

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

# NINTH YEAR MATHEMATICS

Thursday, August 13, 1987—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. [60]

- 1 Solve for  $a$ :  $\frac{3}{5} = \frac{9}{a}$
- 2 Solve for  $a$ :  $3a - a + 4a = 90$
- 3 If  $\cos A = 0.7193$ , what is the measure, in degrees, of angle  $A$ ?
- 4 Solve for  $x$ :  $5x + 2 = 3(x + 6)$
- 5 Multiply and express as a trinomial:  
 $(x + 7)(x - 9)$
- 6 Solve the following system of equations for  $x$ :  
 $3x - 5y = 6$   
 $4x + 5y = 8$
- 7 What is the quotient when  $x^2 + 5x + 6$  is divided by  $x + 3$ ?
- 8 Solve for  $y$ :  $.03y = 6$
- 9 Find  $\sqrt{27}$  to the nearest tenth.
- 10 Express the sum of  $\frac{x}{5}$  and  $\frac{3x}{4}$  as a single fraction.
- 11 Reduce  $\frac{16x^3}{8x^2}$  to lowest terms.
- 12 The lengths of the sides of a triangle are 3, 5, and 7. If the length of the shortest side of a similar triangle is 9, what is the length of the longest side of the second triangle?
- 13 From  $6m + b$ , subtract  $4m - b$ .
- 14 Express the average of  $4x - 2$  and  $2x + 6$  in terms of  $x$ .
- 15 Solve for  $x$ :  $\frac{3}{2}x + 2 = 14$
- 16 What percent of 120 is 30?
- 17 Solve for  $b$  in terms of  $a$ ,  $c$ , and  $d$ :  
 $a = bc - d$
- 18 The length of the hypotenuse of a right triangle is 15 and the length of one leg is 9. Find the length of the other leg.
- 19 Find the positive root of  $x^2 - 16 = 0$ .
- 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 If  $x = 3$ , the expression  $5x - 3x^2$  is equal to  
 (1) -12 (3) 12  
 (2) 6 (4) 42
- 21 If  $A = \{1,3,5,7\}$ , which set is *not* a subset of  $A$ ?  
 (1)  $\{1\}$  (3)  $\{ \}$   
 (2)  $\{1,3,5,7\}$  (4)  $\{0\}$
- 22 The value of  $|-3 - 8|$  is  
 (1) 5 (3) 11  
 (2) -5 (4) -11
- 23 The inequality  $2y + 3 > 5$  is equivalent to  
 (1)  $y < 1$  (3)  $y < 4$   
 (2)  $y > 1$  (4)  $y > 4$

24 The product of  $2a^2$  and  $3c$  is

- (1)  $\frac{2a^2}{3c}$                       (3)  $6a^2c$   
(2)  $2a^2 - 3c$                 (4)  $2a^2 + 3c$

25 An equation of the line parallel to the  $x$ -axis and 2 units below it is

- (1)  $x = 2$                       (3)  $x = -2$   
(2)  $y = 2$                       (4)  $y = -2$

26 Which value of  $x$  will make the expression  $\frac{7}{x-1}$  meaningless?

- (1) 1                              (3) 0  
(2) -1                            (4) 8

27 If  $x$  represents an even integer, which expression represents the next larger consecutive even integer?

- (1)  $x - 1$                       (3)  $x + 1$   
(2)  $x + 2$                       (4)  $x + 3$

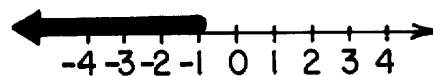
28 What is the sum of 7 and its additive inverse?

- (1) 1                              (3) 49  
(2) 14                            (4) 0


29 Which property is illustrated by the equation  $8 + (4 + 3) = (8 + 4) + 3$ ?

- (1) associative property under addition  
(2) commutative property under addition  
(3) commutative property under multiplication  
(4) reflexive property

30 Which inequality is represented by the graph below?



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

 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 On the same set of coordinate axes, graph the following system of inequalities and label the solution set S.

$$\begin{aligned} 3x + y &> 9 \\ y &\leq 3 \end{aligned} \quad [8,2]$$

- 32 Solve algebraically and check:

$$\begin{aligned} 2x + 7y &= 8 \\ 3x + 2y &= -5 \end{aligned} \quad [8,2]$$

- 33 Answer *both* a and b:

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

$$\frac{x^2 - 3x - 10}{x^2 + 2x} \cdot \frac{2x + 10}{x^2 - 25} \quad [6]$$

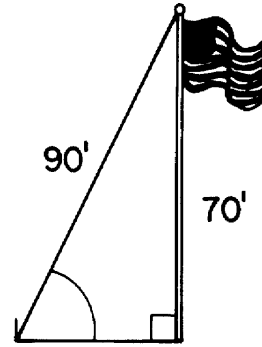
- b Solve for x:

$$\frac{x + 3}{2} + \frac{x - 2}{3} = 5 \quad [4]$$

- 34 From January through October, ACE Autos sold 150 cars. The number of cars sold in November and the number of cars sold in December were in the ratio 3:5. If the total number of cars sold in the year was 390, find the number of cars sold in December. [Only an algebraic solution will be accepted.] [6,4]

- 35 Find 3 consecutive positive integers such that the product of the first and third integers is 48. [Only an algebraic solution will be accepted.] [5,5]

- 36 As shown in the accompanying diagram, a vertical flagpole is 70 feet high. A guy wire 90 feet long extends from the top of the pole to a stake in the ground.



- a Find, to the *nearest degree*, the measure of the angle that the wire makes with the ground. [5]

- b Find, to the *nearest foot*, the distance from the base of the flagpole to the stake. [5]

- 37 On your answer paper, write the letters a through e. After *each* letter, write the answer to the corresponding question below. [10]

- a What number is the additive identity?

- b What number is the multiplicative inverse of  $-\frac{4}{3}$ ?

- c What number has no multiplicative inverse?

- d What is the additive inverse of 2?

- e Write a number which is equal to its multiplicative inverse.

THE UNIVERSITY OF THE STATE OF NEW YORK  
THE STATE EDUCATION DEPARTMENT  
DIVISION OF 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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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.....  | 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

## 9

### SCORING KEY NINTH YEAR MATHEMATICS

Thursday, August 13, 1987—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 20–30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 15	(11) $2x$	(21) 4
(2) 15	(12) 21	(22) 3
(3) 44	(13) $2m + 2b$	(23) 2
(4) 8	(14) $3x + 2$	(24) 3
(5) $x^2 - 2x - 63$	(15) 8	(25) 4
(6) 2	(16) 25	(26) 1
(7) $x + 2$	(17) $\frac{a + d}{c}$	(27) 2
(8) 200	(18) 12	(28) 4
(9) 5.2	(19) 4	(29) 1
(10) $\frac{19x}{20}$	(20) 1	(30) 3

[OVER]

NINTH YEAR MATHEMATICS — *concluded*

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)  $(-3,2)$  or  $\begin{matrix} x = -3 \\ y = 2 \end{matrix}$  [8]

Check [2]

(36)  $a$  51 [5]

$b$  57 [5]

(33)  $a$   $\frac{2}{x}$  [6]

$b$  5 [4]

(37)  $a$  0 [2]

$b$   $-\frac{3}{4}$  [2]

$c$  0 [2]

$d$  -2 [2]

$e$  1 or -1 [2]

(34) Analysis [6]

150 [4]

(35) Analysis [5]

6, 7, 8 [5]

**As a reminder . . .**

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