

ELEMENTARY ALGEBRA

Tuesday, June 15, 1920—1.15 to 4.15 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 Write the prime factors of four of the following:

- $a^2 - .04$ [2]
- $2Pr^2 + 2Prh$ [2]
- $4x^2 + 24x + 36$ [2]
- $12 + 16c - 3c^2$ [2]
- $r^2 - s^2 - 25 + 10s$ [2]

b Divide $6e^2 - 13e - 4$ by $2e - 3$ and check the result, assuming that $e = 2$. Division [2], check [4]

c Solve the following and check:

$$\begin{cases} \frac{5x}{3} + 2y = 17 \\ 2x - \frac{4y}{3} = -2 \end{cases}$$

First solution [6], second solution [2], check [2]

d Represent as a single fraction in its lowest terms:

$$\left(\frac{6a}{a^2-4} + \frac{3}{2-a}\right) \div \frac{3}{a^2-a-6}$$

Addition [5], division [3]

e Write in simplest form each of the following, using a single radical in each case to express the result:

$$\sqrt{16a^3 - 48a^2b} - \sqrt{9ab^2 - 27b^3}; \sqrt[3]{24} \times \sqrt[3]{18}$$

Subtraction [5], multiplication [3]

f Find to the nearest tenth the roots of

$$5 - \frac{x^2}{6} = \frac{4x}{3} \quad [10]$$

2 Find the number whose square diminished by 20 is equal to 8 times the number. Equation [5], solution [5]

3 In the formula $S = \frac{a}{2}(2t - 1)$

a Find the value of t in terms of a and S . [5]

b Find the value of t when $a = 5.65, S = 73.45$ [5]

4 a Give the name applied to the 3 in each of the following and explain its meaning in each case:

$$3a, a^3, \sqrt[3]{a}, \frac{a}{3} \quad [4]$$

b Write in symbols: The square of twice a number diminished by twice the square of the same number. [2]

c If the width of a rectangle is represented by w feet, represent the width of a rectangle (1) 5 feet shorter, (2) 5 feet longer, (3) 5 times as long, (4) one fifth as long. [4]

5 Solve the following for x and y , correctly group your answers and check either set:

$$\begin{cases} 3xy - 10x = y \\ 2 - y = -x \end{cases}$$

First solution [6], second solution [2], check [2]

6 A stream flows at the rate of 2 miles per hour; a launch can go at the rate of 8 miles per hour in still water. How far down the stream can the launch go and return if the complete trip can take only 6 hours? Equation [7], solution [3]

7 If the list price of an article is represented by L , and the discount a merchant offers from the list price is represented by $d\%$, how would you represent the selling price in terms of L and d ? Representing the selling price by S , make a formula for the selling price. [10]

8 In sending a telegram there is a fixed rate for the first 10 words and a fixed rate for each additional word; if a message of 31 words costs 98 cents and a message of 45 words costs \$1.40, what are these two fixed rates? Equations [7], first solution [2], second solution [1]

9 Solve for x :

$$\frac{ax}{2b} - 4b^2 = \frac{2bx}{a} - a^2 \quad [10]$$

10 A cubic foot of water weighs 62.5 pounds. The weight of water may therefore be expressed by the formula $W = 62.5V$, when W represents the weight in pounds and V represents the volume in cubic feet.

a Complete the following table and make a graph of it, i. e., make a graph of the formula $W = 62.5V$: [8]

V (in cu. ft)	1	2	4	6	8	10
W (in lb)	?	?	?	?	?	?

b Show from the graph what the weight of 7 cubic feet should be. [Leave all work on the paper.] [2]

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DIRECTIONS FOR RATING

The direction, "Less than 60% of the credit should be granted when an error in computation occurs," should be followed in rating all incorrect answers to questions which fall under the topics mentioned in "Suggestions on the Rating of Regents Examination Papers in Mathematics" under "Elem. Alg. 10," in rating all problems, see "Suggestion 12."

No credit should be allowed for checks unless made in original statements.

Except in schools where the "committee system" is used, teachers are urged to mark papers cumulatively, that is, to add the credits earned by each answer to the total credits earned by preceding answers so that the mark given to the last answer is the per cent to which the paper is entitled, e. g. consecutive answers earning 5, 7, 4 etc. respectively should be marked 5, 12, 16 etc.

1 50 credits

a 8 credits. Allow 2 credits each

b 6 credits. Allow 2 credits for correct division and 4 credits for correct check. Allow no partial credit on either part.

c 10 credits. Allow 6 credits for first solution, 2 credits for second solution and 2 credits for correct check. Allow no partial credit on any part.

d 8 credits. Allow 5 credits for correct addition and 3 credits for correct division. Allow no partial credit on either part.

e 8 credits. Allow 5 credits for correct subtraction and 3 credits for correct multiplication. Allow no partial credit on either part.

f 10 credits. Allow 7 credits if the solution is written 2.7 and -10.7 , or 2.78 and -10.78 . Allow 10 credits if the solution is written 2.8 and -10.8 .

2 10 credits

Allow 5 credits for correct equation and 5 credits for correct solution.

DIRECTIONS FOR RATING—concluded

3 10 credits

a 5 credits. Allow no partial credit.

b 5 credits

4 10 credits

a 4 credits. Allow 1 credit each.

b 2 credits

c 4 credits. Allow 1 credit each.

5 10 credits

Allow 6 credits for first solution, 2 credits for second solution and 2 credits for correct check.

6 10 credits

Allow 7 credits for correct equation and 3 credits for correct solution.

7 10 credits

Allow 8 credits for representing the selling price in terms of L and d . Allow 2 credits for correct formula.

8 10 credits

Allow 7 credits for correct equations, 2 credits for the first solution and 1 credit for the second solution.

9 10 credits

Allow 7 credits if the answer is not in its simplest form.

10 10 credits

a 8 credits

b 2 credits