

Tuesday, January 23, 1917—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 nine questions, including all the questions in group I and two from group II. 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.

Group I

Answer all the questions in this group.

1 Solve  $2x^2 + 3x - 6 = 0$  [8]. Find the values of the roots to two places of decimals [4].

2 a Simplify  $3\sqrt{98} - 2\sqrt{75} - 3\sqrt{32} + \frac{1}{4}\sqrt{\frac{8}{3}}$  [6]

b If  $x = 2\sqrt{5} - 1$ , find the value of  $x^2 + 2x - 4$  [6]

3 Reduce  $\frac{b+a}{b-a} - 2\left(\frac{b}{a} - \frac{b}{a-b}\right)$  to a single fraction in its lowest terms [10]. Check the result [2].

4 Reduce to a mixed expression: [5]

$$\frac{2x^2 + 5x^2 - 7x - 5}{2x - 1} \quad \text{Check the result.} \quad [2]$$

5 Solve  $\begin{cases} bx + ay = 2ab \\ ax + by = a^2 + b^2 \end{cases}$  [12]

6 Solve  $\sqrt{x-4} - \sqrt{x+11} = -3$  [8]. Check the result [2].

7 Factor and simplify

$$\frac{4x^2 - 1}{6x^2 - 13x + 6} \times \frac{4x^2 - 12x + 9}{4x^2 - 4x - 3} \div \frac{2(ax - bx) - a + b}{3ax + 3bx - 2b - 2a} \quad [15]$$

Group II

Answer two questions from this group.

8 A stone mason has a formula for a certain style of arch; the formula is  $r = \frac{s^2 + h^2}{2h}$

a Find the value of  $r$  if  $h = 4$  and  $s = 8$  [3]

b Find the possible values of  $h$  if  $r = 5$  and  $s = 4$  [7]

9 a If a dealer gains  $c$  cents on the cost of a pair of shoes and the shoes cost  $s$  dollars, what per cent does he gain? [6]

b If  $n$  is an odd number, write the next larger even number and the next smaller odd number. [4]

10 One pound of coffee and 5 pounds of sugar together cost 70 cents; after the price of sugar has advanced  $12\frac{1}{2}\%$  and the price of coffee 20%, 3 pounds of sugar and 2 pounds of coffee together cost 99 cents. Find the price of each per pound. [10]

11 If the greater of two numbers is divided by the less, the quotient is 4 and the remainder is 1; if the less is divided by the greater, the quotient is .24 and the remainder is 2. Find the numbers. [10]

# ELEMENTARY ALGEBRA

## DIRECTIONS FOR RATING

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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. 12."

In all problems solved with two unknowns, no credit should be given for one equation correctly formed if the other is not given or is inaccurate.

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. *x*

### 1 12 credits

Allow 6 credits for one correct fractional value of unknown.

Allow 2 credits for the other correct fractional value of unknown.

Allow 2 credits for one correct decimal value.

Allow 2 credits for the other correct decimal value.

### 2 12 credits

#### a 6 credits

Allow 4 credits for correct simplification (1 each).

Allow 2 credits for correct addition.

#### b 6 credits

Allow 2 credits for correct substitution.

Allow 4 credits for correct answer.

### 3 12 credits

Allow 3 credits for correct addition of  $\left(\frac{b}{a} - \frac{b}{ab}\right)$

Allow 4 credits for correct addition of given fractions.

Allow 3 credits for reducing to lowest terms.

Allow 2 credits for check.

Or, Allow 7 credits for correct removal of parenthesis and addition of resulting fractions.

### 4 7 credits

Allow 5 credits for correct reduction.

Allow 2 credits for a valid check.

Allow no partial credit on either part.

## DIRECTIONS FOR RATING—concluded

### 5 12 credits

Allow 7 credits for the first correct value of the unknown.

Allow 5 credits for the other correct value of the unknown.

Allow 9 credits for correct results in unsimplified form.

### 6 10 credits

Allow 3 credits for removing one radical correctly.

Allow 3 credits for removing the other radical correctly.

Allow 2 credits for correct solution of equation.

Allow 2 credits for correct check.

Allow no credit for check if not made in original equation.

### 7 15 credits

Allow 12 credits for correct factors (2 each).

Allow 3 credits for correct inversion and cancelation.

### 8 10 credits

a 3 credits. Allow no partial credit.

b 7 credits

Allow 1 credit for correct substitution.

Allow 2 credits for equation in quadratic form.

Allow 4 credits for correct solution of quadratic (2 each).

### 9 10 credits

a 6 credits. Allow no partial credit.

b 4 credits. Allow 2 credits for correct larger even number. Allow 2 credits for next smaller odd number.

Allow no partial credit on either part.

### 10 10 credits

Allow 6 credits for correct equation.

Allow 4 credits for correct solution (2 each).

### 11 10 credits

Allow 6 credits for correct equation.

Allow 4 credits for correct solution (2 each).