# ELEMENTARY ALGEBRA

Monday, September 14, 1925 — 9.15 a. m. to 12.15 p. m., only

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*Answer question 1 and five of the others. 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 a Add $3x^2 + 2x - 5$ and $2x^2 - 7$ and from the sum subtract $2x^2 + 12$. [4]

b Factor *each* of the following:

$a^2 - 12a + 36$ [2]

$12x^4 - 37x^2 + 21$ [2]

$ax - bx + by - ay$ [2]

$(r - 2s)^2 - 9$ [2]

$m^2 + .6m - .72$ [2]

c Find the value of the expression $a^2 - b^2$ if $a = \sqrt{6} - \sqrt{3}$ and $b = 2\sqrt{2}$. [6]

d If $7a^2 - 5$ is a factor of $14a^4 - 35a^3 + 18a^2 + 25a - 20$, what is the other factor? [4]

e Solve the following equation and check:

$$\frac{3x-1}{4} - \frac{5x+1}{3} = 4 \quad [8]$$

f Solve the formula $T = 2\pi R (L + R)$ for $L$ in terms of the other letters. [4]

g Find the value of $T$ if $\pi = \frac{22}{7}$, $R = 10$ and $L = 18$. [4]

h Solve for $x$ and $y$ and check:

$2ax + 3by = 1$

$3ax - 2by = 2$ [10]

2 One number is 5 greater than another and the difference between their squares is 1 more than 8 times the greater number; find the numbers. [10]

3 Solve the following set of equations for $x$ and $y$ and group your answers:

$x - 4y = 6$

$x^2 + 2xy = 36$ [10]

4 a Jones loans Smith $d$ dollars for $y$ years. What is the total number of dollars Jones will receive at the end of the period if he gets simple interest at 5% on his money? [3]

b Under normal conditions a certain automobile can travel $m$ miles an hour. At that rate how long will it take to make a journey of 140 miles if during the trip tire trouble causes a delay of 1 hour? [3]

c A man bought some sugar at $s$ cents a pound and 2 pounds of coffee at $c$ cents a pound. If his bill totaled $2.25, how many pounds of sugar did he purchase? [4]

5 Extract the square root of

$$25x^4 - 20x^3 + \frac{2x^2}{3} + \frac{4x}{3} + \frac{1}{9} \quad [10]$$

6 A man owns a rectangular field which is $\frac{3}{4}$ as wide as it is long. He decides to divide it in two equal parts by a fence parallel to the shorter side of the field. If it takes 150 rods of fence to go around one of the small fields, find its dimensions. [10]

7 Find the values of $x$ in the following equation correct to the *nearest hundredth*: $3x^2 - 5x - 6 = 0$ [10]

8 The following table gives approximately the number of thousands of Regents answer papers written yearly in academic subjects from 1919 to 1924:

| | | |
|---|---|---|
| 1919......430 | 1921......520 | 1923......700 |
| 1920......470 | 1922......600 | 1924......750 |

a Represent the above data by either a broken line or a curved line graph. [8]

b By extending the graph estimate the probable number of papers for 1925. [2]