

INTERMEDIATE ALGEBRA

Tuesday, September 16, 1924—9.15 a. m. to 12.15 p. m., only

Answer eight questions. Full 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. Papers entitled to less than 75 credits will not be accepted.

1 Find the prime factors of each of the following:

$$3a^{7b} - 729a^{2b} \quad [2\frac{1}{2}]$$

$$16x^2 - 24x(c-d) + 9(c-d)^2 \quad [2\frac{1}{2}]$$

$$y^2 - 9x^2 + 9 - 6y \quad [2\frac{1}{2}]$$

$$1.2y^2 + 9.82y - 1.5 \quad [2\frac{1}{2}]$$

$$x^2 - 6x^2 + 5x + 12 \quad [2\frac{1}{2}]$$

2 a Find the value of $243^{\frac{1}{3}} \times 27^{-\frac{1}{3}} \times (\sqrt[3]{3})^6 \times (3^2)^0$ [6]b Rationalize the denominator in $\frac{\sqrt{12}}{\sqrt{6}-\sqrt{2}}$ [6 $\frac{1}{2}$]

3 Find the roots of the following equation to the nearest hundredth:

$$2y^2 + .06y = .3 \quad [12\frac{1}{2}]$$

4 Solve the following equation and check one root:

$$\sqrt{2x+3} - \sqrt{x+1} = \frac{3}{\sqrt{2x+3}} \quad [12\frac{1}{2}]$$

5 a In the equation $x^2 = rx - 165$ find the values of r if one root is 4 more than the other root. [6 $\frac{1}{2}$] [Leave all work on the paper.]b Form the quadratic equation whose roots are $3 + 2\sqrt{5}$ and $3 - 2\sqrt{5}$ [6]

6 By the use of logarithms find the value of

$$\frac{\sqrt{(.0621)^2} \times \sqrt[3]{78}}{8.964} \quad [12\frac{1}{2}]$$

7 Solve the following set of equations and correctly group your answer:

$$x^2 + y^2 - 21 = xy$$

$$x^2 - 2xy + 15 = 0 \quad [12\frac{1}{2}]$$

8 Determine by formula the sum of all positive integers less than 650 that are divisible by 7. [12 $\frac{1}{2}$]9 Two boats raced 48 miles. The first averaged 12 miles an hour; the second traveled 18 miles at a certain rate and then increased its speed 3 miles an hour. The first boat won by 30 minutes. Find the rates at which the second boat traveled. [12 $\frac{1}{2}$]10 The numerator and denominator of a certain proper fraction each consist of the same two digits written in different order. The sum of the digits is 9. If the value of the fraction is $\frac{4}{5}$, find the numerator and the denominator. [12 $\frac{1}{2}$]

11 Plot the graph of each of the following equations and from the graphs determine approximately the common solutions:

$$x^2 + 2y^2 = 32$$

$$2x - y = 2 \quad [8\frac{1}{2}, 2, 2]$$