

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

NINTH YEAR MATHEMATICS

Tuesday, August 14, 1973 — 12:30 to 3:30 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.

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 If Robert is now x years old, express, in terms of x , his age 7 years ago.
- 2 Find the solution set of $3x + 1 = x$.
- 3 Solve for x : $3(x + 2) = x - 2$
- 4 Solve for x : $.8x + .8 = 8x$
- 5 Solve for t : $\frac{3t}{4} + 8 = 20$
- 6 If x is a member of the replacement set $\{1,2,3,4\}$, what is the solution set of $3x - 4 < 2$?
- 7 If $A = \frac{1}{2}h(c + d)$, find the numerical value of A when $h = 3$, $c = 8$, and $d = 10$.
- 8 A boy 5 feet tall casts a shadow 15 feet long. At the same time, a nearby tree casts a shadow 60 feet long. What is the height of the tree in feet?
- 9 Factor: $x^2 - 2x - 35$
- 10 The measures of two supplementary angles are in the ratio 5:1. Find the number of degrees in the smaller angle.
- 11 A boy received 90 and 81 on two tests. What must he receive on a third test in order to have an average of 87?
- 12 Express the product $(3a + 4)(3a - 4)$ as a binomial.
- 13 Find, to the nearest degree, the measure of the angle whose cosine is 0.6933.
- 14 Write in simplest form: $3 - (x + 2)$
- 15 Perform the indicated operation and express the result in simplest form:

$$\left(\frac{x^2 - 1}{x + 1}\right) \left(\frac{2x}{x - 1}\right)$$

16 Find the value of the expression $|-3| + |4| - 2$.

17 Express as a single fraction: $\frac{x}{14} - \frac{6}{7}$

18 Solve for y in terms of a and b : $\frac{y}{a} = \frac{b}{3}$

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 If $a < b$ and $b < c$, then which is true?

- | | |
|-------------|-------------|
| (1) $a = c$ | (3) $b > c$ |
| (2) $a > c$ | (4) $a < c$ |

- 20 The sum of $x^2 + 5x + 3$ and $3x^2 + 2$ is

- | | |
|---------------------|---------------------|
| (1) $x^2 + 8x + 5$ | (3) $3x^2 + 5x + 5$ |
| (2) $4x^2 + 5x + 5$ | (4) $4x^2 + 5x + 5$ |

- 21 One side of a square is represented by $4x - 2$. The perimeter of the square in terms of x is

- | | |
|---------------|-----------------------|
| (1) $8x - 4$ | (3) $16x^2 - 4$ |
| (2) $16x - 8$ | (4) $16x^2 - 16x + 4$ |

- 22 Rounded to the nearest hundredth, 8.6446 is

- | | |
|-----------|-----------|
| (1) 8.644 | (3) 8.645 |
| (2) 8.64 | (4) 8.65 |

- 23 The solution set of $2x^2 = 32$ is

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

- 24 Which ordered pair is the solution of the following system of equations?

$$\begin{aligned} y &= 2x - 5 \\ 3x + y &= 10 \end{aligned}$$

- | | |
|------------|-----------|
| (1) (1,3) | (3) (3,1) |
| (2) (0,-5) | (4) (1,7) |

- 25 The sum of $\sqrt{24}$ and $\sqrt{54}$ is

- | | |
|------------------|------------------|
| (1) $5\sqrt{6}$ | (3) $5\sqrt{12}$ |
| (2) $13\sqrt{6}$ | (4) $\sqrt{78}$ |

26 What are the coordinates of the point where the graph of $x + 2y = 8$ crosses the y -axis?

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

27 The additive inverse of $2x - y$ is

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

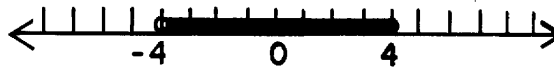
28 The fraction $\frac{x+3}{-5}$ is equivalent to

- (1) $\frac{x-3}{5}$ (3) $\frac{x+3}{5}$
(2) $\frac{-x+3}{5}$ (4) $\frac{-x-3}{5}$

29 The result of dividing $8x^8 - 6x^6$ by $-2x^2$ may be expressed as

- (1) $-4x^6 + 3x^4$ (3) $4x^6 - 3x^4$
(2) $-4x^4 + 3x^3$ (4) $4x^4 - 3x^3$

30 The solution set of which inequality is shown in the graph below?



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

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 Answer *either a or b* but *not both*:

a Solve graphically and check: [8,2]

$$2x + y = 7$$

$$y = x - 5$$

OR

b (1) Graph the solution set of the system: [8]

$$y \geq -x + 4$$

$$y < 2x - 3$$

(2) Write the coordinates of one point in the solution set. [2]

32 a Solve algebraically and check: [4,2]

$$y = x - 1$$

$$3x + y = 11$$

b Express, in *simplest form*, the sum

$$\frac{3a - 2}{2a} + \frac{a + 1}{a} \quad [4]$$

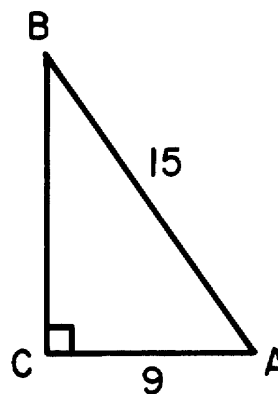
33 The width and the length of a rectangle are represented by two consecutive odd integers. The area of the rectangle is 63. Find the width and the length of the rectangle. [Only an algebraic solution will be accepted.] [5,5]

34 Write an equation or a system of equations that may be used in solving each of the following problems. In each case, state what the variable or variables represent. [Solution of the equations is not required.]

a In a basketball game the number of points made by the winning team was 10 less than twice the number of points made by the losing team. In all, a total of 80 points was made. What was the score? [5]

b Two trains leave a station at the same time and travel in opposite directions. One travels at a rate that is 7 miles faster per hour than the other. At the end of 3 hours the trains are 273 miles apart. Find the rate of each train. [5]

35 Given right triangle ABC with angle C a right angle. $AB = 15$ and $AC = 9$.



a Find BC . [3]

b Express $\cos A$ as a ratio. [2]

c Find the measure of angle A to the nearest degree. [3]

d Find the measure of angle B to the nearest degree. [2]

36 A man invested \$6,000, part at a 6% rate of interest and the rest at a 4% rate of interest. He received the same interest from each investment. Find the amount invested at each rate. [Only an algebraic solution will be accepted.] [5,5]

37 On your answer paper write the letters *a* through *e*. For *each* statement in *a* through *e* write, on the separate answer sheet, the *number* of the property of the real number system, *chosen from the list below*, which best justifies that statement. [10]

Properties

- (1) Closure property for addition
- (2) Additive identity property
- (3) Transitive property of equality
- (4) Associative property of addition
- (5) Commutative property of addition
- (6) Distributive property

a $a + b = b + a$

b $a + 0 = a$

c $a(b + c) = ab + ac$

d If $a = b$ and $b = c$, then $a = c$.

e $a + (b + c) = (a + b) + c$

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	

Part I Score:.....
Rater's Initials:
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The University of the State of New York

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NINTH YEAR MATHEMATICS

Tuesday, August 14, 1973 — 12:30 to 3:30 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.

FOR TEACHERS ONLY

9

NINTH YEAR MATHEMATICS

Tuesday, August 14, 1973 — 12:30 to 3:30 p.m., only

Just before the start of the examination period, distribute one examination booklet, face up, to each pupil. Instruct the pupils to read the directions on the cover of the examination booklets, detach the answer sheet and reference tables, and fill in the heading on their answer sheet. When each pupil has received a booklet and finished filling in the heading of the answer sheet, instruct the pupils to open their examination booklets and begin work.

Use only *red* ink or 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.

SCORING KEY

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 number 1, 2, 3, or 4.

(1) $x - 7$	(11) 90	(21) 2
(2) $\{-\frac{1}{2}\}$ or $-\frac{1}{2}$	(12) $9a^2 - 16$	(22) 2
(3) -4	(13) 46	(23) 2
(4) $\frac{1}{9}$	(14) $1 - x$	(24) 3
(5) 16	(15) $2x$	(25) 1
(6) $\{1\}$ or 1	(16) 5	(26) 3
(7) 27	(17) $\frac{x - 12}{14}$	(27) 2
(8) 20	(18) $\frac{ab}{3}$	(28) 4
(9) $(x - 7)(x + 5)$	(19) 4	(29) 1
(10) 30	(20) 2	(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) $a \ x = 3$ [4]
 $y = 2$ [4]
 Check [2]
 $b \ \frac{5}{2} \text{ or } 2\frac{1}{2}$ [4]

(35) $a \ 12$ [3]
 $b \ \frac{3}{6}$ [2]
 $c \ 53$ [3]
 $d \ 37$ [2]

(33) Analysis [5]
 7, 9 [5]

(36) Analysis [5]
 $\$3,600 @ 4\%$ [5]
 $\$2,400 @ 6\%$ [5]

(34) $a \ x =$ number of points made by
 losing team
 $x + 2x - 10 = 80$ [5]
 $b \ x =$ rate of slower train
 $3x + 3(x + 7) = 273$ [5]

(37) $a \ 5$ [2]
 $b \ 2$ [2]
 $c \ 6$ [2]
 $d \ 3$ [2]
 $e \ 4$ [2]

DO YOU KNOW...

... that practically all objective questions used on the Regents examinations have been "pretested" on a representative sample of students in New York State schools?

Over 6,000 questions in 16 subject areas were tried out in May 1972. These questions were assembled into 267 pretest forms that could be administered in a single classroom period. Some 53,000 students in 355 schools throughout New York State participated in this pretesting of questions for possible use in future Regents examinations.