

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

# NINTH YEAR MATHEMATICS

Wednesday, August 17, 1977 — 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.

- 1 Solve for  $x$ :  $4(2x - 1) = 36$
- 2 Express  $(y + 8)(y - 5)$  as a trinomial.
- 3 If  $a = 5$  and  $b = -3$ , find the value of  $(a + b^2)$ .
- 4 Factor completely:  $x^2 + 2x - 15$
- 5 Solve for  $x$ :  $\frac{x - 1}{6} = \frac{2}{3}$
- 6 Express  $2.361 \times 10^3$  as an integer.
- 7 Express in terms of  $x$  the perimeter of a triangle whose sides are  $(x + 1)$ ,  $(2x - 3)$ , and  $(3x + 2)$ .
- 8 A woman bought  $n$  shares of stock at  $d$  dollars per share. Express, in terms of  $d$  and  $n$ , the total number of dollars she paid for the stock.
- 9 If 25% of a number is 80, find the number.
- 10 Express as a single fraction in lowest terms:

$$\frac{x}{3} + \frac{x}{2}$$

- 11 Solve for  $x$ :  $.4x = 12$
- 12 The sides of two squares are in the ratio 3:2. If a side of the larger square is 15, find a side of the smaller square.
- 13 If the point  $(2, y)$  is on the graph of the equation  $y - 2x = 10$ , find the value of  $y$ .

- 14 Solve for  $x$  in terms of  $b$ ,  $m$ , and  $y$ :

$$y = mx + b$$

- 15 Solve the system of equations for  $x$ :

$$\begin{aligned} 3x + y &= 24 \\ 2x + y &= 11 \end{aligned}$$

- 16 What is the slope of the graph of the equation  $y = -3x + 2$ ?
- 17 Find the positive square root of 67 to the nearest tenth.
- 18 From  $3x^2 - 3x + 1$  subtract  $2x^2 + 5x + 3$ .
- 19 What is the numerical value of  $|7| + |-9|$ ?

*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 The sum of  $2\sqrt{3}$  and  $\sqrt{27}$  is
 

(1) $5\sqrt{3}$	(3) $11\sqrt{3}$
(2) $5\sqrt{6}$	(4) $2\sqrt{30}$
- 21 If a number is multiplied by its reciprocal, the result is always
 

(1) 1	(3) the number
(2) 0	(4) the reciprocal
- 22 A pair of shoes which normally sells for \$24.00 is on sale at a 15% discount. The sale price of the shoes is
 

(1) \$23.85	(3) \$20.00
(2) \$20.40	(4) \$3.60
- 23 Which is an element of the solution set of the inequality  $2x < -6$ ?
 

(1) -1	(3) -3
(2) -2	(4) -4
- 24 When  $5x + 20x^3$  is factored completely, the result is
 

(1) $5(x + 4x^3)$	(3) $5x(1 + 2x)(1 - 2x)$
(2) $5x(1 + 4x^2)$	(4) $5x(1 + 2x)(1 + 2x)$
- 25 Two sides of a rectangle are 5 and 6. What is the length of a diagonal of the rectangle?
 

(1) 7	(3) $\sqrt{61}$
(2) $\sqrt{7}$	(4) $\sqrt{11}$
- 26 The solution set of  $x^2 + 2x - 24 = 0$  is
 

(1) $\{-6, 4\}$	(3) $\{6, 4\}$
(2) $\{-6, -4\}$	(4) $\{6, -4\}$



Part II

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

31 Answer both *a* and *b*.

*a* Solve the following system of equations graphically:

$$\begin{aligned} 2x - y &= 4 \\ y &= -x + 5 \end{aligned} \quad [8]$$

*b* On the graph drawn in answer to part *a*, shade the region which is the graph of  $y \geq -x + 5$ . [2]

32 Answer both *a* and *b*.

*a* Express as a single fraction in *simplest form*:

$$\left(\frac{x^2 - 9}{x - 1}\right) \left(\frac{(x - 1)^2}{x^2 - 4x + 3}\right) \quad [5]$$

*b* Solve for  $x$ :  $x^2 + 2x - 3 = 0$  [5]

33 Answer both *a* and *b*.

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. [Solutions of the equations are not required.]

*a* Joan can plant the garden in 5 hours. Scott takes 7 hours to do the same work. How long would it take them to plant the garden if they worked together? [5]

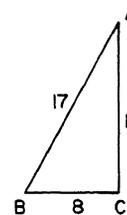
*b* The sum of the digits of a two-digit number is 15. The number is 16 times its units digit. What is the number? [5]

34 A grocer wants to mix two kinds of candy, one of which sells at 50 cents a pound and the other at 65 cents a pound, to make a mixture of 30 pounds to sell at 60 cents a pound. How many pounds of each kind must he use to make the mixture? [Only an algebraic solution will be accepted.] [5,5]

35 At 8 a.m. Mr. Martino and Mr. Smith leave towns which are 360 miles apart and travel in cars toward each other. Mr. Martino drives his car 10 miles per hour faster than Mr. Smith does. They meet at 12 noon. Find the rate of each car. [Only an algebraic solution will be accepted.] [5,5]

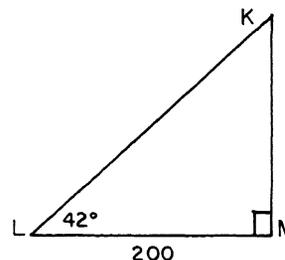
36 Answer both *a* and *b*.

*a* As shown in the accompanying diagram, triangle  $ABC$  has a right angle at  $C$ ,  $AB = 17$ ,  $AC = 15$ , and  $BC = 8$ .



- (1) Express  $\sin A$  as a fraction. [1]
- (2) Find angle  $A$  to the nearest degree. [2]
- (3) Find angle  $B$  to the nearest degree. [2]

*b* As shown in the accompanying figure, a kite at point  $K$  is flying directly over a marker on the ground at point  $M$ . A person at point  $L$ , 200 feet from  $M$  on level ground, observes that the angle of elevation of the kite is  $42^\circ$ . Find the height of the kite to the nearest foot. [5]



37 The replacement set for  $x$  for each open sentence below is  $\{-2, -1, 0, 1, 2\}$ . 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*  $4x \geq 8$
- b*  $|x| = 1$
- c*  $x^2 < 1$
- d*  $\frac{1}{x + 1} < 0$
- e*  $x - 2 = 2 - x$

**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	

# FOR TEACHERS ONLY

SCORING KEY

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### NINTH YEAR MATHEMATICS

Wednesday, August 17, 1977 — 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 number 1, 2, 3, or 4.

(1) 5	(11) 30	(21) 1
(2) $y^2 + 3y - 40$	(12) 10	(22) 2
(3) 14	(13) 14	(23) 4
(4) $(x - 3)(x + 5)$	(14) $\frac{y - b}{m}$	(24) 2
(5) 5	(15) 13	(25) 3
(6) 2,361	(16) -3	(26) 1
(7) $6x$	(17) 8.2	(27) 1
(8) $nd$	(18) $x^2 - 8x - 2$	(28) 3
(9) 320	(19) 16	(29) 4
(10) $\frac{5x}{6}$	(20) 1	(30) 2

[OVER]

**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)  $a \ x + 3 \quad [5]$   
 $b \ -3, 1 \quad [5]$

(35) Analysis  $[5]$   
 $40, 50 \quad [5]$

(33)  $a \ g =$  number of hours required to  
 plant the garden working to-  
 gether

$$\frac{g}{5} + \frac{g}{7} = 1 \quad [5]$$

$b \ t =$  tens digit  
 $u =$  units digit  
 $t + u = 15$   
 $10t + u = 16u \quad [5]$

(36)  $a \ (1) \ \frac{8}{17} \quad [1]$   
 $(2) \ 28 \quad [2]$   
 $(3) \ 62 \quad [2]$   
 $b \ 180 \quad [5]$

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

(34) Analysis  $[5]$   
 $10 \text{ lb of } 50\text{¢ candy}$   
 $20 \text{ lb of } 65\text{¢ candy} \quad [5]$