The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR MATHEMATICS

Monday, January 27, 1986—1:15 to 4:15 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.

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: $5y - 20 = 10$

2 Solve for r: $3r - 4 = 4(r - 3)$

3 If the perimeter of a square is 36, find the length of a side of the square.

4 Find the value of $\frac{a^2}{b}$ when $a = -4$ and $b = 2$.

5 Find the value of $|-5| - |-3|$.

6 Find the length of the hypotenuse of a right triangle whose legs have lengths 6 and 8.

7 Solve for x: $0.3x + 3 = 30$

8 Express the sum of $\frac{a}{3}$ and $\frac{a}{4}$ as a single fraction in *simplest form.*

9 If the cosine of an angle is .4025, find the measure of the angle to the *nearest degree.*

10 If 75% of a number is 90, what is the number?

11 Solve for y: $\frac{9}{y+1} = \frac{3}{5}$

12 If $\frac{x}{a} = \frac{r}{s}$, solve for x in terms of a, r, and s.

13 A 10-foot board is to be cut into 2 pieces whose lengths are in the ratio 4:1. Find the number of feet in the length of the *shorter* piece.

14 The length and width of a rectangle are represented by $(x + 6)$ and $(x - 4)$. Express the area of the rectangle as a trinomial.

15 The lengths of two sides of a triangle are 4 centimeters and 5 centimeters. The lengths of the corresponding sides of a similar triangle are 20 centimeters and x centimeters, respectively. What is the value of x?

16 Factor: $16x^2 - 81$

17 Subtract $-x + y$ from $3x + y$.

Directions (18 – 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.

18 The reciprocal of $-\frac{3}{4}$ is

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

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

19 The product of $-3x^2$ and $11x^4$ is

(1) $33x^6$ (3) $-33x^6$

(2) $33x^8$ (4) $-33x^8$

20 Which ordered pair is the solution of the following system of equations?

$$3x + y = 10$$
$$2x - y = 5$$

(1) (1,3) (3) (3,1)

(2) (5,–5) (4) (–5,5)

21 If x represents an even integer, which expression also represents an even integer?

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

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

22 The number of hours in d days is

(1) $24d$ (3) $12d$

(2) $\frac{d}{24}$ (4) $\frac{12}{d}$

23 If the replacement set for x is $\{-1,0,1,2,3\}$, what is the solution set for the inequality $3x + 5 < 8$?

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

24 An illustration of the distributive property of multiplication over addition is

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

25 Which is *not* a rational number?

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

(2) -2 (4) $\sqrt{11}$

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

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

27 The sum of $\sqrt{48}$ and $2\sqrt{3}$ is

(1) 24 (3) $6\sqrt{3}$
(2) $2\sqrt{51}$ (4) $5\sqrt{16}$

28 Which statement is true of the graph of the equation $x = -4$?

(1) It has a slope of 1.
(2) It has a slope of -4.
(3) It is parallel to the x-axis.
(4) It is parallel to the y-axis.

29 When $18y^{12} - 9y^6 + 3y^3$ is divided by $3y^3$, the quotient is

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

30 The solution set of $x^2 + 3x - 10 = 0$ is

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

☞ 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 Answer *both* *a* and *b*.

a On the same set of coordinate axes, graph the following system of inequalities.

$$y \leq 3x + 4$$
$$y + x > 2$$ [8]

b Write the coordinates of one point that is in the solution set of both inequalities. [2]

32 Answer *both* *a* and *b*.

a Solve for n and check:

$$\frac{n+6}{3} - \frac{n-3}{2} = 2$$ [4,1]

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

$$\frac{x^2-9}{x-3} \cdot \frac{4x+8}{x^2+5x+6}$$ [5]

33 Two heads of lettuce and three pounds of tomatoes cost \$2.85. Three heads of lettuce and two pounds of tomatoes cost \$2.90. Find the cost of one head of lettuce and the cost of one pound of tomatoes. [*Only an algebraic solution will be accepted.*] [4,6]

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.*]

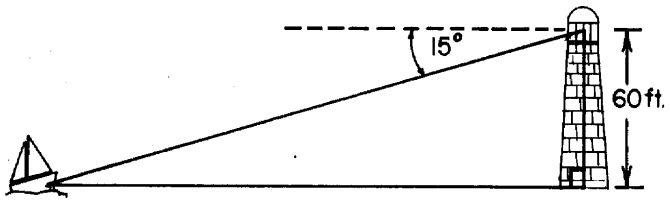
a Julie can keypunch a certain number of computer cards in 4 hours. It takes Pat 6 hours to keypunch the same number of computer cards. If Julie and Pat work together, how long will it take them to keypunch that number of cards? [5]

b The sum of the digits of a two-digit number is 7. If the digits are reversed, the new number is 2 more than twice the original number. Find the original number. [5]

35 The product of two positive consecutive odd integers is 5 more than 6 times the smaller integer. Find both integers. [*Only an algebraic solution will be accepted.*] [5,5]

36 Answer *both* *a* and *b*.

a As shown in the accompanying diagram, a ship at sea is sighted from the top of a 60-foot lighthouse. If the angle of depression of the ship from the top of the lighthouse measures 15°, find, to the *nearest foot*, how far the ship is from the base of the lighthouse. [5]



b In right triangle *DEF*, the measure of angle *E* is 90°, the length of side *EF* is 7 centimeters, and the length of side *DF* is 12 centimeters. Find the measure of angle *F* to the *nearest degree*. [5]

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

a What number is the multiplicative identity element?

b What is the sum of −2 and its additive inverse?

c If $\frac{a}{b} = 1$, what is the value of $a - b$?

d What positive number is equal to its reciprocal?

e If $a + b = c$, and $a = c$, what is the numerical value of b?

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

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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

Monday, January 27, 1986—1:15 to 4:15 p.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 18 – 30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 6

(2) 8

(3) 9

(4) 8

(5) 2

(6) 10

(7) 90

(8) $\frac{7a}{12}$

(9) 66

(10) 120

(11) 14

(12) $\frac{ar}{s}$

(13) 2

(14) $x^2 + 2x - 24$

(15) 25

(16) $(4x + 9)(4x - 9)$

(17) $4x$

(18) 1

(19) 3

(20) 3

(21) 2

(22) 1

(23) 2

(24) 4

(25) 4

(26) 1

(27) 3

(28) 4

(29) 1

(30) 2

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* 9 [4]
Check [1]
b 4 [5]

(33) Analysis [4]
$.60, head of lettuce
$.55, pound of tomatoes [6]

(34) *a* x = time to do the job together

$$\frac{x}{4} + \frac{x}{6} = 1 \quad [5]$$

b t = tens digit
u = units digit
$t + u = 7$
$10u + t = 2(10t + u) + 2$ [5]

(35) Analysis [5]
5, 7 [5]

(36) *a* 224 [5]
b 54 [5]

(37) *a* 1 [2]
b 0 [2]
c 0 [2]
d 1 [2]
e 0 [2]