The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR
MATHEMATICS

Thursday, January 25, 1973 — 1:15 to 4:15 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.

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 Solve for x: $3(x - 2) = 3$

2 Solve for x: $4x + 9 = 12$

3 Solve for n: $.03n = 6$

4 Find the value of y in the proportion $\dfrac{20}{12} = \dfrac{5}{y}$.

5 The sum of the measures of two angles is $90°$. If one angle is twice the other, find the number of degrees in the smaller of the two angles.

6 Express as a trinomial: $(a - 1)(a + 2)$

7 Factor: $n^2 - 5n - 14$

8 If $a = 1$ and $b = 2$, find the value of $(a^2b)^2$.

9 Find, to the *nearest tenth*, the positive square root of 18.

10 Find the value of $|3 - 7|$.

11 Solve for x in terms of c and d: $3x - c = d$

12 Express $\dfrac{a}{4} + \dfrac{b}{8}$ as a single fraction.

13 If tan A is 1.6641, find angle A to the *nearest degree*.

14 A machine can do a certain job in 8 hours. Express in terms of x the fractional part of the job it can do in x hours.

15 What is the slope of the line whose equation is $y = 2x - 5$?

16 Express as a binomial in *simplest form*:
$$5x - 2(x + 5)$$

17 Express as a binomial in terms of x the perimeter of a triangle whose sides are represented by
$$4x - 8, 6x + 3, \text{ and } x + 1.$$

18 The legs of a right triangle are 6 inches and 8 inches. Find the number of inches in the hypotenuse.

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 A member of the solution set of $x + y = 5$ is
(1) (7,—2)   (3) (7,12)
(2) (2,—7)   (4) (2,7)

20 Which is an illustration of the commutative property for addition?
(1) $a + 0 = a$
(2) $a + b = b + a$
(3) $a(b + c) = ab + ac$
(4) $(a + b) + c = a + (b + c)$

21 If the lines whose equations are $x = -2$ and $y = 3$ were graphed on the same set of coordinate axes, their point of intersection would be
(1) (—2,3)   (3) (2,—3)
(2) (3,—2)   (4) (—3,2)

22 The solution set of the inequality $2x + 3 > 5$ is
(1) $\{x \mid x > 1\}$ (3) $\{x \mid x > 4\}$
(2) $\{x \mid x < 1\}$ (4) $\{x \mid x < 4\}$

23 If $\dfrac{x}{y} = -1$, which is true?
(1) $x = 0$ (3) $x = y$
(2) $y = 0$ (4) $x = -y$

24 The solution set of $(x + 8)(x - 7) = 0$ is
(1) $\{7\}$ (3) $\{-8,7\}$
(2) $\{8,-7\}$ (4) $\{8,7\}$

25 The expression $\dfrac{-40d^2e}{-5de^2}$ is equivalent to
(1) $-\dfrac{8d}{e}$ (3) $\dfrac{8d}{e}$
(2) $\dfrac{-8}{de}$ (4) $8de$

26 When $12y^3 - 8y^2 + 4y$ is divided by $4y$, the quotient is

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

27 If $A = \{0,1,2\}$ and $B = \{0,-1,-2\}$, which set would be a subset of both A and B?

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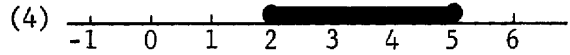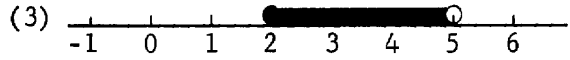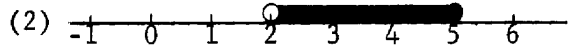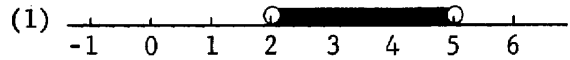(2) $\{-2,-1,0,1,2\}$ (4) $\{-1,-2,1,2\}$

28 The product of $\frac{2}{3}$ and its reciprocal is

(1) 1   (3) 0
(2) $\frac{4}{9}$ (4) -1

29 The expression $\sqrt{48} - \sqrt{12}$ is equivalent to

(1) 6   (3) $3\sqrt{2}$

(2) 2   (4) $2\sqrt{3}$

30 The graph of the solution set of $2 < x \leq 5$ is

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

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]
$$x + 2y = 10$$
$$x - y = 4$$

OR

b On the same set of coordinate axes, graph *each* of the inequalities in the following system and label the solution set *A*:   [8,2]
$$y \geq -x + 1$$
$$y < 3x - 3$$

32 Find two consecutive positive integers such that the square of the smaller increased by 3 times the larger is equal to 57. [*Only an algebraic solution will be accepted.*]   [5,5]

33 Write an equation or system of equations which 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 dealer sold 200 pairs of ski poles. Some were sold at $6 per pair and the remainder were sold at $11 per pair. Total receipts from this sale were $1,600. How many pairs of the poles did he sell at $6 each?
   b The sum of the digits of a two-digit number is 7. If the digits are reversed, the new number is 9 less than the original number. Find the original number.
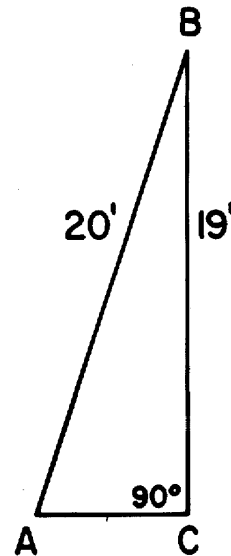
34 Answer *both a* and *b*.
   a Perform the indicated operation and express the result in simplest form.   [6]
$$\frac{x^2 - 25}{x^2 + x - 20} \cdot \frac{x - 4}{x^2 - 5x}$$
   b Solve for x: $\dfrac{6}{x} + \dfrac{x - 3}{2x} = 2$ [4]

35 The diagram shows a telephone pole *CB* that is 19 feet tall braced by a guy wire *AB* that is 20 feet long.

   a Find to the *nearest degree* the acute angle *CAB* that the guy wire makes with the ground.   [5]
   b Find to the *nearest foot* the distance *AC*.   [5]

36 A man invested an amount of money at 6%. He also invested $400 more than the first amount at 4%. The annual incomes from these investments were equal. How much was invested at each rate? [*Only an algebraic solution will be accepted.*]   [5,5]

37 The replacement set for x for each open sentence listed below is {—4,—3,—2,—1}. On your answer paper write the letters *a* through *e*, and next to each write the solution set of each open sentence. [Each answer must be a subset of the replacement set.]
   a $2x^2 = 32$ [2]
   b $5x > 3x - 3$ [2]
   c $6x + 2 = 5x + 3$ [2]
   d $3x + 9 = 0$ [2]
   e $|x| = 2$ [2]

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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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.

SCORING KEY

9

NINTH YEAR MATHEMATICS

Thursday, January 25, 1973 — 1:15 to 4:15 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) 3	(11) $\dfrac{d + c}{3}$	(21) 1
(2) ¾	(12) $\dfrac{2a + b}{8}$	(22) 1
(3) 200	(13) 59	(23) 4
(4) 3	(14) $\dfrac{x}{8}$	(24) 3
(5) 30	(15) 2	(25) 3
(6) $a^2 + a - 2$	(16) $3x - 10$	(26) 4
(7) $(n - 7)(n + 2)$	(17) $11x - 4$	(27) 3
(8) 4	(18) 10	(28) 1
(9) 4.2	(19) 1	(29) 4
(10) 4	(20) 2	(30) 2

[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) Analysis   [5]
     6, 7   [5]

(33) *a* x = number of pairs at \$6
      $6x + 11(200 - x) = 1,600$ [5]

     b t = tens digit
       u = units digit
       $t + u = 7$
       $10u + t = 10t + u - 9$ [5]

(34) *a* $\dfrac{1}{x}$ [6]

     b 3   [4]

(35) *a* 72   [5]

     b 6   [5]

(36) Analysis   [5]
     \$800 at 6%
     \$1,200 at 4%   [5]

(37) *a* {—4} *or* —4   [2]
     b {—1} *or* —1   [2]
     c { } *or* ϕ [2]
     d {—3} *or* —3   [2]
     e {—2} *or* —2   [2]

DO YOU KNOW . . .

Who writes the questions used on Regents examinations?

1 the members of the Board of Regents
2 the subject supervisors in the State Education Department
3 college professors in the various disciplines
4 classroom teachers from schools throughout New York State

The correct answer is 4. Last year more than 400 classroom teachers were involved in the preparation of Regents examination questions, and many other teachers served on the committee that assembled the examinations.