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.
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 If \( a + b = 0 \) and \( a = 5 \), what is the value of \( b \)?

2 Solve for \( x \):
\[
6x = 2(x + 10)
\]

3 Factor:
\[
r^2 - 64
\]

4 A boy 6 feet tall casts a shadow 4 feet long. At the same time, a nearby flagpole casts a shadow 20 feet long. What is the height, in feet, of the flagpole?

5 Find the value of \((ab)^2\) if \( a = 3 \) and \( b = -2 \).

6 Express \( \frac{2x}{3} - \frac{x}{5} \) as a single fraction.

7 Solve for \( c \):
\[
\frac{c}{6} = \frac{c + 1}{8}
\]

8 Find the value of \( \sqrt{45} \) to the nearest tenth.

9 Solve the following system of equations for \( x \):
\[
\begin{align*}
3x + y &= 7 \\
x + y &= 5
\end{align*}
\]

10 If \( n \) represents an odd integer, express the next smaller odd integer in terms of \( n \).

11 The sum of two angles is \( 80^\circ \). If the angles are in the ratio 1:3, what is the number of degrees in the smaller angle?

12 If 60% of a number is 120, find the number.

13 From \( 3x^2 - 4x + 8 \) subtract \( 2x^2 - 6x - 3 \).

14 Solve for \( x \):
\[
0.1x - 0.02x = 8
\]

15 In the accompanying diagram, the cosine of which angle is equal to \( \frac{3}{5} \)?

![Diagram](image.png)

16 The lengths of the sides of a triangle are represented by \( y + 6 \), \( 3y - 1 \), and \( 2y - 6 \). Express the perimeter of the triangle as a binomial in terms of \( y \).

17 What is the multiplicative inverse of 3?

Directions (18–30): Write in the space provided on the separate answer sheet the numeral preceding the expression that best completes each statement or answers each question.

18 Which are the factors of \( x^2 + 5x - 24 \)?

\[
\begin{align*}
(1) (x - 2)(x + 12) & \quad (3) (x - 4)(x + 6) \\
(2) (x - 3)(x + 8) & \quad (4) (x - 1)(x + 24)
\end{align*}
\]

19 The value of \( |5| - |2| - |-3| \) is

\[
\begin{align*}
(1) 0 & \quad (3) 10 \\
(2) 8 & \quad (4) 4
\end{align*}
\]

20 The product of \( 2x^3 \) and \( 3x^2 \) is

\[
\begin{align*}
(1) 6x^6 & \quad (3) 5x^6 \\
(2) 6x^5 & \quad (4) 5x^5
\end{align*}
\]

21 A telephone call costs \( c \) cents for the first 3 minutes and \( m \) cents for each additional minute. What is the cost, in cents, of a 6-minute call?

\[
\begin{align*}
(1) c + m & \quad (3) c + 3m \\
(2) 2c & \quad (4) c + 6m
\end{align*}
\]

Math. 9-Jan. '87
22 What is the solution set for \( n \) when 
\[ 3n - 2 \geq n + 6? \]
(1) \( n \geq 2 \)  
(2) \( n = 2 \)  
(3) \( 3 < n < 6 \)  
(4) \( n \geq 4 \)

23 Which is \textit{not} a rational number? 
(1) 0  
(2) -8  
(3) \( \sqrt{9} \)  
(4) \( \sqrt{6} \)

24 If \( c = ax + b \), then \( x \) equals 
(1) \( \frac{c + b}{a} \)  
(2) \( \frac{c - b}{a} \)  
(3) \( \frac{c}{a} - b \)  
(4) \( \frac{c}{a} + b \)

25 The expression \( 6\sqrt{2} + \sqrt{32} \) is equivalent to 
(1) \( 7\sqrt{34} \)  
(2) 20  
(3) \( 10\sqrt{2} \)  
(4) \( 6\sqrt{34} \)

26 Which statement describes the graph of the equation \( x = 3 \)? 
(1) It has a slope of 3.  
(2) It passes through the origin.  
(3) It is parallel to the \( x \)-axis.  
(4) It is parallel to the \( y \)-axis.

27 Which statement illustrates the associative property for multiplication? 
(1) \( (a \times b) \times c = a \times (b \times c) \)  
(2) \( a \times 0 = 0 \)  
(3) \( a \times b = b \times a \)  
(4) \( a \times \frac{1}{a} = 1 \)

28 When \( 6x^2 + 7x + 2 \) is divided by \( 2x + 1 \), the quotient is 
(1) \( 3x + 5 \)  
(2) \( 3x + \frac{7}{2} \)  
(3) \( 3x + 2 \)  
(4) \( 3x + 7 \)

29 If the length of each side of a square is multiplied by 2, then the area of the square is multiplied by 
(1) \( \frac{1}{2} \)  
(2) 2  
(3) 3  
(4) 4

30 Which inequality is represented by the accompanying graph? 

\[ -4 -3 -2 -1 0 1 2 3 4 \]

(1) \( -2 \leq x < 3 \)  
(2) \( -2 < x \leq 3 \)  
(3) \( x > 3 \) or \( x \leq 2 \)  
(4) \( x \geq 3 \) or \( x < -2 \)
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. [40]

31 Solve graphically and check:
\[
y = x \quad \text{[s,2]}
x + 2y = -6
\]

32 Answer both a and b.
  a Perform the indicated operation and express the result in lowest terms:
\[
\frac{x^2 + 12x + 35}{x + 6} + \frac{2x + 14}{x^2 - 36} \quad \text{[5]}
\]
  b Solve for y and check:
\[
\frac{y}{5} + 7 = \frac{y}{2} - 2 \quad \text{[s,1]}
\]

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 Susan's change purse contained quarters, dimes, and nickels. She had twice as many nickels as quarters and four more nickels than dimes. She had a total amount of $5.10. How many coins of each kind did Susan have in her purse? [5]
  b John rode his bicycle to town at the rate of 15 miles per hour. He left the bicycle in town for minor repairs. He walked home along the same route at the rate of 3 miles per hour. The entire trip took 3 hours. How long did it take John to walk back? [5]

34 The sum of the digits of a two-digit number is 17. If 9 is subtracted from the number, the result is the original number with the digits reversed. Find the original number. [Only an algebraic solution will be accepted.] [4,6]

35 A postal clerk sold 50 postage stamps for $7.00. Some were 2-cent stamps and the rest were 22-cent stamps. Find the number of each kind of stamp that was sold. [Only an algebraic solution will be accepted.] [5,5]

36 In right triangle $ABC$, angle $C$ is a right angle. The length of $AC$ is 7 and the length of $BC$ is 8.
  a Find, to the nearest degree, the measure of angle $A$. [5]
  b Find, to the nearest integer, the length of $AB$. [5]

37 The replacement set for $x$ for each of the open sentences below is $\{-3, -2, -1, 0, 1, 2\}$. On your answer paper, write the letters $a$ through $e$, and next to each letter write the solution set of the open sentence. [Each answer must be a subset of the replacement set.]
  a $5(x - 1) = 10$ [10]
  b $|x| = 2$ [5]
  c $-4x > 4$ [5]
  d $2x^2 = 2$ [5]
  e $x^2 = x$ [5]

Math. 9-Jan. '37 [4]
### Tables of Natural Trigonometric Functions

(For use with 9th and 10th Year Mathematics Regents Examinations)

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The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION
NINTH YEAR MATHEMATICS
Monday, January 26, 1987—1:15 to 4:15 p.m., only

ANSWER SHEET

Pupil ........................................ Teacher ........................................

School ................................................ Grade .........................

Your answers to Part I should be recorded on this answer sheet.

Part I
Answer all questions in this part.

1 ........................................ 11 ........................................ 21 ........................................

2 ........................................ 12 ........................................ 22 ........................................

3 ........................................ 13 ........................................ 23 ........................................

4 ........................................ 14 ........................................ 24 ........................................

5 ........................................ 15 ........................................ 25 ........................................

6 ........................................ 16 ........................................ 26 ........................................

7 ........................................ 17 ........................................ 27 ........................................

8 ........................................ 18 ........................................ 28 ........................................

9 ........................................ 19 ........................................ 29 ........................................

10 ........................................ 20 ........................................ 30 ........................................

Your answers for Part II should be placed on paper provided by the school.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination, and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature

Math. 9-Jan. '87 [7]
FOR TEACHERS ONLY

SCORING KEY
NINTH YEAR MATHEMATICS
Monday, January 26, 1987—1:15 to 4:15 p.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 18–30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) -5 (11) 20 (21) 3
(2) 5 (12) 200 (22) 4
(3) (r - 8)(r + 8) (13) x^2 + 2x + 11 (23) 4
(4) 30 (14) 100 (24) 2
(5) 36 (15) B (25) 3
(6) \frac{7x}{15} (16) 6y - 1 (26) 4
(7) 3 (17) \frac{1}{3} (27) 1
(8) 6.7 (18) 2 (28) 3
(9) 1 (19) 1 (29) 4
(10) n - 2 (20) 2 (30) 1

[OVER]
Part II

Please refer to the Department’s pamphlet Guide for Rating Regents Examinations 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) \[ \frac{(x + 5)(x - 6)}{2} \] [5]

b 30 [4]
Check [1]

(33) \[ \text{Let } n = \text{no. of quarters} \]
\[ .25n + .05(2n) + .10(2n - 4) = 5.10 \] [5]

b Let \( t = \) time to walk back
\[ 15(3 - t) = 3t \] [5]

(34) Analysis [4]
98 [6]

(35) Analysis [5]
20 2-cent stamps [5]
30 22-cent stamps [5]

(36) \[ a \quad 49 \] [5]
\[ b \quad 11 \] [5]

(37) \[ a \{ \} \text{ or } \phi \] [2]
\[ b \quad -2.2 \] [1.1]
\[ c \quad -3, -2 \] [1.1]
\[ d \quad -1, 1 \] [1.1]
\[ e \quad 0, 1 \] [1.1]

As a reminder . . .

Regents examinations based on the Ninth Year Mathematics syllabus will not be offered after January 1988.