

ADVANCED ARITHMETIC

Tuesday, January 16, 1912 — 9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (a) name of school where you have studied, (b) number of weeks and recitations a week in advanced arithmetic.

The minimum time requirement is two recitations a week for a school year or four recitations a week for half a school year.

Answer eight questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient.

1 The denominators of four proper fractions in their lowest terms are 7, 8, 12 and 20; which of these will give exact decimal values? Give reason.

2 A man lost 50 cents more than one half of his money; he then lost 50 cents more than one half of what was left. If he then possessed \$13 how much did he have before his losses?

3 Write the formula for finding the sum of a geometric progression, given the first term, the ratio and the number of terms. Show the application of the formula by finding the exact value of the decimal .7777 . . . to infinity.

4 A board in the form of an isosceles triangle is 15 feet long and has a base of 16 inches; if it is divided into two equivalent parts by a line parallel to the base, what is the altitude of each part? [Similar triangles are to each other as the squares of their homologous sides.]

5 Find the number of square inches of tin in the convex surface of a pail whose bases are 9" and 11" in diameter and whose slant height is 9".

6 In extracting the square root of integers, give reason for pointing off the numbers into periods of two figures each.

7 If stock bought at 15% discount pays 5% on the investment, at what price should the same stock be bought to pay $5\frac{1}{2}\%$?

8 A man goes to Europe with \$1000; if he spends 500 francs in France, 700 marks in Germany, 80£ in England and \$150 for his ocean passage, how many dollars has he left?

9 A man borrowed \$2000 at 6% Jan. 4, 1907; he paid \$400 Feb. 19, 1908 and \$1000 June 29, 1909. What was due Nov. 15, 1909?

10 Common salt is composed of sodium and chlorine in the ratio of 23 to 35.5 by weight; in 100 lb of salt what is the weight of (a) the sodium, (b) the chlorine?

11 A man sells two cows, receiving for each the same amount; on one he gains a certain per cent and on the other he loses the same per cent. Does the gain on the one balance the loss on the other? Explain.

12 If two integral numbers have a common factor, their sum, their difference and any multiple of either number are exactly divisible by that factor. Give proof.