

High School Department

169TH EXAMINATION

ADVANCED ARITHMETIC

Monday, June 17, 1901—9.15 a. m. to 12.15 p. m., only

Answer 10 questions but no more. If more than 10 are answered only the first 10 answers will be considered. Give each step of solution. Express final result in its simplest form and mark it Ans. Each complete answer will receive 10 credits. Papers entitled to 75 or more credits will be accepted.

1 Define *five* of the following: power, duty, bond, trade discount, progression, domestic exchange, compound interest.

2 Multiply 63,147 by 2594. Check the product by casting out nines and demonstrate the principle employed.

3 Show why 8 must be a factor of the product of any two consecutive even numbers.

4 The sides of a triangle are 12 inches, 16 inches and 20 inches respectively; find the area of a similar triangle whose longest side is 15 inches.

5 Extract the cube root of 30,371.328. Give an algebraic explanation of the method used.

6 From 150 pounds of milk containing 4½% of butter fat, 20 pounds of cream containing 25% of butter fat are removed; find the per cent of the butter fat in the remainder.

7 When exchange is at par, express £125 in *a*) French francs, *b*) German marks, *c*) United States dollars.

8 A cylinder and a sphere have equal surfaces; the cylinder is 4 inches high and its base is 6 inches in diameter. Find the radius of the sphere.

9 What is the present value of a bond for \$2000 bearing interest at 4%, payable semiannually, and having two years to run, money being worth 5% per annum?

10 Without dividing, test the divisibility of 919,292 and 15,624,323 by 11. State the principle applied.

11 A merchant was offered goods by one dealer at a discount of 30%, and by another at discounts of 20%, 5% and 5%, the list prices being the same. He accepted the better offer and sold the goods for 15% off the list price; find his gain per cent.

12 A pendulum 5 decimeters long makes 72 oscillations in a given time; how long must a pendulum be to make 60 oscillations in the same time? [The lengths of pendulums are inversely proportional to the squares of the numbers of oscillations in a given time.]

13 If $a:b::c:d$, prove that $ad=bc$ and that $a-b:a::c-d:c$. Give an axiom for *each* step.

14 The first three terms of a series are $1\frac{1}{3}$, $\frac{8}{9}$, $1\frac{5}{9}$; find *a*) the seventh term, *b*) the sum of the first six terms.

15 A note for \$2500 at 5%, dated Sept. 25, 1900, bears the following indorsements: Dec. 13, 1900, \$327; Feb. 25, 1901, \$20; May 1, 1901, \$912. How much is due today?