188TH HIGH SCHOOL EXAMINATION

ADVANCED ARITHMETIC

Monday, January 22, 1906 — 9.15 a. m. to 12.15 p. m., only

Answer eight questions but **no more.** *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 Prove that the difference between the squares of any two consecutive numbers is an odd number. [A simple illustration is not proof.]

2 Apples are bought at the rate of 5 for 2¢; one half of them are sold 2 for 1¢, and the rest 3 for 1¢. If 1¢ is made by the whole transaction, how many apples are bought? Give full analysis in words.

3 Prove that on a bill of goods a trade discount of a%, b% and c% is the same in whatever order the discounts are taken.

4 If a grain dealer uses for a half bushel measure one that holds but 15 quarts, what is the dealer's per cent of gain? What is the customer's per cent of loss? Explain.

5 A and B have the same income; A saves ⅓ of his but B by spending $125 a year more than A, finds himself $100 in debt at the end of 4 years. How much does each spend annually? Give analysis in words.

6 How many quarts does a pail hold that is 1 foot in diameter at the top, 10 inches in diameter at the bottom and 9 inches deep?

7 If stock bought at 20% premium pays 5% on the investment, what would it pay if bought at 20% discount? Explain.

8 Prove that the number of places in the repetend of a circulating decimal must be less than the number of units in the denominator of the common fraction from which it is derived.

9 A and B hire a pasture for $60; A puts in it 9 horses and B 12 cows for the same length of time. If 3 cows eat as much as 2 horses, how much ought each to pay? Write full analysis in words.

10 A sum of money placed at interest for 1 year 6 months amounted to $2696.875; if it had remained at the same rate of interest for 2 years, it would have amounted to $2762.50. Find the rate of interest.

11 When the mercury in the barometer is 30 inches high, the pressure of air is 15 pounds to a square inch; find the pressure on a pane of glass 2 feet square when the mercury column is 28 inches high.

12 Find correct to *three* places of decimals the length of the longest rod, pointed at each end, that can be put into a box 3′ × 4′ × 1′.