

## ADVANCED ARITHMETIC

Tuesday, January 21, 1913 — 9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (a) name of school where you have studied, (b) number of weeks and recitations a week in advanced arithmetic. The minimum time requirement is two recitations a week for a school year or four recitations a week for half a school year.

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.

1 Simplify  $\frac{\frac{1}{8} \times 1\frac{1}{8} + 1\frac{1}{8} \times 6\frac{1}{4} - 1\frac{1}{8} \times 5\frac{3}{4}}{\frac{1}{8} \times 2\frac{5}{8} \times 5\frac{3}{8}}$

2 If a grindstone 18 inches in diameter weighs 50 lb, what will be the weight of a grindstone whose thickness is the same but whose diameter is 24 inches?

3 An iron globe 10 feet in diameter is sunk into a cylindrical water tank that is 13 feet in diameter and 15 feet high, contains 10 feet of water and stands on end; how far will the surface of the water rise?

4 If a bushel measure in the form of a cylinder is 18 inches in diameter what is its depth? If it is 18 inches deep what is its diameter?

5 A merchant marks goods 20% above cost and sells them  $12\frac{1}{2}\%$  below the marked price; what is his per cent of gain?

6 Find, to the nearest pound, the weight of the air in a schoolroom  $24 \times 30 \times 13\frac{1}{3}$ , assuming that water weighing 1000 oz. per cubic foot is 770 times as heavy as air.

7 How many boards 12 feet long will be required to build a straight fence 4 boards high about a rectangular field that is 40 rods wide and contains 20 acres?

8 When water is heated from  $32^\circ$  to  $212^\circ$  it expands  $\frac{1}{4}$  in volume; if a cubic foot of water at  $32^\circ$  weighs  $62\frac{1}{2}$  lb what does a cubic foot of water at  $212^\circ$  weigh?

9 A man bought 50 shares of stock at  $120\frac{1}{4}$  and six months later a  $3\frac{1}{2}\%$  dividend was declared; he then sold the stock at 118, brokerage in each case  $\frac{1}{8}\%$ . Find his net gain or loss, money being worth 5%.

10 A merchant bought 3 hhd. of molasses, each containing 63 gal., at 40¢ a gal., and paid \$6.75 for freight and cartage; if 4% is allowed for waste, 5% of the sales for bad debts and 2% of the remainder for collecting, what must he charge per gallon in order to make 27% on the entire cost?

11 A cellar is  $12.4 \text{ m} \times 9.6 \text{ m} \times 8.5 \text{ m}$ . How many cu. m does it contain? How many liters of water would it contain? How much would this water weigh in kilograms? How many Hl of corn would it contain?