

The University of the State of New York  
REGENTS HIGH SCHOOL EXAMINATION

# NINTH YEAR MATHEMATICS

Friday, April 1, 1977 — 9:15 a.m. to 12:15 p.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  $x$ :  $3(x - 4) = 15$
- 2 Solve for  $x$ :  $-4x + 7 = 3$
- 3 What is the numerical value of  $|-5| + |5|$ ?
- 4 If  $x$  represents an integer, express in terms of  $x$  the next larger integer.
- 5 Find the value of  $3x^3$  if  $x = -2$ .
- 6 Factor completely:  $x^2 - 2x - 15$
- 7 Express as a trinomial the product of  $(x + 4)$  and  $(x + 3)$ .
- 8 Solve for  $x$ :  $\frac{x}{2} - 4 = 8$
- 9 A building casts a shadow 132 feet long at the same time that a vertical pole 7 feet high casts a shadow 12 feet long. What is the height of the building in feet?
- 10 Solve for  $x$ :  $.2x + 3 = 9$
- 11 If  $\cos A = .6200$ , find angle  $A$  to the nearest degree.
- 12 Solve for  $x$  in terms of  $a$ ,  $b$ , and  $c$ :  $ax - b = c$
- 13 Find the hypotenuse of a right triangle whose legs are 5 and 12.
- 14 Express the sum of  $2x + 3y$  and  $3x - 4y$  as a binomial.
- 15 If  $A = \frac{1}{2}bh$ , find  $A$  when  $b = 12$  and  $h = 10$ .
- 16 From  $5x^2 + 2x - 3$  subtract  $4x^2 + 8x - 1$ .
- 17 Find the value of  $\sqrt{59}$  to the nearest tenth.
- 18 For what value of  $x$  is the expression  $\frac{1}{x - 3}$  undefined?
- 19 Express  $5\sqrt{11} - \sqrt{44}$  as a single term in radical form.  
  
*Directions (20-30):* Write in the space provided on the separate answer sheet the numeral preceding the expression that best completes each statement or answers each question.
- 20 Which ordered pair is the solution of the following system of equations?  
$$\begin{aligned} x - y &= 2 \\ 2x + y &= 13 \end{aligned}$$

(1) (5,3)	(3) (5,-3)
(2) (3,5)	(4) (4,2)
- 21 What is the slope of the line whose equation is  $y = \frac{1}{3}x + 2$ ?  

(1) $-\frac{1}{3}$	(3) $\frac{1}{3}$
(2) 2	(4) -2
- 22 The graph of the equation  $2x + y = 7$  contains the point whose coordinates are  

(1) (0,6)	(3) (3,2)
(2) (4,-1)	(4) (4,3)
- 23 The sum of  $\frac{3}{x}$  and  $\frac{4}{3x}$  is  

(1) $\frac{13}{3x}$	(3) $\frac{7}{4x}$
(2) $\frac{12}{3x^2}$	(4) $\frac{7}{3x^2}$
- 24 The fact that  $(3 + 4) + 2 = 3 + (4 + 2)$  is an illustration of the  

(1) distributive property
(2) commutative property of addition
(3) additive inverse property
(4) associative property of addition
- 25 If  $A = \{1, 3, 5, 7, 9\}$ , which is a subset of  $A$ ?  

(1) $\{0\}$	(3) $\{1, 2, 3, 4\}$
(2) $\{1, 5, 9\}$	(4) $\{2, 4, 6, 8, 10\}$
- 26 Which is the solution set of the equation  $x^2 - 2x - 8 = 0$ ?  

(1) $\{4, -2\}$	(3) $\{-4, 2\}$
(2) $\{-8, 1\}$	(4) $\{8, -1\}$

27 The area of a square is 36 square meters. The number of meters in the *perimeter* of the square is

- (1) 6
- (2) 12
- (3) 24
- (4) 36

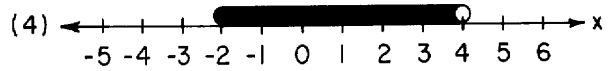
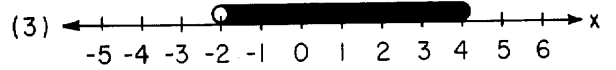
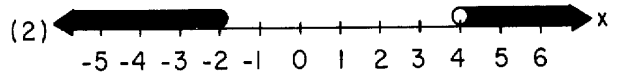
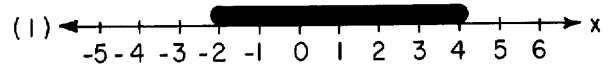
28 The inequality  $2x + 1 > 17$  is equivalent to


- (1)  $x < 9$
- (2)  $x > 9$
- (3)  $x < 8$
- (4)  $x > 8$

29 Which is *not* a rational number?

- (1) 0
- (2)  $\sqrt{2}$
- (3)  $\frac{1}{2}$
- (4) -1

30 Which graph shows the solution set of the inequality  $-2 \leq x < 4$ ?



 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 Graph the following system of inequalities and label the solution set S. [8,2]

$$\begin{aligned}y &\leq 2x + 1 \\y &> x\end{aligned}$$

- 32 Answer both *a* and *b*.

*a* Solve for *x*:  $\frac{x}{3} + \frac{12 - x}{4} = 2$  [5]

- b* Simplify and express as a single fraction in *lowest terms*:

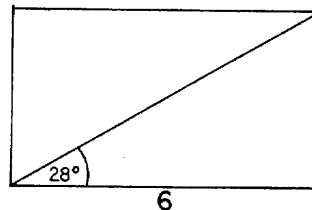
$$\frac{a^2 - 2a + 1}{2a + 4} \div \frac{a - 1}{a + 2} \quad [5]$$

- 33 Find three consecutive positive integers such that 9 less than 3 times the smallest integer is twice the largest integer. [Only an algebraic solution will be accepted.] [5,5]

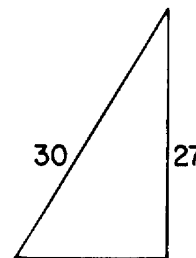
- 34 How much money must be added to an investment of \$4,500 at 5% so that the annual interest on the total investment will be \$295? [Only an algebraic solution will be accepted.] [5,5]

- 35 Answer both *a* and *b*.

- a* As shown in the accompanying diagram, a longer side of a rectangle is 6 centimeters. A diagonal makes an angle of  $28^\circ$  with a longer side. Find to the nearest tenth of a centimeter the shorter side of the rectangle. [5]



- b* As shown in the accompanying diagram, a 30-foot ladder leaning against a building touches it at a point 27 feet above the ground. Find to the nearest degree the angle which the ladder makes with the ground. [5]



- 36 The legs of a right triangle are represented by  $6x$  and  $8x$ , respectively. The hypotenuse of the triangle is 80. Find the length of each leg. [Only an algebraic solution will be accepted.] [5,5]

- 37 The replacement set for *x* for each open sentence below is  $\{-3, -2, -1, 0, 1, 2, 3\}$ . 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*  $|x| > 2$

*b*  $x - 1 = 1 - x$

*c*  $-3 < x < 0$

*d*  $2x + x = 3x$

*e*  $x^2 = 4$

**THE UNIVERSITY OF THE STATE OF NEW YORK**  
**THE STATE EDUCATION DEPARTMENT**  
 BUREAU OF ELEMENTARY AND SECONDARY EDUCATIONAL TESTING

Tables of Natural Trigonometric Functions  
 (For use with 9th and 10th Year Mathematics Regents Examinations)

Angle	Sine	Cosine	Tangent	Angle	Sine	Cosine	Tangent
1°	.0175	.9998	.0175	46°	.7193	.6947	1.0355
2°	.0349	.9994	.0349	47°	.7314	.6820	1.0724
3°	.0523	.9986	.0524	48°	.7431	.6691	1.1106
4°	.0698	.9976	.0699	49°	.7547	.6561	1.1504
5°	.0872	.9962	.0875	50°	.7660	.6428	1.1918
6°	.1045	.9945	.1051	51°	.7771	.6293	1.2349
7°	.1219	.9925	.1228	52°	.7880	.6157	1.2799
8°	.1392	.9903	.1405	53°	.7986	.6018	1.3270
9°	.1564	.9877	.1584	54°	.8090	.5878	1.3764
10°	.1736	.9848	.1763	55°	.8192	.5736	1.4281
11°	.1908	.9816	.1944	56°	.8290	.5592	1.4826
12°	.2079	.9781	.2126	57°	.8387	.5446	1.5399
13°	.2250	.9744	.2309	58°	.8480	.5299	1.6003
14°	.2419	.9703	.2493	59°	.8572	.5150	1.6643
15°	.2588	.9659	.2679	60°	.8660	.5000	1.7321
16°	.2756	.9613	.2867	61°	.8746	.4848	1.8040
17°	.2924	.9563	.3057	62°	.8829	.4695	1.8807
18°	.3090	.9511	.3249	63°	.8910	.4540	1.9626
19°	.3256	.9455	.3443	64°	.8988	.4384	2.0503
20°	.3420	.9397	.3640	65°	.9063	.4226	2.1445
21°	.3584	.9336	.3839	66°	.9135	.4067	2.2460
22°	.3746	.9272	.4040	67°	.9205	.3907	2.3559
23°	.3907	.9205	.4245	68°	.9272	.3746	2.4751
24°	.4067	.9135	.4452	69°	.9336	.3584	2.6051
25°	.4226	.9063	.4663	70°	.9397	.3420	2.7475
26°	.4384	.8988	.4877	71°	.9455	.3256	2.9042
27°	.4540	.8910	.5095	72°	.9511	.3090	3.0777
28°	.4695	.8829	.5317	73°	.9563	.2924	3.2709
29°	.4848	.8746	.5543	74°	.9613	.2756	3.4874
30°	.5000	.8660	.5774	75°	.9659	.2588	3.7321
31°	.5150	.8572	.6009	76°	.9703	.2419	4.0108
32°	.5299	.8480	.6249	77°	.9744	.2250	4.3315
33°	.5446	.8387	.6494	78°	.9781	.2079	4.7046
34°	.5592	.8290	.6745	79°	.9816	.1908	5.1446
35°	.5736	.8192	.7002	80°	.9848	.1736	5.6713
36°	.5878	.8090	.7265	81°	.9877	.1564	6.3138
37°	.6018	.7986	.7536	82°	.9903	.1392	7.1154
38°	.6157	.7880	.7813	83°	.9925	.1219	8.1443
39°	.6293	.7771	.8098	84°	.9945	.1045	9.5144
40°	.6428	.7660	.8391	85°	.9962	.0872	11.4301
41°	.6561	.7547	.8693	86°	.9976	.0698	14.3007
42°	.6691	.7431	.9004	87°	.9986	.0523	19.0811
43°	.6820	.7314	.9325	88°	.9994	.0349	28.6363
44°	.6947	.7193	.9657	89°	.9998	.0175	57.2900
45°	.7071	.7071	1.0000	90°	1.0000	.0000	



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**NINTH YEAR MATHEMATICS**

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Part I 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.....  | 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





# FOR TEACHERS ONLY

## SCORING KEY

# 9

## NINTH YEAR MATHEMATICS

Friday, April 1, 1977 — 9:15 a.m. to 12:15 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 20–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

(1) 9	(11) 52	(21) 3
(2) 1	(12) $\frac{c + b}{a}$	(22) 2
(3) 10	(13) 13	(23) 1
(4) $x + 1$	(14) $5x - y$	(24) 4
(5) -24	(15) 60	(25) 2
(6) $(x - 5)(x + 3)$	(16) $x^2 - 6x - 2$	(26) 1
(7) $x^2 + 7x + 12$	(17) 7.7	(27) 3
(8) 24	(18) 3	(28) 4
(9) 77	(19) $3\sqrt{11}$	(29) 2
(10) 30	(20) 1	(30) 4

[OVER]

NINTH YEAR MATHEMATICS — *concluded*

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)  $a - 12$  [5]  
 $b \frac{a - 1}{2}$  [5]

(33) Analysis [5]  
13, 14, 15 [5]

(34) Analysis [5]  
\$1,400 [5]

(35)  $a 3.2$  [5]  
 $b 64$  [5]

(36) Analysis [5]  
48, 64 [5]

(37)  $a -3, 3$  [1, 1]  
 $b 1$  [2]  
 $c -2, -1$  [1, 1]  
 $d -3, -2, -1, 0, 1, 2, 3$  [2]  
 $e -2, 2$  [1, 1]