

INTERMEDIATE ALGEBRA

Monday, January 18, 1915—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 (1) elementary algebra, (2) intermediate algebra.

Answer eight questions. Each answer should be reduced to its simplest form.

1 Express in simplest form with positive exponents the first four terms of the following: $(a^{\frac{2}{3}}b^{-\frac{1}{2}} - 2a^{-\frac{1}{3}}b^{\frac{3}{4}})^6$

2 Solve the following equation, finding all four roots:

$$(x^2 - 6x)^2 - 2(x^2 - 6x) = 35$$

3 a Find the square of $-\frac{5}{2} - \frac{5}{2}\sqrt{-3}$

b Simplify $\frac{2-3\sqrt{-1}}{3-\sqrt{-4}} + \frac{2+\sqrt{-9}}{3+2\sqrt{-1}}$

4 Solve $\begin{cases} x^2 - y^2 = 21 \\ 2x^2 - xy - y^2 = 36 \end{cases}$

5 Find the factors and indicate the H. C. F. and the L. C. M. of $n^3 - 5n^2 + 2n + 8$ and $2n^3 - 3n^2 - 3n + 2$

6 A quadratic equation $x^2 + mx + n = 0$ has its absolute (or constant) term printed by mistake as 32 instead of 27, and the roots are found to be -8 and -4 ; what are the roots of the equation when it is correctly printed?

7 How much does a teacher earn in 25 years if she receives a salary of \$720 the first year and an increase of \$80 each year for 14 years? [Solve by progression.]

8 By drawing the graphs, estimate as nearly as you can the solutions of the pair of equations $\begin{cases} 3x + 2y - 6 = 0 \\ y^2 - 2x = 9 \end{cases}$

[No credit will be granted unless regularly ruled coordinate paper is used.]

9 a Given the equation $x^2 - 3x - 28 = 0$; write the equation the sum of whose roots is the same as that of the given equation, and the product of whose roots is two greater than that of the given equation.

b Find the sum and the product of the roots of the following: $2x^2 + 5ax - 6a^2 = 0$

10 Find two numbers whose difference is 32 and whose arithmetic mean exceeds the geometric mean by 4.

11 A boy was sent with \$2.10 to buy oranges; he found the price 3¢ per doz. higher than he expected, so he bought $\frac{1}{2}$ doz. fewer than he intended to buy and received 1¢ in change. What price did he pay for the oranges?

12 Solve $(x-3)^{-\frac{2}{3}} + 3(x-3)^{-\frac{1}{3}} = 4$