The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR MATHEMATICS

Thursday, August 17, 1978 — 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 What is the absolute value of -6?

2 On a map, 1 centimeter represents 70 kilometers. How many kilometers are represented by a line segment 2.5 centimeters long?

3 If the sine of angle A is .5000, find the number of degrees in angle A.

4 If a car travels at the rate of x miles per hour, express in terms of x the distance covered by the car in 4 hours.

5 Solve for n: $180(n - 2) = 1{,}440$

6 Solve for a: $\frac{2a}{3} + 1 = 9$

7 The sum of 2 consecutive integers is 35. Find the *smaller* integer.

8 Solve the following system of equations for y:

$$2y + x = 10$$
$$y - x = 8$$

9 Find the value of $-3pr^2$ when $p = -2$ and $r = 5$.

10 A girl 5 feet tall casts a 7-foot shadow at the same time that a monument casts a 63-foot shadow. What is the total number of feet in the height of the monument?

11 Divide $25x^3 - 10x^2$ by $5x$.

12 Express $(2y - 3)(y + 2)$ as a trinomial.

13 Express, in terms of x, the perimeter of a square whose side is $x - 2$.

14 Solve for x in terms of c, d, and m: $mx - cd = 0$

15 Express the sum of $\sqrt{50}$ and $\sqrt{18}$ as a single term.

16 From the sum of $(6x - 5)$ and $(2x + 1)$ subtract $(x - 7)$ and express your answer as a binomial.

17 Solve the following equation and round your answer to the *nearest tenth*: $3x = 5.77$

18 Factor completely: $25b + 5b^3$

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 Which is *not* an element of the solution set of $x + 3 > 7$?

(1) 9 (3) 3
(2) 7 (4) 5

20 If one factor of $x^2 - 3x - 28$ is $x - 7$, the other factor is

(1) $x + 4$ (3) $x + 7$
(2) $x - 4$ (4) $x - 14$

21 The value of $2[5 + (8 \times 3)]$ is

(1) 32 (3) 58
(2) 34 (4) 78

22 If the replacement set for x is the set of whole numbers, then the solution set for $2 \leq x < 4$ is

(1) {2,3,4} (3) {3,4}
(2) {2,3} (4) { }

23 The product of ab^3 and a^2b^2 is

(1) a^3b^5 (3) a^3b^6
(2) a^2b^6 (4) a^2b^5

24 The sum of $\frac{x + y}{4}$ and $\frac{x - y}{2}$ is

(1) $\frac{x}{3}$ (3) $\frac{3x}{4}$

(2) $\frac{x}{2}$ (4) $\frac{3x - y}{4}$

25 The width of a rectangle is represented by w and the length by $2w + 3$. Which expression represents the area of the rectangle?

(1) $2w^2 + 3w$
(2) $6w + 6$
(3) $3w + 3$
(4) $2w^2 + 3$

26 The solution set for x in the equation $x^2 - 4x - 5 = 0$ is

(1) $\{5,1\}$
(2) $\{-5,-1\}$
(3) $\{5,-1\}$
(4) $\{-5,1\}$

27 The fraction $\frac{x-3}{-2}$ is equivalent to

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

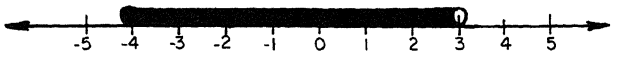
28 Which set is *not* a finite set?

(1) $\{x \mid x + 2 = x + 5\}$, x is a real number
(2) $\{x \mid x + 2 > 6\}$, x is an integer
(3) $\{x \mid x$ is a positive integer less than 1,000,000$\}$
(4) $\{x \mid x = 4\}$, x is a real number

29 The graph of the equation $y = x$ is a straight line which

(1) passes through the origin
(2) is parallel to the y-axis
(3) is parallel to the x-axis
(4) has a slope of zero

30 Which solution set is represented by the graph below?



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

☞ 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.

31 Solve graphically and check:

$$y = 2x + 4$$
$$x + y = 1 \qquad [8,2]$$

32 Answer *both a* and *b*.

a Perform the indicated operations and express the answer in *simplest form*:

$$\frac{2x + 6}{x^2 + 6x + 9} \div \frac{4}{x + 3} \qquad [5]$$

b Solve the following system of equations:

$$3x + 2y = 7$$
$$y = x - 9 \qquad [5]$$

33 A grocer has some candy selling for \$1.90 a pound and some other candy selling for \$2.50 a pound. How many pounds of each kind must he mix to obtain 20 pounds of a mixture to sell for \$2.05 a pound? [*Only an algebraic solution will be accepted.*] [5,5]

34 The length of a rectangle exceeds its width by 2. If the area of the rectangle is 24 square units, find both the length and the width. [*Only an algebraic solution will be accepted.*] [5,5]

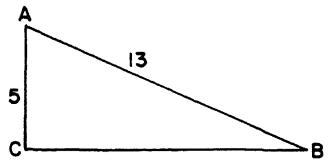
35 Write an equation or a system of equations that can be used to solve *each* of the following problems. In *each* case, state what the variable or variables represent. [*Solution of the equations is not required.*]

a Find two supplementary angles such that the larger is 20 less than 3 times the smaller. [5]

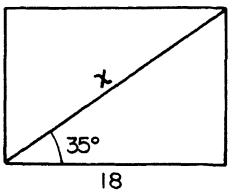
b The sum of the digits of a two-digit number is 11. If the number is increased by 45, the result is the number with the digits reversed. Find the original number. [5]

36 Answer *both a* and *b*.

a As shown in the accompanying diagram, hypotenuse AB of right triangle ABC is 13 and leg AC is 5. Find the measure of angle B to the *nearest degree*. [5]



b As shown in the accompanying diagram, a diagonal of a rectangle makes an angle of 35° with a side whose length is 18 inches. Find the length of the diagonal to the *nearest inch*. [5]



37 Write the letters *a* through *e* on your answer paper. Then, for each question in *a* through *e* below, write the number of the set(s), *chosen from the list below*, which answers the question. [10]

Sets

(1) Natural numbers
(2) Integers
(3) Rational numbers
(4) Irrational numbers

a Which set has $\sqrt{2}$ as a member?

b Which sets have no additive identity element?

c Which set has -1 as an element, but not $-\frac{1}{2}$?

d Which set (with 0 excluded from it) has closure under division?

e Which set has $\frac{1}{2}$ as a member?

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

9 NINTH YEAR MATHEMATICS

Thursday, August 17, 1978 — 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 19–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

(1) 6

(2) 175

(3) 30

(4) $4x$

(5) 10

(6) 12

(7) 17

(8) 6

(9) 150

(10) 45

(11) $5x^2 - 2x$

(12) $2y^2 + y - 6$

(13) $4x - 8$

(14) $\frac{cd}{m}$

(15) $8\sqrt{2}$

(16) $7x + 3$

(17) 1.9

(18) $5b(5 + b^2)$

(19) 3

(20) 1

(21) 3

(22) 2

(23) 1

(24) 4

(25) 1

(26) 3

(27) 2

(28) 2

(29) 1

(30) 4

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* $\frac{1}{2}$ [5]

b $x = 5$
$y = -4$ [5]

(33) Analysis [5]
15 lb. at \$1.90 per pound
5 lb. at \$2.50 per pound [5]

(34) Analysis [5]
4,6 [5]

(35) *a* Let A = number of degrees in larger angle
B = number of degrees in smaller angle

$A + B = 180$
$A = 3B - 20$ [5]

b Let t = tens digit
u = units digit

$t + u = 11$
$10t + u + 45 = 10u + t$ [5]

(36) *a* 23 [5]
b 22 [5]

(37) *a* 4 [2]
b 1,4 [1,1]*
c 2 [2]
d 3 [2]
e 3 [2]

* Allow one credit if student writes one of the answers and nothing more *or* two correct answers and an incorrect one.