INTERMEDIATE ALGEBRA

Monday, January 22, 1917—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 (1) elementary algebra, (2) intermediate algebra.

The minimum time requirement is four recitations a week for half a school year, after the completion of elementary algebra.

Answer six questions, including four from group I, question eleven and one other question from group II.

Group I

Answer four questions from this group.

1 Solve for values of x and y: [12]

$$\begin{cases} x^{-1}+3y^{-1}=a \\ 3x^{-1}+2y^{-1}=b \end{cases}$$

Check the results. [4]

2 Solve $\sqrt{2x}-\sqrt{x+1}=\dfrac{3}{\sqrt{x+1}}$ [10]

Check the results. [6]

3 Find the prime factors of *four* of the following: [16]
$6a^2+7ab-3b^2$; a^3-3a+2; $(m+3)^4-18(m+3)^2+32$; x^6-64; b^4+64

4 Find one side of a square whose area is represented by the following expression: [12]

$$\frac{x^2}{9}+\frac{2x}{3}-\frac{1}{3}-\frac{4}{x}+\frac{4}{x^2}$$

Check the result. [4]

5 Solve $6x^2+2x+1=0$ [8]
Check the results. [8]

6 Find the sixth term in the expansion of

$$\left(\frac{a}{3b^{-2}}-2\sqrt{b}\right)^8$$ [16]

7 Graph the equations
$$2x+y-5=0$$
$$2y-3x+18=0$$ [10]
and from them determine the values of x and y. [6]

Group II

Answer question eleven and one other question from this group.

8 The area of the mat about a picture 10 inches long by 8 inches wide is one half the area of the picture; what are the outside dimensions of the mat? [16]

9 The sum of the volumes of 2 cubes is 152 cubic feet; when one cube is placed on the other their combined hights are 8 feet. What are the dimensions of the cubes? [16]

10 In a potato race, 8 potatoes are placed 6 feet apart on a straight line, the first being 6 feet from the basket; a competitor starts from the basket and puts one potato at a time into the basket. How far will he travel if he finishes the race? [16]

11 *a* Without solving the equation, determine the nature of the roots in *each* of the following: [12]

$$\frac{x}{2}+3=\frac{5}{x}$$

$$4x^2+9=9x$$

$$4x=4x^2+1$$

b Without solving the equation $2x^2+6x=1$, determine the sum of the roots in the equation. [3]

c In the equation $x^2=5x-c$, find the value of c, if the difference between the roots is 11. [5]

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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 "General 3." 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. respectively.

1 16 credits
   Allow 7 credits for first correct value of unknown.
   Allow 5 credits for second correct value of unknown.
   Allow 4 credits for correct check.
   Allow no credit for check unless made in original
      equation.

2 16 credits
   Allow 6 credits for correct removal of radicals.
   Allow 4 credits for correct solution.
   Allow 6 credits for correct checks (3 each).
   Allow no credit for check unless made in original
      equation.

3 16 credits
   Allow 4 credits each. Apply suggestion 17 under
      "Suggestions on Elementary Algebra" for fac-
      tors not prime.

4 16 credits
   Allow 6 credits for first two correct terms of root.
   Allow 6 credits for third correct term of root if
      work is finished correctly.
   Allow 4 credits for check.

5 16 credits
   Allow 8 credits for correct solution.
   Allow 6 credits if ± sign is omitted.

DIRECTIONS FOR RATING—concluded

Allow 8 credits for correct checks if made in origi-
   inal equation or 5 credits if made in original
   equation divided by 6.

6 16 credits
   Allow 2 credits for correct formula.
   Allow 6 credits for correct substitution.
   Allow 8 credits for correct reduction.
   If formula is not used but work is correct, allow
      full credit.

7 16 credits
   Allow 10 credits for correct graphs (5 each).
   Allow 6 credits for correct values of x and y.

8 16 credits
   Allow 10 credits for correct equation.
   Allow 6 credits for correct solution.

9 16 credits
   Allow 8 credits for correct equation.
   Allow 8 credits for correct solution (2 for each
      dimension).

10 16 credits
   Allow 2 credits for correct formula or formulas.
   Allow 14 credits for correct value of S.
   Allow 8 credits if only $\frac{1}{2}$ the distance is found.

11 20 credits
   a 12 credits (4 each).
   b 3 credits. Allow no partial credit.
   c 5 credits
      Allow 3 credits for correct equations.
      Allow 2 credits for correct solution.