

## ADVANCED ARITHMETIC

Monday, September 18, 1911—9.15 a. m. to 12.15 p. m., only

*Answer eight questions. No credit will be allowed 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 The schedule of a train that runs from Port Jervis to Canisteo, distant from each other 240 miles, requires an average speed of 30 miles per hour; on a certain day the train left Port Jervis 2 hours late but for  $\frac{3}{4}$  of the way the engineer ran the train at 40 miles per hour and for the remainder of the way at 30 miles per hour. How late was the train in reaching Canisteo?

2 Prove that the product of any three consecutive numbers will exactly contain 6.

3 A has \$4 more than B;  $\frac{3}{4}$  of A's money is equal to  $\frac{5}{6}$  of B's. How much has each? [Solve by arithmetic.]

4 What are the dimensions of a cubic block of granite containing  $47\frac{3}{8}1\frac{5}{8}$  cubic feet?

5 A merchant sells some goods at a profit of 8%; how much per cent would he increase his profits by buying for 10% less, the selling price remaining the same?

6 If the atmospheric pressure at the level of the ocean is 15 lb to the square inch, what is the pressure in grams to the square foot at the same level? [1 g. = 2.2 lb.]

7 A circular flower bed is 3 ft in diameter; what is the circumference of a similar flower bed whose area is four times as great?

8 A man buys 10 shares of Union Pacific preferred stock at  $94\frac{7}{8}$  and 10 shares of Union Pacific common stock at  $179\frac{1}{8}$ , the brokerage in each case being  $\frac{1}{8}$ ; if the preferred stock pays 2% semiannually and the common stock  $2\frac{1}{2}$ % quarterly, what rate per cent does he receive on each investment? What is his total annual income?

9 A man gave a 5% mortgage for \$600 May 1, 1909; March 1, 1910 he paid \$150; Jan. 2, 1911 \$200. Find the amount due today.

10 A room is 15 ft long, 12 ft wide and 10 ft high; what is the distance from one of the lower corners to the opposite upper corner?

11 What is the face of a bill on London that may be purchased in New York for \$1384.35, exchange being at 10% premium in favor of London? [ $\pounds 1 = \$4.8665$ .]

12 A saves  $\frac{1}{3}$  of his income; B has the same income but by spending \$500 a year more than A he finds himself \$100 in debt at the end of the year. What is the income of each and how much does each spend a year?