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. [60]

1 Solve for $x$: \( \frac{3}{4} = \frac{x}{24} \)

2 If $s = 16t^2$, find the value of $s$ when $t = 2$.

3 Solve for $x$: \( 9x + 28 = 7x + 16 \)

4 Solve for $a$: \( 4(2a + 1) = 20 \)

5 Express $(3x + 5)(x - 1)$ as a trinomial.

6 Factor: \( a^2 - 9a + 14 \)

7 Solve the following system of equations for $x$:
   \[
   \begin{align*}
   3x + y &= 11 \\
   2x - y &= -1 
   \end{align*}
   \]

8 Express \( \frac{6a^2b^2}{2ab^2} \) in lowest terms.

9 If $\tan A = 0.1988$, find the measure of angle $A$ to the nearest degree.

10 If the point $(2,k)$ lies on the graph of the equation $y = 3x - 5$, what is the value of $k$?

11 A basketball player scored $x$, $y$, and $z$ points in three games. Express the average number of points scored by the player in terms of $x$, $y$, and $z$.

12 Find the value of $\sqrt{30}$ to the nearest tenth.

13 Solve for $y$ in terms of $a$, $b$, and $c$:
   \[
   by + a = c
   \]

14 Solve for $x$: \( 0.3x - 0.15 = 0.45 \)

15 If 12% of a number is 6, find the number.

16 Express as a single fraction in simplest form:
   \[
   \frac{x}{2} - \frac{x}{3}
   \]

17 The lengths of the sides of a triangle are 12, 15, and 20. If the length of the shortest side of a similar triangle is 3, find the length of the longest side of that triangle.

18 Find the perimeter of a square whose area is 36.

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 What is the positive root of the equation $3x^2 - 27 = 0$?
   \[
   \begin{align*}
   (1) & \ 9 \\
   (2) & \ -9 \\
   (3) & \ 3 \\
   (4) & \ -3
   \end{align*}
   \]

20 The value of $|-6| - |-2|$ is
   \[
   \begin{align*}
   (1) & \ -8 \\
   (2) & \ -4 \\
   (3) & \ 8 \\
   (4) & \ 4
   \end{align*}
   \]

21 The product of $3x^2y$ and $2x^3y$ is
   \[
   \begin{align*}
   (1) & \ 6x^5y^2 \\
   (2) & \ 6x^5y \\
   (3) & \ 5x^5y^2 \\
   (4) & \ 5x^5y^2
   \end{align*}
   \]

22 Which expression is undefined if $x = 2$?
   \[
   \begin{align*}
   (1) & \ \frac{1}{x + 2} \\
   (2) & \ \frac{1}{x - 2} \\
   (3) & \ \frac{2}{x} \\
   (4) & \ x - 2
   \end{align*}
   \]

23 If $n + 3$ represents an odd integer, the next consecutive odd integer is represented by
   \[
   \begin{align*}
   (1) & \ n \\
   (2) & \ n + 4 \\
   (3) & \ n + 5 \\
   (4) & \ n + 6
   \end{align*}
   \]

Math. 9-Jan. '88
24 If three times a number is increased by 6, the result is 21. The number is
   (1) 5
   (2) 9
   (3) 15
   (4) -9

25 The expression $5 - 2(x + 1)$ is equivalent to
   (1) $3x + 3$
   (2) $3x + 1$
   (3) $3x - 2$
   (4) $3 - 2x$

26 The slope of the graph of the equation $y = 2x$ is
   (1) 1
   (2) 2
   (3) 0
   (4) $\frac{1}{2}$

27 The additive inverse of 5 is
   (1) $\frac{1}{5}$
   (2) $-\frac{1}{5}$
   (3) 0
   (4) -5

28 Which is equivalent to $4\sqrt{3}$?
   (1) $\sqrt{16}$
   (2) $\sqrt{19}$
   (3) $\sqrt{48}$
   (4) 144

29 Which represents an irrational number?
   (1) $\frac{2}{3}$
   (2) $\frac{4}{9}$
   (3) $\frac{\sqrt{2}}{3}$
   (4) $\sqrt{\frac{4}{9}}$

30 Which open sentence is represented by the graph below?

\[ \begin{array}{cccccccc}
\text{ } & \text{ } & \text{ } & \text{ } & \text{ } & \text{ } & \text{ } & \text{ } \\
-5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & 5 \\
\end{array} \]

   (1) $-4 \leq x \leq 3$
   (2) $-4 < x \leq 3$
   (3) $-4 \leq x < 3$
   (4) $-4 < x < 3$

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. [40]

31. Solve graphically and check:

\[
\begin{align*}
  y &= x + 1 \\
  2x + y &= 7
\end{align*}
\] [8,2]

32. Answer both a and b.
   
   a. Perform the indicated operation and express the result in simplest form:

   \[
   \frac{3x + 24}{x + 2} \cdot \frac{x^2 - 6x - 16}{x^2 - 64}
   \] [6]

   b. Solve for x:

   \[
   \frac{x + 4}{2} + \frac{2x}{3} = 9
   \] [4]

33. Solve algebraically and check:

\[
\begin{align*}
  2x + 4y &= 2 \\
  3x - 6y &= 15
\end{align*}
\] [8,2]

34. Find three consecutive positive even integers such that the product of the first and second is two less than five times the third. [Only an algebraic solution will be accepted.] [5,5]

36. In the accompanying diagram of right triangle ABC, the measure of angle C is 90°. The length of leg AC is 7 and the length of hypotenuse AB is 12.

\[
\begin{align*}
\text{a} & \text{ Find, to the nearest degree, the measure of angle } A. \quad [5] \\
\text{b} & \text{ Find, to the nearest integer, the length of } BC. \quad [5]
\end{align*}
\]

37. The replacement set for x for the open sentences below is \{−3, −2, −1, 0, 1, 2, 3\}. 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.] [10]

\[
\begin{align*}
\text{a} & \quad 9 + 2x = 7 \\
\text{b} & \quad \frac{2}{x} = 1 \\
\text{c} & \quad |x| = 1 \\
\text{d} & \quad 3x + 2 \leq 2x \\
\text{e} & \quad 5x + 6 = 3x + 9
\end{align*}
\]

Math. 9-Jan. '58 [4]
### Tables of Natural Trigonometric Functions
(For use with 9th and 10th Year Mathematics Regents Examinations)

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Part I Score  
Part II Score  
Total Score  
Rater's Initials:  

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  
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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. '88

[7]
FOR TEACHERS ONLY

SCORING KEY
NINTH YEAR MATHEMATICS
Monday, January 25, 1988 – 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 19–30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 18 \hspace{1cm} (11) \frac{x + y + z}{3} \hspace{1cm} (21) 1

(2) 64 \hspace{1cm} (12) 5.5 \hspace{1cm} (22) 2

(3) \ -6 \hspace{1cm} (13) \frac{c - a}{b} \hspace{1cm} (23) 3

(4) 2 \hspace{1cm} (14) 2 \hspace{1cm} (24) 1

(5) 3x^2 + 2x - 5 \hspace{1cm} (15) 50 \hspace{1cm} (25) 4

(6) (a - 2)(a - 7) \hspace{1cm} (16) \frac{x}{6} \hspace{1cm} (26) 2

(7) 2 \hspace{1cm} (17) 5 \hspace{1cm} (27) 4

(8) 3a \hspace{1cm} (18) 24 \hspace{1cm} (28) 3

(9) 11 \hspace{1cm} (19) 3 \hspace{1cm} (29) 3

(10) 1 \hspace{1cm} (20) 4 \hspace{1cm} (30) 2
Part II

Please refer to the Department publication *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) \(a \ 3\) \[6\] \(b \ 6\) \[4\] (35) Analysis \[6\] 4 \[4\]  
(33) \(x = 3, y = -1\) or \((3,-1)\) \[8\] \(a \ 54\) \[5\] \(b \ 10\) \[5\]  
Check \[2\] (37) \(a \ -1\) \[2\] \(b \ 2\) \[2\] \(c \ -1,1\) \[1.1\]  
(34) Analysis \[5\] \(d \ -3,-2\) \[1.1\] \(e \ \{\} \) or \(\phi\) \[2\]  

As a reminder...

This is the last Regents examination based on the Ninth Year Mathematics syllabus.