The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR MATHEMATICS

Tuesday, June 19, 1973—9:15 a.m. to 12:15 p.m., only

The last page of the booklet is the answer sheet, which is perforated. Fold the last page along the perforation and then, slowly and carefully, tear off the answer sheet. Now fill in the heading of your answer sheet. On page 5, which is perforated, you will find the "Tables of Natural Trigonometric Functions" which you will need to answer some questions in this examination. Fold this page along the perforation, and tear it off. When you have torn off these two pages and finished the heading, you may begin the examination immediately.

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 Find the value of $4xy$ if $x = 2$ and $y = -5$.

2 Perform the indicated operations and express as a binomial: $9x - 5y - 4x - y$

3 Solve for x: $3(x + 2) = 9$

4 Solve for x: $2.3x + 4.5 = 16$

5 Solve for k: $\frac{k - 5}{4} = \frac{k}{5}$

6 Solve the following system of equations for x and y:

$$y = x$$
$$x + y = 4$$

7 What is the height, in feet, of a vertical pole which casts a shadow 8 feet long at the same time another vertical pole 12 feet high casts a shadow 3 feet long?

8 If the replacement set for x is $\{-4,-3,-2,-1\}$, find the solution set of $x > -3$.

9 Find the numerical value of $|-4| + |4|$.

10 Find, to the *nearest degree*, the measure of the angle whose tangent is 0.7500.

11 If $(2x + 5)$ is one factor of $2x^2 - 9x - 35$, what is the other factor?

12 Factor completely: $3x^2 - 48$

13 Find the positive square root of 45 to the *nearest tenth*.

14 If the diagonal of a rectangle is 15 and its length is 12, find its width.

15 If the point $(3,k)$ is on the graph of the equation $y = 3x - 3$, find the value of k.

16 From $5y^2 - 2y - 1$ subtract $3y^2 - 2y + 6$.

17 Perform the indicated operation and express the result in *simplest form*:

$$\frac{x}{n^2} \div \frac{x^2}{n^3}$$

18 Solve for h in terms of A and b: $A = \frac{bh}{2}$

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 The expression $(3abc)^2$ is equivalent to

(1) $9a^2b^2c^2$ (3) $9abc$
(2) $6a^2b^2c^2$ (4) $6abc^2$

20 If p and q represent natural numbers, which expression must represent another natural number?

(1) $\frac{q}{p}$ (3) $p - q$
(2) $p + q$ (4) $p \div q$

21 Which is an example of an infinite set?

(1) the citizens of the United States
(2) positive integers less than 100
(3) the even integers
(4) all schools in New York State

22 If $14n^3 - 21n^2 + 7n$ is divided by $7n$, the quotient is

(1) $2n^2 - 3n + 1$ (3) $2n^2 - 21n^2 + 7n$
(2) $2n^2 - 3n$ (4) $2n^2 + 3n - 1$

23 The root of the equation $1 + 2x = 0$ is

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

24 Which statement illustrates the associative property for multiplication?

(1) $2(\frac{1}{2}) = 1$
(2) $2(1) = 2$
(3) $2(3 + 4) = 2(3) + 2(4)$
(4) $2(3 \cdot 4) = (2 \cdot 3)4$

25 The expression $(x - 3)^2$ is equivalent to

(1) $x^2 - 9$ (3) $x^2 - 6x + 9$
(2) $x^2 + 9$ (4) $x^2 + 6x - 9$

26 The solution set of the equation $x^2 - 7x + 10 = 0$ is

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

27 Which is equivalent to $3\sqrt{3}$?

(1) $\sqrt{6}$
(2) $\sqrt{9}$
(3) $\sqrt{12}$
(4) $\sqrt{27}$

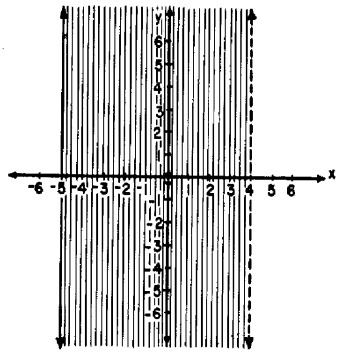
28 The product of two numbers is p. If one number is represented by n, then the other number can be represented by

(1) $p - n$
(2) pn
(3) $\frac{n}{p}$
(4) $\frac{p}{n}$

29 The expression $\frac{2x}{5} - \frac{x + 7}{15}$ is equivalent to

(1) $\frac{5x - 7}{15}$
(2) $\frac{5x + 7}{15}$
(3) $\frac{x - 7}{15}$
(4) $\frac{x + 7}{15}$

30 Which relation is shown in the graph below?



(1) $\{(x,y) \mid x + y > -5\}$
(2) $\{(x,y) \mid -5 \leq x \leq 4\}$
(3) $\{(x,y) \mid -5 \leq x < 4\}$
(4) $\{(x,y) \mid -5 \leq y < 4\}$

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 *a* On the same set of coordinate axes, graph *each* of the inequalities in the following system: [8]

$$y > x - 3$$
$$y \geq -x + 5$$

b Name an ordered pair in the solution set of this system. [2]

32 *a* Solve and check: $\frac{6 + x^2}{x} = x - 3$ [4,1]

b Perform the indicated operation and express the results in *simplest form.* [5]

$$\left(\frac{3x^2}{x^2 - 4}\right)\left(\frac{x + 2}{6x}\right)$$

33 One of two *positive* integers is 5 less than the other. If the product of the two integers is 36, find the integers. [*Only an algebraic solution will be accepted.*] [5,5]

34 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.*] [10]

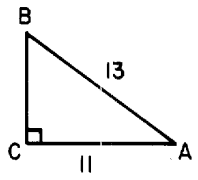
a A freight train leaves a station averaging 30 miles per hour. Two hours later an express train, averaging 50 miles per hour, leaves the same station and travels in the same direction. In how many hours will the express train overtake the freight train?

b A woman bought 7 ears of corn and 6 oranges for $1.22. A second woman bought 10 ears of corn and 3 oranges for $1.13. Find the price of an ear of corn and the price of an orange.

35 In the accompanying diagram of right triangle ABC, the measure of hypotenuse AB is 13 and the measure of AC is 11.

a Find, to the *nearest degree,* the measure of angle A. [5]

b Find, to the *nearest integer,* the measure of BC. [5]



36 One angle of a triangle is 70°. The measures of the other two angles are in the ratio of 2:3. Find the number of degrees in each of the other two angles. [*Only an algebraic solution will be accepted.*] [6,4]

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

Equations or Statements

(1) If $x = y$ and $y = z$, then $x = z$

(2) $(1)(x) = x$

(3) $x\left(\frac{1}{x}\right) = 1$

(4) $(x)(y) = (y)(x)$

(5) If $x = y$ then $y = x$

(6) $(x) + (-x) = 0$

(7) $x(y + z) = xy + xz$

(8) $x + (y + z) = (x + y) + z$

a Commutative property of multiplication
b Additive inverse property
c Associative property of addition
d Symmetric property of equality
e Multiplicative identity property

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, June 19, 1973—9:15 a.m. to 12:15 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

SCORING KEY

NINTH YEAR MATHEMATICS

Tuesday, June 19, 1973—9:15 a.m. to 12:15 p.m., only

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.

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) -40

(2) $5x - 6y$

(3) 1

(4) 5

(5) 25

(6) $x = 2$, $y = 2$ *or* (2,2)

(7) 32

(8) {—2,—1} *or* —2,—1

(9) 8

(10) 37

(11) $x - 7$

(12) $3(x + 4)(x - 4)$

(13) 6.7

(14) 9

(15) 6

(16) $2y^2 - 7$

(17) $\frac{n}{x}$

(18) $\frac{2A}{b}$

(19) 1

(20) 2

(21) 3

(22) 1

(23) 3

(24) 4

(25) 3

(26) 1

(27) 4

(28) 4

(29) 1

(30) 3

[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* -2 [4]
Check [1]

b $\frac{x}{2(x-2)}$ *or* $\frac{x}{2x-4}$ [5]

(33) Analysis [5]
4, 9 [5]

(34) *a* x = no. of hr. required for express train to overtake freight train
$30(x+2) = 50x$ [5]

b x = price (dollars) of an ear of corn
y = price (dollars) of an orange
$7x + 6y = 1.22$
$10x + 3y = 1.13$ [5]

(35) *a* 32° [5]
b 7 [5]

(36) Analysis [6]
44, 66 [4]

(37) *a* 4 [2]
b 6 [2]
c 8 [2]
d 5 [2]
e 2 [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.