

ELEMENTARY ALGEBRA

Monday, June 17, 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 elementary algebra.

The minimum time requirement is five recitations a week for a school year.

Answer the first four questions and four of the others. Credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each answer should be reduced to its simplest form.

1 Divide $9x^6 - 10x^3 + 9 - 16x^2 - x^4$ by $4x - x^2 + 3x^3 - 3$
[Credit will not be granted if there is any error in the work.]

2 Factor each of the following: $x^4 - x^2 - 12$; $(a+2)^2 - 9x^2$;
 $x^3 - 27$; $6x^2 - x - 2$; $x^5 + 32$; $a^3 - a^2 - a + 1$

3 Solve $\begin{cases} 2x + y = a + 1 \\ x - 2y = a - 1 \end{cases}$

4 The length of a rectangular field is twice its width; it costs as much to fence it at 50¢ per yard as it does to sod it at 15¢ a square yard. Find the dimensions.

5 Solve $2 + \sqrt{2x+8} = 2\sqrt{x+5}$

6 Solve $x^2 + ax = 42a^2$

Expand by the binomial formula $(2a-3b)^5$, giving all the work.

7 Solve $\begin{cases} x^2 + y^2 = 13 \\ xy = 6 \end{cases}$

Group the four pairs of roots properly.

8 Two men start at the same time and travel in opposite directions; the ratio of their rates is 2:3 and in 5 hours they are 100 miles apart. Find the rate of each.

9 Divide the number c into two parts such that a times the larger part shall equal b times the smaller part.

10 If a triangle with equal sides has its sides increased 7 inches, 4 inches and 1 inch respectively, a right triangle is formed; find the sides of the right triangle.