ADVANCED ALGEBRA

Monday, September 13, 1926 — 1.15 to 4.15 p. m., only

_____

Answer eight questions. Each answer should be reduced to its simplest form. Papers entitled to less than 75 credits will not be accepted.

1 Form a fourth degree equation with rational coefficients two of whose roots are $3 - 2\sqrt{2}$ and $1 + \sqrt{-5}$ [12½]

2 Solve the following equation and check one of the values obtained:

$$\frac{3}{\sqrt{12-x}+2} - \frac{\sqrt{12-x}}{3} = 0$$ [12½]

3 A starts from R and goes toward S at the same time that B starts from S and goes toward R. When they meet, A has gone 40 miles farther than B. A then completes the journey to S in 2 hours and B completes the journey to R in 8 hours. Find the rates of A and B. [12½]

4 a Find the value of the repeating decimal 2.1515 . . . [6]

b In a window display 17 boxes of cereal are placed side by side in a straight line. Sixteen boxes are placed on top of these, 15 on top of the second layer, etc. If there are in all 17 layers, find by formula the number of boxes in the pile. [6½]

5 Solve the following set of equations and correctly group your answers:

$$x^3 + y^3 = 152$$
$$x^2y + xy^2 = 120$$ [10, 2½]

6 a The sum of $800 is placed at 4½% interest; find by the use of logarithms the amount of this sum at the end of 6 years, if the interest is compounded annually. [9]

b Solve the following equation for x:

$$a^{x^2+2} = a^{3x}$$ [3½]

7 Given the equation $x^3 + 2x - 20 = 0$; compute to the nearest hundredth the root between 2 and 3. [12½]

8 a A man has 5 coins of different denominations; how many different sums can he form from these coins if he uses one or more at a time? [6½]

b How many different integers of 3 digits each can be formed by using only the digits 2, 3, 4, 6, 8, if no digit is repeated in any integer? [6]

9 Transform the equation $2x^3 + 7x^2 + x - 10 = 0$ into one whose roots are 2 greater than the roots of this equation. Solve the equation thus formed and from the roots found determine the roots of the original equation. [12½]

10 Two men ran around a track 1320 feet in circumference. It took one man 5 seconds less time than it took the other who ran 2 feet per second slower. How long did it take each man? [12½]

11 Using the same set of axes, represent graphically each of the following equations and from the graph determine the solutions that the two equations have in common:

$$x + y = 5$$
$$x^2 + 2y^2 = 17$$ [8, 4½]