

EXAMINATION FOR QUALIFYING CERTIFICATES

ADVANCED ARITHMETIC

Monday, September 14, 1914—9.15 a. m. to 12.15 p. m., only

Answer eight questions. Credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each complete answer will receive $12\frac{1}{2}$ credits. Papers entitled to less than 75 credits will not be accepted.

- 1 A grocer sold part of a stock of sugar at \$43.60 per hundred and realized 8% profit; he sold the remainder at \$36 per hundred. Did he gain or lose on the second sale and by what per cent?
- 2 If I buy 560 shares of stock at 117 (par value \$100), and after receiving a 9% dividend I sell the stock for 8% less than it cost me, do I gain or lose and how much? [Disregard brokerage.]
- 3 A tin pail is 13 inches in diameter at the top, 9 inches in diameter at the bottom and 8 inches deep; how many liquid quarts does it contain?
- 4 The tank of a street sprinkler is 12 feet long and 12 feet 6.2 inches in circumference, outside measurements; if it is constructed of $1\frac{1}{2}$ inch lumber, with heads 2 inches from ends of staves, what is its capacity in gallons?
- 5 The base of a right-angled triangle is 12 inches and the ratio of the hypotenuse to the other side is 5:3; find the hypotenuse and the other side.
- 6 The base of a right triangle is 24 feet and the hypotenuse is 51 feet; find the perimeter of a similar triangle whose perpendicular is 225 rods.
- 7 Find, to five places of decimals, the square root of 3, giving all the work.
- 8 A sloop is 20 miles ahead of a steamer that runs 10 miles an hour while the sloop sails 2 miles an hour; find by progression the number of hours required for the steamer to overtake the sloop.
- 9 Lead weighs 709.375 pounds to the cubic foot. Find the diameter of a lead ball that weighs 30 pounds.
- 10 A pine beam 1 foot square is floating in water; if its specific gravity is .55, how long must it be to support a man weighing 180 pounds?