

ADVANCED ARITHMETIC

Monday, January 23, 1905—9.15 a. m. to 12.15 p. m., only

Answer eight questions but no more. If more than eight are answered only the first eight answers will be considered. Give all operations (except mental ones) necessary to find results. Reduce each result to its simplest form and mark it Ans. Division of groups is not allowed. Each complete answer will receive $1\frac{1}{2}$ credits. Papers entitled to 75 or more credits will be accepted.

1 A number is divisible by 9 if the sum of its digits is divisible by 9. Demonstrate the above principle.

2 State the effect on the product of two numbers of increasing one of the numbers by 2 and the other by 3. Give proof.

3 Had a merchant sold a certain quantity of butter for $21\frac{1}{2}\phi$ a pound, he would have lost \$2.10; had he sold it for $28\frac{1}{2}\phi$ a pound, he would have gained \$2.25. What was its cost a pound?

4 The diameters of the forward and hind wheels of a carriage are respectively $3\frac{1}{2}$ feet and $3\frac{3}{4}$ feet; a certain spoke in each was up when the carriage started. How many more times had the smaller wheel revolved than the larger when the same spokes were up together for the 100th time?

5 If $\frac{3}{4}$ of a bushel of potatoes are worth $\frac{3}{8}$ of a barrel of apples or are worth 30¢ in money, what are $5\frac{1}{2}$ barrels of apples worth in potatoes and in money? Write analysis in full.

6 A man paid a certain amount for a cow, 3 times as much for a horse and $\frac{3}{4}$ as much for a harness; had he paid 10% less for the cow, 10% more for the horse and 20% more for the harness, he would have paid \$204 for all. How much did he pay for each?

7 A prize of \$60 was divided between two persons in the ratio of $\frac{2}{3}$ to $\frac{1}{3}$; how much was each one's share? Write analysis in full.

8 A general formed his men into a square and had 110 men more than was needed; with these 110 men and 134 others, he could increase the number in both rank and file by 2 men and thus form another square. How many men had he?

9-10 A note for \$780 bearing interest at 5%, dated Mar. 16, 1904, has the following indorsements: Oct. 4, \$20; Dec. 13, \$40. Find the amount due today.

11 A pyramid 9 feet high is divided into two equivalent parts by a plane parallel to the base; find the height of each part.

12 A basket is placed on the ground in a line with 20 potatoes which are 2 feet apart; the basket is 2 feet from the first potato. How far must a boy run to bring the potatoes, one by one, to the basket, if he starts from the basket?