ELEMENTARY ALGEBRA

Wednesday, January 19, 1921 — 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 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 *a* Factor *four* of the following:

$c^2 - c - 6$ [2]
$2a^3 - 2ay^4$ [2]
$5x^2 - 7xy + 2y^2$ [2]
$4a^2 + 12ab + 9b^2$ [2]
$4x^2 + y^2 - 4xy - a^2$ [2]

No partial credit allowed on any part.

b Divide $a^2 + 3ab - 15b^2$ by $a - 2b$ [4]

c Unite into a single fraction in its lowest terms:

$$\frac{a}{a-2} - \frac{a-2}{a+2} - \frac{8}{a^2-4}$$ [6]

d Simplify:

$$\frac{a(2a-b)^2}{2a+b} \times \frac{b}{2a^2-ab} \div \frac{b(4a^2-b^2)}{(2a+b)^2}$$ [6]

e Solve and check:

$$\frac{x}{2} - 2\left(\frac{4x}{5} - 3\right) = 4 - \frac{3}{2}\left(\frac{x}{2} + 1\right)$$

Solution [4], check [2]

f Solve for x and y and check:

$$\frac{x}{a} + \frac{y}{b} = 2$$
$$bx - ay = 0$$

First solution [4], second solution [2], check [2]

g Simplify *each* of the following and unite the results into a single term:

$$6a\sqrt{\frac{2}{3}} - \frac{b}{3}\sqrt{54} + \sqrt{24b^2}$$

First [2], second [1], third [1], uniting [2]
No partial credit allowed on any part.

h Solve and check:

$$\frac{x}{3(x-1)} = \frac{x-2}{2}$$

Solution [4], check [2]

2 Separate 24 into two parts such that one part shall be less than twice the other part. Equation [7], solution [3]

3 Solve the following equation and find the values of x to the *nearest* tenth:

$$x^2 - 21 = 2x$$ [10]

4 Solve for x and y and group your answers:

$$x(y+1) = 4$$
$$3x = 2y$$

First pair [6], second pair [2], grouping [2]

5 Find the square root of

$$100x^4 + 65x^2 - 100x^3 + 4 - 20x$$ [10]

6 In the formula $R = \dfrac{gs}{g+s}$

a Solve for s in terms of R and g. [5]

b Find the value of s to the *nearest* hundredth when $R = 2.75$ and $g = 3.9$ [5]

Credit given *b* independent of *a*.

7 In a purse containing $2.50 there are one half as many quarters as 5 cent pieces and one third as many dimes as 5 cent pieces; how many pieces of each kind are there? Equation [6], solution [4]

8 Answer *two* of the following:

a The width of a rectangle is x yards and its length is y yards; express its area and its perimeter. [5]

b What will be the amount (simple interest) at the end of 5 years if P dollars are invested at $r\%$? [5]

c If $2n + 1$ is an odd number, express the next two higher even numbers. [5]

9 A grocer's record of sales of peaches for a certain year showed that at $1.25 a basket he sold 10 baskets; at $1, he sold 30 baskets; at 75 cents, 70 baskets; at 60 cents, 85 baskets and at 50 cents, 90 baskets. Represent this graphically and from your graph estimate the probable demand when the price is $1.10 a basket.

Making graph [8], making estimate from graph [2]