

ADVANCED ARITHMETIC

Tuesday, January 20, 1914—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 Find the expense of paving, at \$3.50 per sq. yd, a path 6 ft wide around and immediately outside a court 21 yd long and 10 yd broad.

2 What relation must the radius of a given sphere bear to the radii of two other spheres if its surface is a mean proportional between their surfaces?

3 In a swimming tank the water is $6\frac{1}{2}'$ deep and the ceiling is 11' above the water; a pole 22' long rests obliquely on the bottom of the tank and touches the ceiling. How much of the pole is above the water?

4 Find the value of the following if $h = 6$, $r = 4$, $r' = 8$ and $\pi = \frac{22}{7}$:

$$\frac{h}{2} \left(\pi r^2 + \pi r'^2 + \frac{\pi h^3}{6} \right)$$

5 At the rate of 350 gal. per minute, water enters a cylindrical reservoir that is 28' in diameter and stands on end; find the number of inches per minute that the water rises.

6 Find by progression the sum of the odd numbers between 226 and 264.

7 A schoolroom is $24' \times 30' \times 13' 4''$; there are 35 pupils seated in the room. Assuming that 30 cu. ft of fresh air per minute per pupil enters the room, how much air will be driven into the room and how many times will the air be changed during a period of 45 minutes?

8 A note for \$385.75, payable in 6 months, with interest at 5%, was given April 28, 1913; if the note is discounted September 3, 1913 at 6%, find the bank discount and the proceeds.

9 A steel ball 16 cm in diameter is dropped into a cylindrical vessel 28 cm in diameter, which is filled within 5 cm of the top with water; how many liters of water will overflow?

10 A coal bin is 5' deep and 7' square, inside measure; in making the framework for this bin 12 pieces $4' \times 2' \times 7' 4''$ are used. If the boards used for the sides and bottom are 1" thick, how much will the lumber cost at \$28 a thousand?