ADVANCED ARITHMETIC

Tuesday, June 18, 1912 — 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 Answer both *a* and *b:*

   a Add 68530, 26982, 36293 and 57368. Verify the work by casting out the nines.

   b Multiply 67853 by 2976. Verify by casting out the elevens.

2 What decimal bears the same ratio to .05 that $\frac{3}{8}$ does to $1\frac{1}{2}$?

3 Iron is 7.8 times as heavy as water; find the weight in kilograms of a bar of iron 1.5 meters long, 1.2 decimeters wide and 5 centimeters thick.

4 A man in business for six years made $500 the first year and each year thereafter made three times as much as in the preceding year; find the total income. [Solve by progression.]

5 The oxygen in the air is to the nitrogen in the air as 21 to 79; find the number of cubic feet of each gas in a school-room whose inside dimensions are $30 \times 24 \times 13\frac{1}{2}$.

6 A and B together can do a piece of work in 12 days, A and C in 15 days, B and C in 20 days; in what time can they do it if they all work together?

7 A merchant imports 1200 yards of carpet 27″ wide, invoiced at $973.30; the duty is 28¢ per square yard and 40% ad valorem. If freight charges and losses aggregate $185.50, at what price per yard must he sell the carpet to gain 20%?

8 The slant hight of a church spire is 16.5 meters and its base is a hexagon 225 centimeters on each side; find the cost of painting the spire at 42¢ a square meter.

9 A conical vessel 2 decimeters high holds a liter of water; find the radius in centimeters to *three* decimal places.

10 A water tank is made in the shape of the frustum of a cone; its depth is 15′, the diameters of the upper and lower bases are 16′ and 12′ respectively. How many cubic feet of water will the tank contain?

11 Mr Jones buys 200 shares of railway stock at $89\frac{7}{8}$, brokerage $\frac{1}{8}$. If he realizes 5% on his total investment what will be his annual income? How many shares of stock at $74\frac{7}{8}$, brokerage $\frac{1}{8}$, may be bought with his income for one year?

12 Define proportion, denominate number, least common multiple, similar fractions.