The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE II

Wednesday, August 16, 1995 — 8:30 to 11:30 a.m., only

Notice . . .

Calculators must be available to all students taking this examination.

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 9 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 30 questions from 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. Where applicable, answers may be left in terms of π or in radical form. [60]

1 What is the value of $a * (b * d)$ in the system defined below?

*	a	b	c	d
a	c	d	a	b
b	d	c	b	a
c	a	b	c	d
d	b	a	d	c

2 If $\tan A = 0.4548$, find the measure of $\angle A$ to the *nearest degree*.

3 If $\frac{3}{a+4} = \frac{a-1}{a}$, what is the positive value of a?

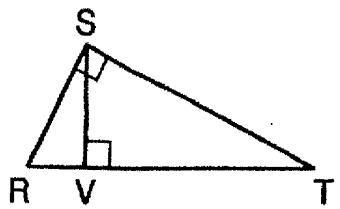
4 Write an equation of the line whose slope is -2 and whose y-intercept is 1.

5 A student council consists of ten members. How many different four-member subcommittees can be formed from the student council?

6 In parallelogram $DATE$, $m\angle D = 8x - 20$ and $m\angle A = 2x + 30$. Find x.

7 In $\triangle ABC$, $m\angle A$ is three times $m\angle B$. An exterior angle at vertex C measures 100°. What is $m\angle B$?

8 In the accompanying diagram, $\overline{SV}$ is the altitude to hypotenuse $\overline{RT}$ of right triangle RST. If $RV = 3$ and $VT = 12$, find the length of $\overline{SV}$.



9 Solve for x: $\frac{x}{6} + \frac{2x}{3} = 5$

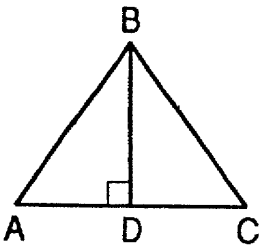
10 Find the coordinates of the image of point $T(-7,3)$ under a reflection in the origin.

11 Find, to the *nearest tenth*, the distance between two points whose coordinates are $(-2,5)$ and $(3,-4)$.

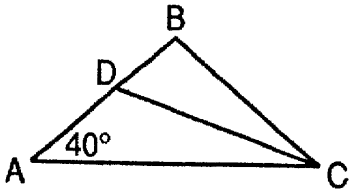
12 Express $\frac{2x - 10}{x^2 - 2x - 15}$ in simplest form.

13 What are the coordinates of the center of a circle whose equation is $(x + 3)^2 + (y - 1)^2 = 16$?

14 In the accompanying diagram of isosceles triangle ABC, $\overline{BA} \cong \overline{BC}$ and altitude $\overline{BD}$ is drawn. If $BD = 4$ and $AD = 3$, find the perimeter of $\triangle ABC$.



15 In the accompanying diagram of isosceles triangle ABC, $\overline{BA} \cong \overline{BC}$ and $\overline{DC}$ bisects $\angle ACB$. If $m\angle A = 40$, find $m\angle CDB$.



Directions (16–34): For *each* question chosen, write on the separate answer sheet the *numeral* preceding the word or expression that best completes the statement or answers the question.

16 If x and y are any two whole numbers, which statement is *always* true?

(1) $xy = yx$
(2) $\frac{x}{y} = \frac{y}{x}$
(3) $x - y = y - x$
(4) $x + 3y = y + 3x$

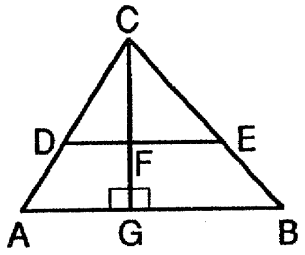
17 After a reflection in the line $y = x$, the image of $(-3,2)$ lies in Quadrant

(1) I
(2) II
(3) III
(4) IV

18 What is the negation of the statement $\sim c \wedge d$?

(1) $c \wedge d$
(2) $c \vee d$
(3) $c \wedge \sim d$
(4) $c \vee \sim d$

19 In the accompanying diagram of $\triangle ABC$, $\overline{DE} \parallel \overline{AB}$, $\overline{CFG} \perp \overline{AB}$, $CD = 6$, $DA = 4$, and $CF = 5$.



What is the length of $\overline{FG}$?

(1) $1\frac{1}{3}$
(2) $3\frac{1}{3}$
(3) $5\frac{1}{3}$
(4) $10\frac{1}{3}$

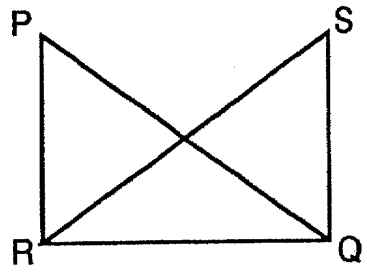
20 Given the true statements, $a \rightarrow b$, $a \vee c$, and $\sim b$. Which statement is logically true?

(1) $a \wedge b$
(2) b
(3) c
(4) $\sim c \wedge \sim b$

21 Line segment $\overline{AB}$ has midpoint M. If the coordinates of A are $(2,3)$ and the coordinates of M are $(-1,0)$, what are the coordinates of B?

(1) $(1,3)$
(2) $\left(\frac{1}{2},\frac{3}{2}\right)$
(3) $(-4,-3)$
(4) $(-4,6)$

22 In the accompanying diagram, $\overline{PR} \cong \overline{SQ}$, $\overline{PR} \perp \overline{RQ}$, and $\overline{SQ} \perp \overline{RQ}$. Which statement can be used to prove that $\triangle PQR \cong \triangle SRQ$?



(1) AAS $\cong$ AAS
(2) SAS $\cong$ SAS
(3) HL $\cong$ HL
(4) SSS $\cong$ SSS

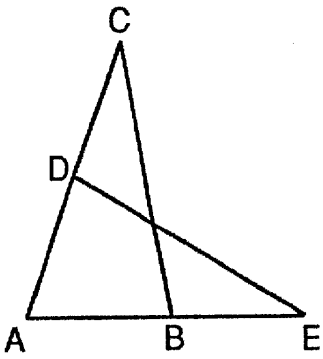
23 Given points $A(0,0)$, $B(3,2)$, and $C(-2,3)$, which statement is true?

(1) $\overline{AB}$ is parallel to $\overline{AC}$.
(2) $\overline{AB}$ is perpendicular to $\overline{AC}$.
(3) AB is greater than BC.
(4) $\overline{BC}$ is perpendicular to $\overline{CA}$.

24 Which equation represents the locus of all points 3 units to the right of the y-axis?

(1) $x = 3$
(2) $x = -3$
(3) $y = 3$
(4) $y = -3$

25 In the accompanying diagram of $\triangle ABC$, D is a point on $\overline{AC}$, $\overline{AB}$ is extended to E, and $\overline{DE}$ is drawn so that $\triangle ADE \sim \triangle ABC$.



If $m\angle C = 30$ and $m\angle A = 70$, what is $m\angle ADE$?

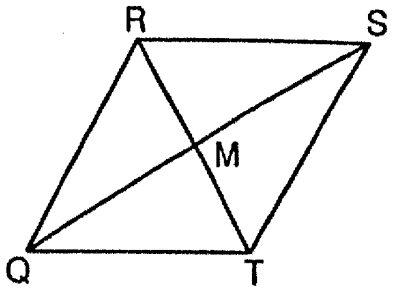
(1) 30
(2) 70
(3) 80
(4) 100

26 A gumball machine contains six yellow gumballs and five orange gumballs. What is the probability of obtaining, at random and without replacement, two yellow gumballs?

(1) $\frac{36}{110}$ (3) $\frac{30}{110}$

(2) $\frac{36}{121}$ (4) $\frac{30}{121}$

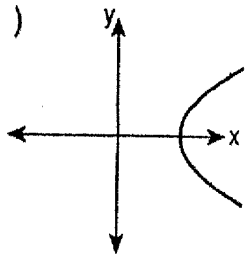
27 In the accompanying diagram of rhombus $QRST$, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at M.

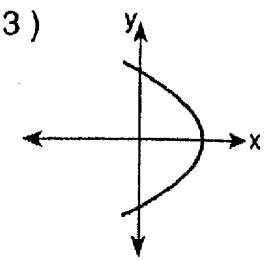


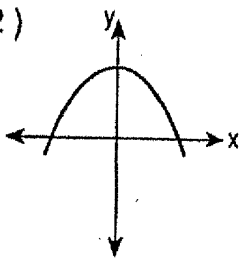
Which statement *must* be true?

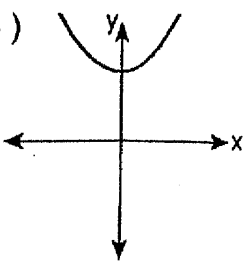
(1) Triangle QRM is an isosceles right triangle.
(2) $\triangle QRM \cong \triangle SRM$.
(3) Triangle QRM is an obtuse triangle.
(4) $\overline{QS} \cong \overline{RT}$.

28 Which graph represents the equation $y = -x^2 + 4$?

(1)


(3)


(2)


(4)


29 In $\triangle ABC$, if $AB = 14$ and $BC = 9$, AC may be equal to

(1) 5 (3) 23
(2) 13 (4) 25

30 The straight string of a kite makes an angle of elevation from the ground of 60°. The length of the string is 400 feet. What is the best approximation of the height of the kite?

(1) 200 ft (3) 300 ft
(2) 250 ft (4) 350 ft

31 In $\triangle ABC$, $m\angle A = 3x$, $m\angle B = 4x - 19$, and $m\angle C = 3x - 1$. Which statement is true?

(1) $\overline{AB}$ is the longest side of $\triangle ABC$.
(2) $\triangle ABC$ is an isosceles triangle.
(3) $\overline{AC}$ is the longest side of $\triangle ABC$.
(4) $\triangle ABC$ is an obtuse triangle.

32 The statement $(A \rightarrow \sim R) \wedge (C \rightarrow R)$ is logically equivalent to

(1) $\sim C \rightarrow \sim A$ (3) $A \rightarrow C$
(2) $C \rightarrow A$ (4) $A \rightarrow \sim C$

33 How many different seven-letter arrangements can be formed from the letters in the word "SUCCESS"?

(1) $\frac{7!}{2!3!}$ (3) $\frac{7!}{3!}$

(2) $7!$ (4) $\frac{7!}{2!}$

34 The intersection of the graphs of the functions $y = x^2$ and $y = 2x$ includes the point

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

Directions (35): Leave all construction lines on the answer sheet.

35 *On the answer sheet*, construct the median $\overline{AP}$ to $\overline{BC}$ of $\triangle ABC$.

Answers to the following questions are to be written on paper provided by the school.

Part II

Answer three questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [30]

36 *a* On graph paper, draw the graph of the equation $y = x^2 - 6x + 8$ for all values of x in the interval $0 \leq x \leq 6$. [6]

b On the same set of axes, draw the image of the graph drawn in part *a* after a translation of $(x - 3, y + 1)$ and label it *b*. [2]

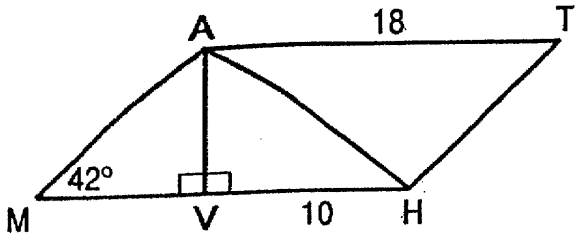
c Write an equation of the graph drawn in part *b*. [2]

37 The length of a rectangle is 4 less than twice its width. If the area of the rectangle is 20, find the width of the rectangle to the *nearest tenth*. [5,5]

38 *a* Triangle PQR is congruent to triangle $P'Q'R'$. If $PQ = x + y$, $P'Q' = 10$, $Q'R' = 3x - y$, and $QR = 14$, find the values of x and y. [5]

b For all values for which the expression is defined, solve for x: $\frac{3}{x} = \frac{x + 5}{2}$ [5]

39 In the accompanying diagram of parallelogram *MATH*, $\overline{AH}$ is a diagonal, altitude $\overline{AV}$ is drawn to side $\overline{MH}$, $AT = 18$, $VH = 10$, and $m\angle M = 42$.



a Find AV to the *nearest tenth*. [4]

b Find the area of parallelogram *MATH* to the *nearest integer*. [2]

c Find the perimeter of parallelogram *MATH* to the *nearest integer*. [4]

40 Solve the following system of equations algebraically and check:

$$x^2 + y^2 = 100$$
$$y = x - 2$$ [8,2]

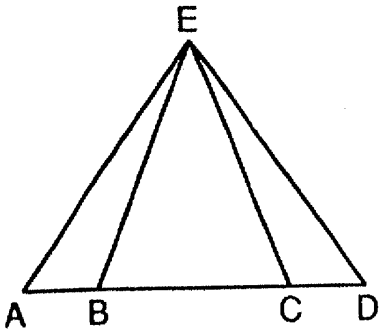
☞ GO RIGHT ON TO THE NEXT PAGE.

Answers to the following questions are to be written on paper provided by the school.

Part III

Answer one question from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [10]

41 Given: $\triangle EAD$, $\overline{ABCD}$, $\overline{AB} \cong \overline{DC}$, and $\angle EBC \cong \angle ECB$.



Prove that $\triangle EAD$ is an isosceles triangle. [10]

42 Quadrilateral $ABCD$ has vertices $A(-8,2)$, $B(0,6)$, $C(8,0)$, and $D(-8,-8)$. Prove that quadrilateral $ABCD$ is an isosceles trapezoid. [10]

THE UNIVERSITY OF THE STATE OF NEW YORK

THE STATE EDUCATION DEPARTMENT

Tables of Natural Trigonometric Functions

(For use with Sequential Math – Course II 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	

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE II

Wednesday, August 16, 1995 — 8:30 to 11:30 a.m., only

Part I Score	
Part II Score	
Part III Score	
Total Score	
Rater's Initials:	

ANSWER SHEET

Pupil ..... Sex: ☐ Male ☐ Female Grade .....

Teacher ..... School .....

Your answers to Part I should be recorded on this answer sheet.

Part I

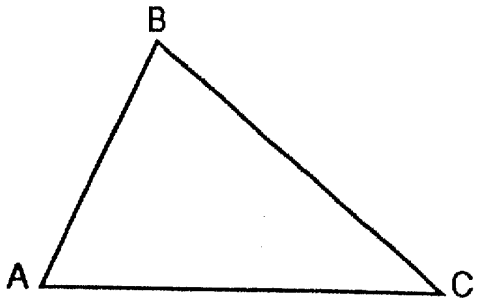
Answer 30 questions from this part.

1	11	21	31 .....
2	12	22	32 .....
3	13	23	33 .....
4	14	24	34 .....
5	15	25	35 **Answer question 35 on the other side of this sheet.**
6	16	26	
7	17	27	
8	18	28	
9	19	29	
10	20	30	

Tear Here

Tear Here

35



Your answers for Part II and Part III 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

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE II

Wednesday, August 16, 1995 — 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 student's work by making insertions or changes of any kind. Use checkmarks to indicate student 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 a total of 60 credits, 2 credits for each of 30 of the following. [If more than 30 are answered, only the first 30 answered should be considered.] Allow no partial credit. For questions 16–34, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) c

(2) 24

(3) 2

(4) $y = -2x + 1$

(5) 210

(6) 17

(7) 25

(8) 6

(9) 6

(10) (7,–3)

(11) 10.3

(12) $\frac{2}{x+3}$

(13) (–3,1)

(14) 16

(15) 60

(16) 1

(17) 4

(18) 4

(19) 2

(20) 3

(21) 3

(22) 2

(23) 2

(24) 1

(25) 3

(26) 3

(27) 2

(28) 2

(29) 2

(30) 4

(31) 3

(32) 4

(33) 1

(34) 1

(35) construction

Part II

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics* and its supplement. 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.

(36) $c\ y = x^2$ [2]

(37) 4.3 [5,5]

(38) *a* (6,4) [5]

b {−6,1} [5]

(39) *a* 7.2 [4]

b 130 [2]

c 58 [4]

(40) (−6,−8)
(8,6) [8]