189TH HIGH SCHOOL EXAMINATION

ADVANCED ARITHMETIC

Tuesday, June 12, 1906 — 9.15 a. m. to 12. 15 p. m., only

Answer eight questions. Give all operations (except mental ones) necessary to find results. Reduce each result to its simplest form and mark it Ans. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted if written by students in class A; those entitled to 60 or more credits will be accepted if written by students in class B.

1 State and demonstrate (1) a method of proving multiplication, (2) a method of proving division in case there is a remainder.

2 Describe a short method of multiplying by 33⅓; by 125. Write the demonstration of each of these processes.

3 Solve the following question and give in words a complete analysis: ⅘ is ⅔ per cent of what number?

4 Find the weight in kilograms of a round iron bar 5 meters long and 8 centimeters in diameter, iron being 7.8 times as heavy as water.

5 Define root, square root, cube root. Write and solve a problem involving an application of the extraction of a square root.

6 Derive and state a rule for finding the sum of an arithmetic series when the first term, the last term and the number of terms are given.

7 A man sells ½ of his potatoes @ 40¢ a bushel, ⅓ of them @ 50¢, and the remainder for $11, which is at the rate of 55¢ a bushel; how much does he receive for all his potatoes? Write the analysis.

8 A man sold ½ of an article for what ⅔ of it cost; what was the gain per cent? Write the analysis.

9 The mean distance of Mercury from the sun is 36,000,000 miles; that of the earth is 92,000,000 miles. Find in days Mercury's period of revolution around the sun, assuming the period of the earth to be 365 days. [The squares of the times of revolutions of the planets about the sun are proportional to the cubes of their mean distances from the sun.]

10 On a mortgage for $4000, dated Jan. 15, 1904, the following payments were made: Dec. 8, 1904, $200; March 9, 1905, $356; Nov. 22, 1905, $157. How much was due June 4, 1906, interest at 6%?

11 Prove that the sum of any three consecutive integral numbers is exactly contained in three times their product. [Mere illustration is not sufficient.]

12 If to a certain number 16 be added, the sum multiplied by 7.2, the product diminished by 16.6, the remainder divided by .02 and the quotient divided by 122, the quotient will be 111 and the remainder 28; what is the number?