ADVANCED ARITHMETIC

Tuesday, June 13, 1911 — 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 Define factor, numeration, bank discount, least common multiple, square root.

2 Prove by trial that 313 is a prime number. [Do not carry the work farther than is necessary and explain why it is not necessary to carry it farther.]

3 Using a short method (*a*) multiply 6408 by 125, (*b*) divide 4275 by 25. Prove the correctness of your method.

4 A merchant has a note of one of his customers for $450, dated May 15 and due 3 months after date, with interest at 5%; he discounts the note at a bank at 6% on June 20. What are the proceeds?

5 Oak lumber $\frac{3}{4}''$ thick was purchased for the floor of a room $12'\times14'$; the lumber cost $80 per M and $\frac{1}{8}$ of it was wasted in laying. The floor was lined with 21 pine boards 8" wide 12' long and $\frac{1}{4}''$ thick, at $4.50 per C. Find the cost of the oak and pine.

6 A merchant received an invoice of crockery, 20% of which was broken; at what per cent above cost must the remainder be sold to make $33\frac{1}{3}\%$ on the invoice? [Give proof of work.]

7 A cylindric tank 14' long and 42" in diameter, lying on its side, contains oil to the depth of 21"; how many gallons of oil are there in the tank? $[\pi = 3\frac{1}{7}]$

8 A man loans $\frac{1}{2}$ of his money at 6%, $\frac{1}{5}$ at 5% and the remainder at 4%; his income is $312. How much money does he loan? [Give analysis in full.]

9 A bin of equal depth and width contains 125 bushels; if its length is twice its width what are its dimensions in inches correct to *one* decimal place?

10 *a* If 6% stock is purchased at 10% premium what is the rate on the investment?

   b If 5% stock yields 6% on the investment at what price was it purchased?

   c If stock purchased at 20% below par yields 5% on the investment what is the rate on the stock?

11 If a body falls through space $16\frac{1}{12}$ ft in the first second and in each succeeding second $32\frac{1}{6}$ ft farther than in the second just preceding, how far will it fall (*a*) in the 8th second, (*b*) in 8 seconds? [Solve by progression.]

12 Find in rods the difference in the perimeters of two lots each containing 10 acres, one in the form of a square and the other in the form of a circle.