190TH HIGH SCHOOL EXAMINATION

ADVANCED ARITHMETIC

Monday, September 17, 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.

1 Define finite decimal, pure circulating decimal, mixed circulating decimal. Express the following as circulating decimals with similar repetends: $\frac{1}{6}$, $\frac{5}{11}$, $\frac{2}{3}\frac{3}{7}$

2 Prove that the difference between any integral number and its square is always an even number. [Illustration only is not sufficient.]

3 A merchant marks goods 12½% above cost and sells them 20% below the marked price; find his per cent of loss. Write the analysis in words.

4 Find the prime factors of 942. Show that in finding these factors by trial it is not necessary to use any divisors other than 2, 3, 5, 7, 11 and 13.

5 Extract the cube root of 15 to *two* places of decimals.

6 In the proportion $a:b::c:d$ prove that (1) $ad=bc$, (2) $b:a::d:c$, (3) $a:c::b:d$

7 Explain in detail the process of reducing (1) $4\frac{3}{7}$ to $\frac{3}{7}\frac{1}{7}$, (2) $\frac{3}{7}\frac{1}{7}$ to $4\frac{3}{7}$

8 Find the two successive, equal rates of discount that are equivalent to the single rate 19%.

9 Sea water is 2.8% salt and has a specific gravity of 1.025; find how many kilograms of salt can be obtained from 100 cubic meters of sea water. Write the analysis in words.

10 A and B can do a piece of work in $5\frac{5}{11}$ days, B and C in $6\frac{2}{3}$ days, A and C in 6 days; how long will it take each man to do the work alone? Write full analysis in words.

11 A man bought 50 shares of stock at 120¼ and 6 months later a 3½% dividend was declared; he then sold the stock at 118, brokerage in each case ⅛%. Find his net gain or loss, money being worth 5%.

12 The first term of a geometric series is 2, the last term 1458 and the number of terms 7; find the sum of the series.