University of the State of New York

High School Department

167TH EXAMINATION

ADVANCED ARITHMETIC

Monday, January 21, 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 Find to *three* decimal places the product of 79430 and .00068 by contracted multiplication. Explain fully how the position of the decimal point is determined.

2 Test the divisibility of 523464 by each of the following numbers without dividing it by them: 3, 6, 8.

3 Reduce $.6\dot{7}$ to a common fraction, giving the reasons in full.

4 A pipe $1\frac{1}{8}$ inches in diameter fills a reservoir in $1\frac{1}{2}$ hours; what is the diameter of a pipe that will fill the reservoir in 24 minutes?

5 A field in the form of an equilateral triangle requires 72 rods of fencing; find the area of the field.

6 Goods are bought at successive discounts of 5% and 20% from the list price and are sold at a gain of $12\frac{1}{2}$%. What per cent must be deducted from the list price to give the selling price?

7 When it is 1.30 p. m. at Rome 12° 27′ east longitude, what time is it at Philadelphia 75° 10′ west longitude? Give the reason for each step in solution.

8 Two bodies attract each other with a force f at a distance of 64 meters; find the force of attraction when the bodies are 48 meters apart. [The attraction of two bodies varies inversely as the square of the distance between their centers.]

9 Find the square root, to *two* decimal places, of 5729. Give a full explanation of the following: *a*) separation into periods, *b*) formation of the trial divisor, *c*) completion of the trial divisor.

10 Find the cost of a bill of exchange on London for £216 5s 8d sterling, when exchange is at $4.85.

11 Find the entire surface of a square pyramid whose altitude is 15 inches and a side of whose base is 16 inches.

12 Derive the formula for finding the sum of an arithmetic series when the extremes and the number of terms are given. Apply the formula in finding the sum of the terms of a series of 10 terms whose extremes are 5 and 32.

13 Find the net cost of 15 pieces of silk, each containing 50 yards, invoiced at 45 cents a yard, the duty being 9 cents a yard and 22% ad valorem.

14 The radius of a sphere is 6 inches; find the surface of a sphere whose volume is $\frac{1}{27}$ the volume of the first sphere.

15 Define *five* of the following: circular (continued) fraction, repetend, gram, bond, net cost, specific duty, international date line.