

## INTERMEDIATE ALGEBRA

Monday, June 16, 1924 — 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.

The minimum time requirement is five recitations a week for half a school year, or the equivalent, after the completion of elementary algebra.

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.

In the examination in intermediate algebra the use of the slide rule will be allowed for checking, provided all computations with tables are shown on the answer paper.

1 Find the prime factors of each of the following:

$$6x^2 - 5x - 4 \quad [2\frac{1}{2}]$$

$$12xy + 25 - 4x^2 - 9y^2 \quad [2\frac{1}{2}]$$

$$x^3 - 9x^2 + 2x + 48 \quad [2\frac{1}{2}]$$

$$8a^4 - 125ac^6 \quad [2\frac{1}{2}]$$

$$36x^{2a} - 60x^{4a} + 25x^{6a} \quad [2\frac{1}{2}]$$

2 Multiply  $3a^{-\frac{1}{2}} - 4a^{-\frac{1}{2}} + 3$  by  $3a^{\frac{1}{2}} + 4a^{\frac{1}{2}} + 3$  and find the value of the product when  $a = 8$ . [8, 4 $\frac{1}{2}$ ]

3 a Form the quadratic equation whose roots are  $3 - \sqrt{2}$  and  $3 + \sqrt{2}$  [6]

b Without solving, determine the nature of the roots of the equation  $12x^2 + 44x = 45$  [6 $\frac{1}{2}$ ]

4 Find the roots of the following equation to the nearest tenth:  
 $3x^2 - 15x + 11 = 0$  [12 $\frac{1}{2}$ ]

5 Solve the following equation and check one root:

$$\sqrt{3x} = \frac{28}{\sqrt{2x+10}} - \sqrt{2x+10} \quad [10\frac{1}{2}, 2]$$

6 For boring a well 180 yards deep a contractor receives \$2 for the first yard, and for each yard thereafter 5 cents more than for the preceding one. By formula find the cost of the job. [12 $\frac{1}{2}$ ]

7 The third term of a geometric progression is  $\frac{3}{4}$  and the sixth term is  $-\frac{1}{4}$ . Find the eighth term. [12 $\frac{1}{2}$ ]

8 Answer either a or b: [12 $\frac{1}{2}$ ]

a By the use of logarithms find the value of

$$\frac{\sqrt[3]{978} \times (.52)^4}{71.42 \times .032}$$

b In the formula  $A = P(1+r)^n$ , find the value of  $n$  if  $A = \$8575$ ,  $P = \$5000$  and  $r = 4\frac{1}{2}\%$

9 Solve, correctly group your answers and check:

$$x^3 + y^3 = 208$$

$$x + y = 4 \quad [8\frac{1}{2}, 2, 2]$$

10 A man bought a number of articles at equal cost for \$500; he sold all but two for \$540 at an advance of \$5 on the original cost of each. How many articles did he buy? [8, 4 $\frac{1}{2}$ ]

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

$$y = x^2 - 6x + 5 \quad (\text{Plot from } x = -1 \text{ to } x = +7)$$

$$3x - 2y = 12 \quad [7\frac{1}{2}, 3, 2]$$