

Solution :—(Pulling lid and bottom outside).

Two sides $18 + 18$, and two ends $14 + 14 = 64$ in.

$64 \times 8 = 512$ sq. in. in sides and end $2 \times 18 \times 16 = 540$ sq. in. in bottom and lid. Then $(512 + 540) \times 500 \div 144 = 3652\frac{2}{3}$ sq. ft.

16. A house was worth \$3,600, and was insured for $\frac{3}{4}$ of its value, at $\frac{2}{3}\%$; find the premium paid. Ans. \$18.

Solution :— $\$3600 \times \frac{3}{4} \times \frac{2}{3} \div 100 = \18 . Ans.

17. A drover bought from one farmer 15 sheep for \$70. From another 14 for \$65.25; from a third 21 for \$92.50. Four of them gave out on the road, and he sold them to a farmer for \$6.50. He paid a boy \$4.60 for driving them, and \$30 for a month's pasture. He then sold them for \$350. Find what he made per cent. on his outlay. $86\frac{2}{3}\%$ per cent. Ans.

Solution :— $\$70 + \$65.25 + \$92.50 + \$4.60 + \$30 = \262.35

$= 255.75$ the whole outlay,

and $\$350 - \$255.75 = \$94.25$ whole gain,

and $\$94.25 \div \$255.75 = 36\frac{2}{3}\%$ on \$, or $86\frac{2}{3}\%$.

18. A young man saved \$150, he could have loaned it at 8% . Instead of doing so he bought a buggy costing \$150, kept it 16 months without using, and sold it for \$120, giving a year's credit without interest; find how much he lost by the transaction?

Solution :— $\$150 \times .08 \times 2\frac{1}{2} + \$150 = \$178 - \$120 = \$58$ loss.

19. Find the cost of the material necessary for the following fence :—Fence, 80 rods long. The large pickets 6 feet apart, and costing 12 cents each. The slats 3 inches wide, and set $2\frac{1}{2}$ inches apart, at \$1.50 per 100. The two pieces of scantling to which the slats are nailed (at the top and bottom) being 3 by 4 inches, and costing \$25 per thousand board measure.

Solution :— $(80 \times 16\frac{1}{2} \div 6) + 1 = 221$ pickets at 12c. each \$26.52.

$(80 \times 16\frac{1}{2} \times 12 \div 5\frac{1}{2}) + 1 = 2,881$ slats at $1\frac{1}{2}$ c. 43.22.

$2 \times 80 \times 16\frac{1}{2} \times \frac{1}{2} \times 3 = 2,640$ ft. of lumber at \$25 per M. 66.00.

Large pickets = \$26.52.

Small pickets or slats = 43.22.

Scantling = 66.00.

$\} = \$135.74$ Ans.

20. Gold was quoted in New York at 108, and sterling exchange $9\frac{3}{4}$; find the value in sterling money of \$1,000 American currency (greenbacks.)

Solution :— $\$1,000$ (Greenbacks) $\div 108 = \$925.92\frac{1}{2}$ (Gold.)

$\$925.92\frac{1}{2}$ less $\frac{1}{10}$ of itself = $925.92\frac{1}{2} - \$92.59\frac{1}{2}$

$= \$833.33\frac{1}{2} \div 109\frac{3}{4} = \$760.16 = £190.09\frac{1}{2}$.

Ans. £190.09 $\frac{1}{2}$ sterling.

[Note.—This is the bank method, but not the one given in School Arithmetics.]

21. The net proceeds of a sales-account made by a commission merchant in Montreal on behalf of cheese consigned by "Springfield Cheese factory" were \$1879.58, but the following two mistakes were afterwards found in it :—

3468 lbs. were reckoned at $12\frac{1}{2}$ c. a lb. instead of $10\frac{1}{2}$ c., and \$74.93 were entered instead of 98.74; find the correct amount of account.

Solution :— $3468 @ 2\frac{1}{2}$ (error) = \$78.03 too much returned to cheese factory for cheese and \$93.74—\$74.93 = \$18.81 too little to factory, and \$78.03—\$18.81 = \$59.22 amount of error in favor of factory, and \$1,879.58—\$59.22 = \$1,820.36 Ans.

22. A pile of broken stone was 41 ft. 8 in. long, 29 ft. 9 in. wide, and 2 feet $1\frac{1}{2}$ in. high; find how many toise it contained.

Solution :— $\frac{29\frac{3}{4} \times 41\frac{2}{3} \times 2\frac{1}{2}}{6 \times 6 \times 6} = 12\frac{1913}{20736}$ or $12\frac{1}{2}$ toise (nearly)

23. Adopting the saw-mill rule that a round log will only square $\frac{2}{3}$ of its diameter, find the price, when hewn square, of a round log 18 ft. long, and 40 in. in diameter at 20c. per solid ft.

Solution :— $\frac{2}{3}$ of 40 = $26\frac{2}{3}$ in. what it will square,

and $\frac{2}{3} \times \frac{2}{3} = 88\frac{2}{3}$ sq. ft. $\times 20$ c. = \$17.77 $\frac{2}{3}$ Ans.

24. A farmer read in "The Weekly Globe" that the French Government ordered 6,000 kilograms of American pork to be thrown into the sea as it was infected with trichina, and he enquired of his children who were attending school, how many lbs. that was.

Solution :—15,432,348 grains = 1 Gramme

154,323,488 " = 1 Dekagram

1,543,234,888 " = 1 Hectogram

15,432,348 " = 1 Kilogram

$15,432,348 \times 6000 \div 7000 = 13,227\frac{1}{2}$ lbs. Ans.

Or 1 Kg. = $2\frac{1}{2}$ lbs. nearly and $6000 \times 2\frac{1}{2} = 13,200$ lbs. (nearly.)

25. A laborer charges 80c. per cord for sawing ordinary cord-wood into stove wood, putting two cuts in each stick—that is each stove-wood 1 ft. 4 in. long—what should he charge for sawing wood 8 ft. long into the same kind of stove-wood.

Solution :—A cord of wood in 8 ft. lengths is only half the ordinary length—that is, is only 4 ft. long, and to saw it into cord-wood is equal to sawing half a cord, or, 20c., which, added to 80c., the charge for sawing a cord of regular cordwood equals \$1; the charge for sawing eight feet lengths into stove-wood 1 ft. 4 in. long.

\$1.00 Ans.

26. What is meant by "Initial Point," "Principal Meridian," "Base Line," "Range" and "Correction Line" in Rectangular surveying as practised in the Western States, Manitoba and N.W. Territory.

The fundamental lines upon which a survey is based are called the principal meridian and base line. The first is a meridian of the earth, and the second is, of course, a parallel of latitude; and their point of intersection is called "The Initial point." Upon these every piece of land has a direct bearing. The selection of the initial point is the first step in the survey of any new district; and some natural landmark is adopted. From this point the principal meridian is run N. and S. and the Base Line E. and W. Upon these lines six-mile distances are marked for township corners. From each six-mile point on the base line east and west of the "Initial Point" other meridians are run which divide the territory into strips six miles wide lying N. and S., and these strips are called "Ranges." Since meridians converge as they approach the poles, it is evident that townships are not quite square. To arrest the error that would naturally arise from this convergence and keep it within reasonable bounds, lines called "Correction Lines" are run every 24 miles north and 30 miles south of the base line and parallel to it. Upon these the distances are measured off anew, as on the "Base Line," and they become secondary base lines in their survey. The Ranges are numbered east and west of Principal Meridian, and the townships numbered north and south of the Base Line (as T. 2 N.; R. 3 E.)

Practical Department.

THE BRAVE AND THE FAIR.

For Friday Afternoon.

BY BAYARD TAYLOR.

They lay along the battery's side
Beneath the roaring cannon,
Brave hearts from Severn and from Clyde,
And from the banks of Shannon.

"Give us a song," the soldiers say,
"We storm the Forts to-morrow,
Sing while we may, another day
May bring enough of sorrow."

They sang of love and not of fame,
Forgot was Britain's glory;
Each heart recalled a different name,
But all sang "Annie Laurie."

Voice after voice took up the song,
Until its tender passion
Rose like an anthem rich and strong—
Their battle-ere confession.

Beyond the darkening ocean, burned
The sunset's bloody embers,
And the Crimean valleys learned
How English love remembers.

And once again the fires of hell
Rained on the Russian quarters,
With scream of shot and burst of shell,
And bellowing of the mortars.

And Irish Norah's eyes are dim
For a singer dumb and gory;