The University of the State of New York

229th High School Examination

ELEMENTARY ALGEBRA

Wednesday, June 20, 1923—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 question 1 and five ot 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.

1 *a* Divide $x^4 - 5x^3 + 15x^2 - 22x + 20$ by $x^2 - 2x + 4$ and check your work, letting $x = 2$. Division [4], check [2]

b Find the prime factors of *four* of the following:

$x^2 - 7xy + 10y^2$ [2]

$98a^2b - 8b^3$ [2]

$15a^2 - 7ab - 2b^2$ [2]

$x^2 - b^2 - a^2 + 2ab$ [2]

$x^{2a} - 2x^a y^a + y^{2a}$ [2]

c Simplify the following and express the result as a fraction in its lowest terms:

$$\left(\frac{8}{m-x} - \frac{4}{x^2 - m^2}\right) \div \left(\frac{1}{m-x} - \frac{1}{m+x}\right) \quad [3, 2, 1]$$

d Solve for x and y:

$$\frac{x}{a} + \frac{y}{b} = \frac{5}{6}$$

$$\frac{4x}{a} - \frac{5y}{b} = -\frac{7}{6} \qquad \text{First value [4], second value [2]}$$

e Simplify each radical and unite the results into a single term: $4\sqrt{\dfrac{x^2}{2}} - \dfrac{1}{12}\sqrt{288x^2} - \sqrt{2(x-1)^2}$ [1, 1, 2, 2]

f Solve and check:

$$\tfrac{2}{3}(x-1) - \tfrac{1}{4}(x+1) - (x-4) = \frac{x+1}{12} - \tfrac{1}{3}$$

Solution [5], check [1]

g Solve the following formula for L: $S = \dfrac{n}{2}(a+L)$ [3]

Find the value of S correct to the *nearest tenth*, if $n = 9$, $a = 4.37$ and $L = 13$. [3]

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h Solve and check:

$$\frac{x}{4} - \frac{x}{x+4} = \frac{x-1}{6} \qquad \text{Solution [4], check [2]}$$

2 If 3 is added to the numerator and 5 is subtracted from the denominator of a certain fraction, the value of the fraction is $\frac{8}{7}$; if 2 is subtracted from the numerator and 3 is added to the denominator, the value becomes $\frac{1}{5}$. Find the fraction.

Equation [7], solution [3]

3 Extract the square root of the following polynomial and check the result:

$$4x^4 + 17x^2 - 12x - 12x^3 + 4 \qquad [8, 2]$$

4 Two automobiles starting from Albany travel east and west respectively, the first one traveling $\frac{3}{4}$ as fast as the second. In 6 hours they are 378 miles apart. Find the rate of each.

Equation [7], solution [3]

5 *a* If x apples cost b cents, what will y apples cost? [3]

b If m dollars represents my money and I lend $\frac{1}{5}$ of it for one year at 6%, what interest shall I receive? [4]

c If n is a certain number, write the equation which shows that one fourth of the number, increased by one, equals the number diminished by two. [3]

6 Find the roots of the following equation to the *nearest hundredth*:

$$3x^2 - 16x = 32 \qquad [10]$$

7 Solve for x and y, correctly group your answers and check *one* set:

$$2x^2 - y^2 = 14$$

$$x - y = 1$$

Solution [7], grouping [1], check [2]

8 The following table gives, to the nearest 10, the number of deaths yearly by automobile accident in New York State from 1915 to 1920 inclusive:

1915	690	1918	1240
1916	840	1919	1350
1917	1080	1920	1410

a Represent the above table as a broken line graph. [9]

b In what year was the *rate of increase* greatest? [1]