6¼ Ac=whole meadow, and 6 A, 1 R. – 2 A, 3 R, 18 per., 6½ yds=3 A, 1 R, 21 P, 23¾ yds. the quantity cut.

12. On Jan. 25th, 1883, a storekeeper borrowed from a farmer $200 for one year at 8%, with permission to pay the whole or part any time during the year. On the 11th of Oct., 1883, he paid $180. How much will settle his note in free on Jan. 25th, 1884. Ans. $31.82.

Solution. $200 × ·08=16.00=int. $200+$16=216.00 amt. of $200 for one year. From Oct. 11 to Jan. 25=106 days,
and $180 × ·08×106÷365=$4.18 interest on $180,
and $180+4.18=$184.18 (credit),
and $216.00 – $184.18=$31.82 Ans.

13. A wood-rack was ordered from a carpenter to contain 1¼ cords of wood (the wood piled crossways), the load to be 4½ feet high; find the length of the rack 8 ft. 10¾ in.

Solution :— $\frac{128 \times 1\frac{1}{4}}{4 \times 4\frac{1}{2}}$=8 ft. 10⅔ in. Ans.

14. On Oct. 12th, 1884, notes to the amount of $1,308.35 were given at a credit sale with interest at 7% for 1 year. On the 2nd of Feb. following these notes were sold to a money-lender for $1,250. Find what rate of interest will be made by the money-lender. $17²⁷/₁₀₀%.

Solution :—$1,308 35 × ·07=$91.58 int. for 1 year,
and $1,308.35+91.58=$1,399.93 amount
$1,399.93 – $1.250=$149.93=The interest made on $1,250 from Feb. 2 to Oct. 12=8 m. 10 d.,
and $149.93÷($1,250 × 8⅓ m. ÷12)=·17²⁷/₁₀₀ cents on the $, or 17²⁷/₁₀₀% Ans.

15. How much lumber will make 500 biscuit boxes 18 in. long, 15 in. wide, and 6 inches deep, outside measurement, the lumber being half an in. thick 3652⅝ sq. ft.