The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR MATHEMATICS

Tuesday, August 19, 1986—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 y: $5y - 3 = 17 + y$

2 What is the measure, in degrees, of the acute angle which has the same value for both its sine and cosine?

3 Solve for x: $3(x + 2) = 15$

4 If one factor of $a^2 + 4a - 21$ is $(a + 7)$, what is the other factor?

5 Express the product of $(2x + 9)$ and $(x - 2)$ as a trinomial.

6 What is the value of $|-12| - |4| + |-2|$?

7 If $s = -1$, find the value of $(3s)^2$.

8 Solve for x: $\frac{2x}{3} - \frac{x}{2} = 5$

9 Solve the following system of equations for x:

$$2x + y = 5$$
$$3x - y = 15$$

10 A point with coordinates $(2,k)$ lies on the graph of the equation $5x + 3y = 16$. What is the value of k?

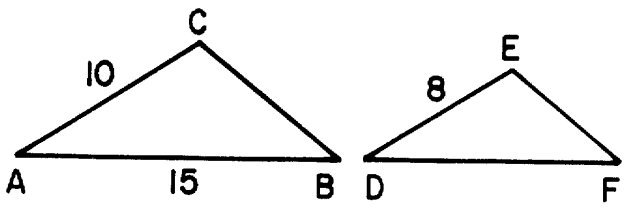
11 What is the multiplicative inverse of $\frac{1}{4}$?

12 Find the length of the hypotenuse of a right triangle whose legs have lengths 3 and 4.

13 Find the value of $\sqrt{53}$ to the *nearest tenth*.

14 The length of a rectangle is 10 and the width is represented by w. Express the perimeter of the rectangle in terms of w.

15 In the accompanying diagrams, triangle ABC is similar to triangle DFE with $\angle A \cong \angle D$ and $\angle B \cong \angle F$. If $AC = 10$, $AB = 15$, and $DE = 8$, find the length of $\overline{DF}$.



Directions (16–30): Write in the space provided on the separate answer sheet the *numeral* preceding the expression that best completes *each* statement or answers *each* question.

16 The product of $6x^2$ and $4x^3$ is

(1) $10x^5$ (3) $24x^5$

(2) $10x^6$ (4) $24x^6$

17 The sum of $\frac{2x}{5} + \frac{x - 2}{3}$ is

(1) $\frac{11x - 10}{8}$ (3) $\frac{11x - 10}{15}$

(2) $\frac{3x + 2}{8}$ (4) $\frac{11x + 2}{15}$

18 If the replacement set for x is $\{1,2,3,4\}$, what is the solution set of $3x + 4 < 13$?

(1) $\{1,2\}$ (3) $\{3\}$

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

19 If $A = \frac{1}{2}bh$, then b equals

(1) $\frac{Ah}{2}$ (3) $\frac{h}{2A}$

(2) $2Ah$ (4) $\frac{2A}{h}$

20 If $x + 1$ represents an odd number, the next larger odd number is represented by

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

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

21 The fraction $\frac{3x - 6}{3}$ is equivalent to

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

22 The equation $2 \cdot (5 \cdot 3) = (2 \cdot 5) \cdot 3$ is an illustration of the

(1) distributive property
(2) associative property of addition
(3) commutative property of multiplication
(4) associative property of multiplication

23 In simplest radical form, the expression $\sqrt{32} + \sqrt{48}$ equals

(1) $\sqrt{80}$
(2) $16\sqrt{5}$
(3) $8\sqrt{5}$
(4) $4\sqrt{2} + 4\sqrt{3}$

24 The quotient when $2x^6y^2$ is divided by x^2y^2 is

(1) $2x^3$
(2) $2x^4$
(3) $2x^3y$
(4) $2x^4y$

25 What are the factors of $x^2 - .09$?

(1) $(x - .3)(x + .3)$
(2) $(x - .3)(x - .3)$
(3) $(x + .03)(x - .3)$
(4) $(x - .03)(x + .03)$

26 For which value of x is the fraction $\frac{x^2 - 1}{3x - 3}$ undefined?

(1) 1
(2) -1
(3) 0
(4) $\frac{1}{3}$

27 What is the slope of the graph of the equation $2x - y = 4$?

(1) -2
(2) 2
(3) -4
(4) 4

28 The expression $7a - (a - 2b)$ is equivalent to

(1) $8a + 2b$
(2) $8a - 2b$
(3) $6a + 2b$
(4) $6a - 2b$

29 The solution set of $2x^2 = 50$ is

(1) {25}
(2) {5}
(3) {25,-25}
(4) {5,-5}

30 The accompanying graph shows the solution set of which open sentence?

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

☞ 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 Solve graphically and check:

$$x + 3y = 6$$
$$y = 2x - 5$$ [8,2]

32 Answer *both a* and *b*.

a Solve for x:

$$\frac{2x - 1}{5} - \frac{x - 1}{2} = 1$$ [5]

b Perform the indicated operation and express the result in *lowest terms*:

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

33 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.*]

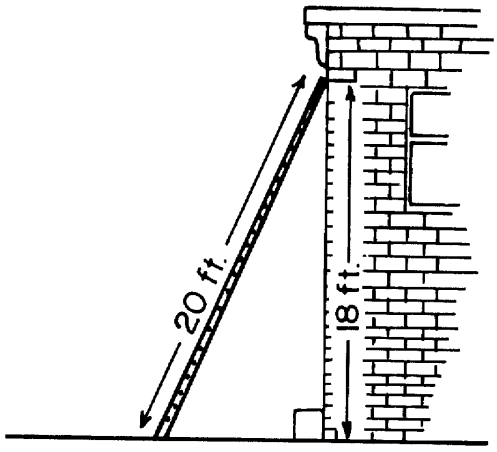
a Jack went jogging on a country road at a rate of 6 miles per hour. One hour later, riding her bicycle, Jill set out after him on the same road. If Jill's rate was 12 miles per hour, how long did it take her to overtake Jack? [5]

b The tens digit of a two-digit number is 2 more than twice the units digit. The sum of the digits is 11. Find the number. [5]

34 The length of a rectangle is 1 centimeter less than twice its width. If the perimeter of this rectangle is 76 centimeters, find the number of centimeters in the width and length. [*Only an algebraic solution will be accepted.*] [5,5]

35 Find three consecutive positive odd integers such that the product of the two smaller integers exceeds the largest by 8. [*Only an algebraic solution will be accepted.*] [4,6]

36 The accompanying diagram shows a 20-foot ladder leaning against the side of a house so that the top of the ladder is 18 feet from the ground.



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

b Find, to the *nearest foot*, the distance from the base of the house to the foot of the ladder. [5]

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

a What integer is the additive identity element?

b What is the largest negative integer?

c What is the additive inverse of x?

d What are the members of the set of integers for x such that $2 \leq x < 4$?

e What is the positive root of $x^2 - 9 = 0$?

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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NINTH YEAR MATHEMATICS

Tuesday, August 19, 1986—8:30 to 11:30 a.m., only

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

Tuesday, August 19, 1986—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 16 – 30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 5

(2) 45

(3) 3

(4) $a - 3$

(5) $2x^2 + 5x - 18$

(6) 10

(7) 9

(8) 30

(9) 4

(10) 2

(11) 4

(12) 5

(13) 7.3

(14) $2w + 20$

(15) 12

(16) 3

(17) 3

(18) 1

(19) 4

(20) 3

(21) 2

(22) 4

(23) 4

(24) 2

(25) 1

(26) 1

(27) 2

(28) 3

(29) 4

(30) 2

[OVER]

Part II

Please refer to the Department's pamphlet *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) *a* -7 [5]

b $\frac{x-2}{2x}$ [5]

(33) *a* t = time for Jill to overtake Jack
$6(t + 1) = 12t$ [5]

b u = units digit
t = tens digit
$t + u = 11$
$t = 2u + 2$ [5]

(34) Analysis [5]
13, 25 [5]

(35) Analysis [4]
3, 5, 7 [6]

(36) *a* 64 [5]
b 9 [5]

(37) *a* 0 [2]
b -1 [2]
c $-x$ [2]
d 2,3 [1,1]
e 3 [2]

As a reminder . . .

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