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. What is the absolute value of $-6$?

2. On a map, 1 centimeter represents 70 kilometers. How many kilometers are represented by a line segment 2.5 centimeters long?

3. If the sine of angle $A$ is $0.5000$, find the number of degrees in angle $A$.

4. If a car travels at the rate of $x$ miles per hour, express in terms of $x$ the distance covered by the car in 4 hours.

5. Solve for $n$: $180(n - 2) = 1,440$

6. Solve for $a$: \( \frac{2a}{3} + 1 = 9 \)

7. The sum of 2 consecutive integers is 35. Find the smaller integer.

8. Solve the following system of equations for $y$:
   \[
   \begin{align*}
   2y + x &= 10 \\
   y - x &= 8
   \end{align*}
   \]

9. Find the value of $-3pr^2$ when $p = -2$ and $r = 5$.

10. A girl 5 feet tall casts a 7-foot shadow at the same time that a monument casts a 63-foot shadow. What is the total number of feet in the height of the monument?

11. Divide $25x^3 - 10x^2$ by $5x$.

12. Express $(2y - 3)(y + 2)$ as a trinomial.

13. Express, in terms of $x$, the perimeter of a square whose side is $x - 2$.

14. Solve for $x$ in terms of $c$, $d$, and $m$: $mx - cd = 0$

15. Express the sum of $\sqrt{50}$ and $\sqrt{18}$ as a single term.

16. From the sum of $(6x - 5)$ and $(2x + 1)$ subtract $(x - 7)$ and express your answer as a binomial.

17. Solve the following equation and round your answer to the nearest tenth: $3x = 5.77$

18. Factor completely: $25b + 5b^3$

Directions (19–30): Write in the space provided on the separate answer sheet the numeral preceding the expression that best completes each statement or answers each question.

19. Which is not an element of the solution set of $x + 3 > 7$?
   \[
   \begin{align*}
   (1) & \quad 9 \\
   (2) & \quad 7 \\
   (3) & \quad 3 \\
   (4) & \quad 5
   \end{align*}
   \]

20. If one factor of $x^2 - 3x - 28$ is $x - 7$, the other factor is
   \[
   \begin{align*}
   (1) & \quad x + 4 \\
   (2) & \quad x - 4 \\
   (3) & \quad x + 7 \\
   (4) & \quad x - 14
   \end{align*}
   \]

21. The value of $2[(5 + (8 \times 3))]$ is
   \[
   \begin{align*}
   (1) & \quad 32 \\
   (2) & \quad 34 \\
   (3) & \quad 58 \\
   (4) & \quad 78
   \end{align*}
   \]

22. If the replacement set for $x$ is the set of whole numbers, then the solution set for $2 \leq x < 4$ is
   \[
   \begin{align*}
   (1) & \quad \{2,3,4\} \\
   (2) & \quad \{2,3\} \\
   (3) & \quad \{3,4\} \\
   (4) & \quad \{\} \\
   \end{align*}
   \]

23. The product of $ab^2$ and $a^2b^2$ is
   \[
   \begin{align*}
   (1) & \quad a^3b^5 \\
   (2) & \quad a^4b^6 \\
   (3) & \quad a^3b^6 \\
   (4) & \quad a^2b^5
   \end{align*}
   \]

24. The sum of $\frac{x + y}{4}$ and $\frac{x - y}{2}$ is
   \[
   \begin{align*}
   (1) & \quad \frac{x}{3} \\
   (2) & \quad \frac{x}{2} \\
   (3) & \quad \frac{3x}{4} \\
   (4) & \quad \frac{3x - y}{4}
   \end{align*}
   \]
25 The width of a rectangle is represented by \( w \) and the length by \( 2w + 3 \). Which expression represents the area of the rectangle?

(1) \( 2w^2 + 3w \)  
(2) \( 6w + 6 \)  
(3) \( 3w + 3 \)  
(4) \( 2w^2 + 3 \)

26 The solution set for \( x \) in the equation \( x^2 - 4x - 5 = 0 \) is

(1) \( \{5, 1\} \)  
(2) \( \{-5, -1\} \)  
(3) \( \{5, -1\} \)  
(4) \( \{-5, 1\} \)

27 The fraction \( \frac{x - 3}{-2} \) is equivalent to

(1) \( \frac{x + 3}{2} \)  
(2) \( \frac{-x + 3}{2} \)  
(3) \( \frac{-x - 3}{2} \)  
(4) \( \frac{x - 3}{2} \)

28 Which set is not a finite set?

(1) \( \{x | x + 2 = x + 5\}, \) \( x \) is a real number  
(2) \( \{x | x + 2 > 6\}, \) \( x \) is an integer  
(3) \( \{x | x \) is a positive integer less than 1,000,000\}  
(4) \( \{x | x = 4\}, \) \( x \) is a real number

29 The graph of the equation \( y = x \) is a straight line which

(1) passes through the origin  
(2) is parallel to the \( y \)-axis  
(3) is parallel to the \( x \)-axis  
(4) has a slope of zero

30 Which solution set is represented by the graph below?

(1) \( \{x | -4 < x < 3\} \)  
(2) \( \{x | -4 < x \leq 3\} \)  
(3) \( \{x | -4 \leq x \leq 3\} \)  
(4) \( \{x | -4 \leq x < 3\} \)

GO RIGHT ON TO THE NEXT PAGE.
Answers to the following questions are to be written on paper provided by the school.

Part II

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

31 Solve graphically and check:
\[ y = 2x + 4 \quad x + y = 1 \]  \[ [8,2] \]

32 Answer both a and b.

a Perform the indicated operations and express the answer in simplest form:
\[ \frac{2x + 6}{x^2 + 6x + 9} + \frac{4}{x + 3} \]  \[ [5] \]

b Solve the following system of equations:
\[ 3x + 2y = 7 \quad y = x - 9 \]  \[ [5] \]

33 A grocer has some candy selling for $1.90 a pound and some other candy selling for $2.50 a pound. How many pounds of each kind must he mix to obtain 20 pounds of a mixture to sell for $2.05 a pound? \[ [5,5] \]

34 The length of a rectangle exceeds its width by 2. If the area of the rectangle is 24 square units, find both the length and the width. \[ [5,5] \]

35 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 Find two supplementary angles such that the larger is 20 less than 3 times the smaller. \[ [5] \]

b The sum of the digits of a two-digit number is 11. If the number is increased by 45, the result is the number with the digits reversed. Find the original number. \[ [5] \]

36 Answer both a and b.

a As shown in the accompanying diagram, hypotenuse \( AB \) of right triangle \( ABC \) is 13 and leg \( AC \) is 5. Find the measure of angle \( B \) to the nearest degree. \[ [5] \]

b As shown in the accompanying diagram, a diagonal of a rectangle makes an angle of 35° with a side whose length is 18 inches. Find the length of the diagonal to the nearest inch. \[ [5] \]

37 Write the letters \( a \) through \( e \) on your answer paper. Then, for each question in \( a \) through \( e \) below, write the number of the set(s), chosen from the list below, which answers the question. \[ 10 \]

Sets
1. Natural numbers
2. Integers
3. Rational numbers
4. Irrational numbers

a Which set has \( \sqrt{2} \) as a member?
b Which sets have no additive identity element?
c Which set has \( -1 \) as an element, but not \( -\frac{1}{2} \)?
d Which set (with 0 excluded from it) has closure under division?
e Which set has \( \frac{1}{2} \) as a member?
Tables of Natural Trigonometric Functions
(For use with 9th and 10th Year Mathematics Regents Examinations)

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Math. 9-Aug. '78 [5] [OVER]
NINTH YEAR MATHEMATICS

Thursday, August 17, 1978 — 8:30 to 11:30 a.m., only

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 19–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

(1) 6          (11) $5x^2 - 2x$          (21) 3
(2) 175        (12) $2y^2 + y - 6$          (22) 2
(3) 30         (13) $4x - 8$          (23) 1
(4) $4x$       (14) $\frac{cd}{m}$          (24) 4
(5) 10         (15) $8\sqrt{2}$          (25) 1
(6) 12         (16) $7x + 3$          (26) 3
(7) 17         (17) 1.9          (27) 2
(8) 6          (18) $5b(5 + b^2)$          (28) 2
(9) 150        (19) 3          (29) 1
(10) 45        (20) 1          (30) 4
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) \[ a = \frac{1}{2} \quad [5] \]

\[ b \quad x = 5 \quad y = -4 \quad [5] \]

(33) Analysis [5]

15 lb. at $1.90 per pound
5 lb. at $2.50 per pound

(34) Analysis [5]

4,6 [5]

(35) a Let \( A = \) number of degrees in larger angle

\( B = \) number of degrees in smaller angle

\[ A + B = 180 \quad [5] \]

\[ A = 3B - 20 \quad [5] \]

b Let \( t = \) tens digit

\( u = \) units digit

\[ t + u = 11 \quad [5] \]

\[ 10t + u + 45 = 10u + t \]

(36) a 23 [5]

b 22 [5]

(37) a 4 [2]

b 1,4 [1.1]*

c 2 [3]

d 3 [2]

e 3 [2]

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