ELEMENTARY ALGEBRA

Monday, January 20, 1913—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 elementary algebra. The minimum time requirement is five recitations a week for a school year.

Answer the first six questions and two of the others. 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.

1 Factor each numerator and denominator in the following expressions; perform the operations indicated and reduce to simplest form:

$$\frac{x^4 - 9x^3 - 36x^2}{x^2a^2 - 10xa^2 + 9a^2} \times \frac{x^4 - 4x^2 + 3}{x^4 - 7x^2 - 18} \div \frac{x^3 + x^2}{a^2x^2 + 2a^2}$$

[Credit will not be granted for the answer to this question if there is any error in the work.]

2 Solve $\begin{cases} \frac{x}{2} + \frac{y}{3} = 4 \\ 5x - 3y = 2 \end{cases}$

3 Solve $x + \frac{a}{2} = \frac{a^2}{2x}$

4 Simplify *each* of the following:

$$4\sqrt{24} + 2\sqrt{54} - \sqrt{6} + 3\sqrt{96} - 5\sqrt{150}$$

$$\sqrt[3]{375}, \quad \sqrt{\frac{2}{3}}, \quad \sqrt[3]{\frac{1}{4}}, \quad \frac{1}{\sqrt{3}}$$

[Credit will not be granted for the answer to this question if there is any error in the work.]

5 Solve $\frac{16x + 3}{10} - \frac{2x - 5}{5x - 1} = \frac{8x - 1}{5}$

6 Separate 42 into *two* parts such that the greater part divided by the less shall give a quotient of 2 and a remainder of 3.

7 Solve $\begin{cases} 6y^2 - xy = 2x^2 \\ 9y - 12 = -4x \end{cases}$

8 What must be added to $x + a$ to make $y - b$?

What is the cost of 3 apples if a apples cost c cents?

9 The sum of two numbers is 8 and the sum of their cubes is 152; find the numbers.

10 If 1 is added to the numerator of a fraction the value of the fraction becomes $\frac{1}{2}$; if 1 is added to the denominator of the same fraction the value becomes $\frac{1}{4}$. Find the fraction.