

INTERMEDIATE ALGEBRA

Wednesday, September 8, 1920—9.15 a. m. to 12.15 p. m., only

Answer eight questions. 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:

$$10a^3c - 15a^2c^2 - 70ac^3$$

$$x^2 - 8x^2 + 17x - 10$$

$$x^4y^8 - 64$$

$$4k^{2x} - 20k^xy^2 + 25y^{2x}$$

- 2 a Solve without the use of tables:  $\frac{1}{2}x^{-\frac{1}{2}} = 2$

b Divide  $x^2 + x^{-\frac{1}{2}} - 2$  by  $x^{\frac{1}{2}} - x^{-\frac{1}{2}}$

- 3 a State two distinct ways of forming an equation when the roots are given. Using one of these methods, form the equation whose roots are

$$2 + \sqrt{2} \text{ and } 2 - \sqrt{2}$$

- b What must be the value of  $k$  in the equation

$$3x^2 - 6x - 17 + k = 0$$

to make both roots equal?

Leave on the paper all work for both a and b.

- 4 Solve the following, correctly group your answers and check one set of answers:

$$\begin{cases} 4x^2 - 13xy + 9y^2 = 9 \\ xy - y^2 = 3 \end{cases}$$

- 5 Represent graphically each equation in the following set and from the graph determine the common solutions:

$$y^2 = 3x + 9; 2x - 3y = 0$$

- 6 Three numbers whose sum is 24 are in arithmetic progression, but if 3, 4 and 7 are added to these respectively, the result forms a geometric progression; find the numbers. Leave all work on the paper.

Or

By the use of logarithms find the value of

$$\sqrt[4]{\frac{1032 \times 176.25}{(824)^2}}$$

- 7 Simplify  $(\frac{1}{2})^{\frac{1}{2}} - (\frac{1}{2})^{-\frac{1}{2}} + \sqrt{(\frac{1}{2})^{-1}} + \sqrt{1.35} - \sqrt{(1\frac{1}{2})^{-2}}$

Multiply  $2\sqrt{6} - 3\sqrt{5}$  by  $4\sqrt{3} - \sqrt{10}$

- 8 In the formula  $P = \frac{nd^2}{2.3}$

a Solve for  $d$ .

b Find the value of  $d$  to the nearest tenth when  $P = 51.84$  and  $n = 4.32$ .

- 9 The dimensions of a rectangle are 5' by 2'. Find the amounts to the nearest hundredth by which each dimension must be changed in order that both area and perimeter shall be doubled.

- 10 A boatman trying to row up a river drifted back at the rate of 2 miles per hour, but when rowing down the river his rate was  $12\frac{1}{2}$  miles per hour; find the rate of the current.