NINTH YEAR
MATHEMATICS

Thursday, August 14, 1980 — 8:30 to 11:30 a.m., only

The last page of the booklet is the answer sheet. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

On page 5 you will find the "Tables of Natural Trigonometric Functions" which you may need to answer some questions in this examination. Fold this page along the perforations, and tear it off also slowly and carefully.

When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer paper cannot be accepted if you fail to sign this declaration.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet.

1 Solve for y: $3y + 6 = y - 2$

2 Solve for x: $.08x = 3.2$

3 Find the value of $\frac{|-7|}{7} + |5|$.

4 How many significant digits are there in 63.2?

5 If $x = -2$ and $y = 3$, find the value of the expression $5x^2y$.

6 Solve for x: $\frac{2x}{3} - 6 = 2$

7 In a class of 400 freshmen, 80 percent study algebra. How many freshmen study algebra?

8 Sheila can mow a lawn in 3 hours. At this rate, what part of the lawn can she mow in one hour?

9 Solve for s in terms of p: $4s = p$

10 Express $\frac{2x}{3} - \frac{x}{5}$ as a single fraction.

11 Factor: $a^2 - 81$

12 If 6 grams of a certain metal costs \$8, what will be the cost of 15 grams of the metal?

13 One root of the equation $(x - 2)(x + 3) = 0$ is -3. Find the other root.

14 Solve for x: $3x + 2(x + 2) = 14$

15 Find the value of $\sqrt{28}$ to the nearest tenth.

16 Two numbers are in the ratio of 1:4 and their sum is 55. Find the smaller of the two numbers.

17 The measure of one acute angle of a right triangle is $32°$. Find the number of degrees in the other acute angle.

18 Find, to the nearest degree, the measure of the angle whose cosine is .8510.

19 Find the greatest common factor of $3x^3 + 6x$.

20 The length of a side of an equilateral triangle is represented by $3x - y$. Express the perimeter of the triangle in terms of x and y.

21 If the replacement set for x is $\{1,2,3,4\}$, what is the solution set of the inequality $4x - 3 < 2$?

22 Solve the following system of equations for y:
$$7x + 3y = 3$$
$$-7x + y = 1$$

Directions (23–30): Write in the space provided on the separate answer sheet the numeral preceding the expression that best completes each statement or answers each question.

23 The expression $(x + 3)^2$ is equivalent to
(1) $x^2 + 9$ (3) $x^2 + 6x + 9$
(2) $x^2 + 3x + 9$ (4) $x^2 + 9x + 9$

24 The expression $\sqrt{12} + 3\sqrt{3}$ is equivalent to
(1) $7\sqrt{3}$ (3) $3\sqrt{15}$
(2) $5\sqrt{3}$ (4) $4\sqrt{15}$

25 The point where the graph of $y = x + 5$ intercepts the y-axis is
(1) $(0,5)$ (3) $(-5,0)$
(2) $(5,0)$ (4) $(1,0)$

26 Where does the point $(-4,3)$ lie on the coordinate plane?
(1) on the x-axis   (3) above the x-axis
(2) on the y-axis   (4) below the x-axis

27 Which statement illustrates the associative property for multiplication?

(1) $9 \times 0 = 0$

(2) $\frac{1}{2} \times \frac{1}{4} = \frac{1}{4} \times \frac{1}{2}$

(3) $5 \times (3 \times 2) = (5 \times 3) \times 2$

(4) $5 \times \frac{1}{5} = 1$

28 The reciprocal of $3\frac{1}{7}$ is

(1) 7

(2) $\frac{7}{22}$

(3) $\frac{1}{3}$

(4) $-3\frac{1}{7}$

29 Which is a finite set?

(1) $\{x \mid x$ is an even number$\}$

(2) $\{x \mid x$ is a number greater than 1$\}$

(3) $\{x \mid x$ is an integer less than 100$\}$

(4) $\{x \mid x$ is the number of people in the United States$\}$

30 For which value of x is the expression $\frac{6}{x-4}$ undefined or meaningless?

(1) -6

(2) -4

(3) 0

(4) 4

☞ GO RIGHT ON TO THE NEXT PAGE.

Part II

Answer four questions from this part. Show all work unless otherwise directed.

31 Solve graphically and check.

$$y = 2x - 4 \quad [8,2]$$
$$x + 2y = 7$$

32 Answer *both* a and b.

a Find the roots of the equation
$x^2 = 4 - 3x.$ [5]

b Express the indicated product as a single fraction in *lowest* terms:

$$\frac{a^2 - 25}{a^2 + 8a + 15} \cdot \frac{a + 3}{a^2 - 5a} \quad [5]$$

33 Write an equation or a system of equations that can be used to solve *each* of the following problems. In *each* case, state what the variable or variables represent. [*Solution of the equations is not required.*]

a A man invested $1,000 more than his wife. The annual income from both investments at 6% was $300. How much did they each invest? [5]

b The denominator of a fraction is 7 more than its numerator. If the numerator is increased by 3 and the denominator is decreased by 2, the new fraction equals $\frac{4}{5}$. Find the original fraction. [5]

34 The width of a rectangle is 1 less than the side of a square, and the length of the rectangle is 2 more than the side of the square. The area of the rectangle is 4 more than the area of the square. Find the length of a side of the square. [*Only an algebraic solution will be accepted.*] [5,5]

35 Mike has 2 more dimes than quarters and 7 more nickels than quarters. The total value of the coins is $1.75. How many quarters does he have? [*Only an algebraic solution will be accepted.*] [5,5]

36 Answer *both* a and b.

a In the accompanying figure ABCD is a rectangle. If $AC = 15$ cm and angle CAB contains 41 degrees, find the length of $\overline{AB}$ correct to the nearest centimeter. [5]
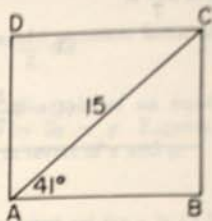
b As shown in the accompanying figure, a flagpole 10 meters high casts a shadow 12 meters long on level ground. Find, to the *nearest degree*, the measure of the angle of elevation of the Sun (angle E). [5]
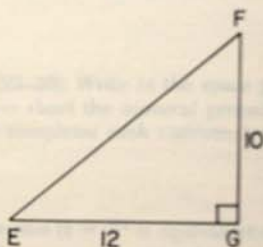
37 The replacement set of x for each open sentence below is $\{-2, -1, 0, 1, 2\}$. On your answer paper write the letters a through e, and next to each write the solution set of each open sentence. [*Each answer must be a subset of the replacement set.*] [10]

a $2x + 1 < x + 1$
b $3x = 1$
c $4 - x^2 = 0$
d $|x| = 1$

e $2 - \dfrac{x}{2} = 1$

FOR TEACHERS ONLY

9

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the pupil's work by making insertions or changes of any kind. Use checkmarks to indicate pupil errors.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Part I

Allow 2 credits for each correct answer; allow no partial credit. For questions 23–30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) -4	(11) $(a - 9)(a + 9)$	(21) 1
(2) 40	(12) \$20	(22) 1
(3) 6	(13) 2	(23) 3
(4) 3	(14) 2	(24) 2
(5) 60	(15) 5.3	(25) 1
(6) 12	(16) 11	(26) 3
(7) 320	(17) 58	(27) 3
(8) $\frac{1}{3}$	(18) 32	(28) 2
(9) $\frac{p}{4}$	(19) $3x$	(29) 4
(10) $\frac{7x}{15}$	(20) $9x - 3y$ or $3(3x - y)$	(30) 4

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Part II

Please refer to the Department's pamphlet *Suggestions on the Rating of Regents Examination Papers in Mathematics*. Care should be exercised in making deductions as to whether the error is purely a mechanical one or due to a violation of some principle. A mechanical error generally should receive a deduction of 10 percent, while an error due to a violation of some cardinal principle should receive a deduction ranging from 30 percent to 50 percent, depending on the relative importance of the principle in the solution of the problem.

(32) *a* −4, 1   [5]

   b $\frac{1}{a}$ [5]

(33) *a* Let x = amount invested by wife
   $.06 (x + x + 1,000) = 300$ [5]

   b Let N = numerator of original fraction

   $\frac{N + 3}{N + 7 - 2} = \frac{4}{5}$ [5]

(34) Analysis   [5]
    6   [5]

(35) Analysis   [5]
    3   [5]

(36) *a* 11   [5]
    b 40   [5]

(37) *a* −2, −1   [1,1] *
    b { } or ϕ [2]
    c 2, −2   [1,1] *
    d 1, −1   [1,1] *
    e 2   [2]

   * Allow one credit if the
   student writes one of the an-
   swers and nothing more or
   two correct answers and an
   incorrect one.

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