

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

TENTH YEAR MATHEMATICS

Wednesday, August 17, 1983 — 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 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 all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Unless otherwise specified, answers may be left in terms of π or in radical form. Write your answers in the spaces provided on the separate answer sheet.

1 A vertical pole 10 meters high casts a shadow 8 meters long. At the same time, a nearby tree casts a shadow 40 meters long. Find the number of meters in the height of the tree.

2 The measures of the angles of a triangle are in the ratio 2:3:4. What is the number of degrees in the measure of the largest angle?

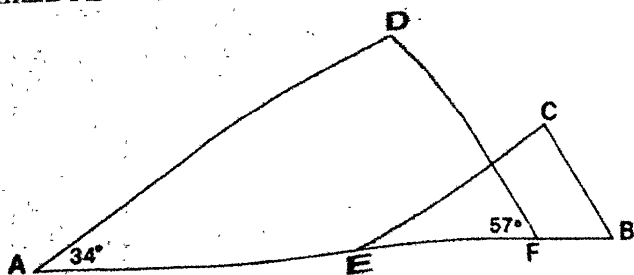
3 In triangle ABC , $AB = 8$, $BC = 14$, and $CA = 10$. Points M , N , and P are the midpoints of sides \overline{AB} , \overline{BC} , and \overline{CA} , respectively. If M , N , and P are connected to form a triangle, what is the perimeter of triangle MNP ?

4 Triangle XYZ is similar to triangle RST with $\angle X \cong \angle R$ and $\angle Y \cong \angle S$. If $XY = 4$, $RS = 12$, $ST = 18$, and $TR = 24$, find the length of side YZ .

5 The bases of a trapezoid have lengths of 4 and 7 and the height is 6. What is the area of the trapezoid?

6 In a right triangle, the length of the median drawn to the hypotenuse is 6. Find the length of the hypotenuse.

7 In the accompanying diagram, \overline{AEFB} , $\overline{AD} \parallel \overline{EC}$, $\overline{DF} \parallel \overline{CB}$, $m\angle DAE = 34$, and $m\angle DFE = 57$. Find $m\angle ECB$.

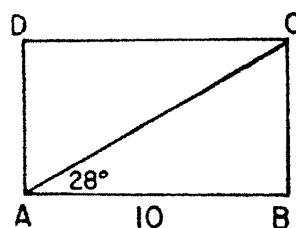


8 How many degrees are in the measure of each exterior angle of a regular 8-sided polygon?

9 The circumference of a circle is 18π . If the length of an arc of this circle is 3π , find the number of degrees in the measure of the arc.

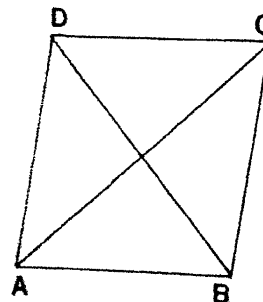
10 A square is circumscribed about a circle whose radius is 6. What is the length of the apothem of the square?

11 In the accompanying diagram of rectangle $ABCD$ with diagonal \overline{AC} , $m\angle BAC = 28$ and $AB = 10$. Find BC to the nearest tenth.

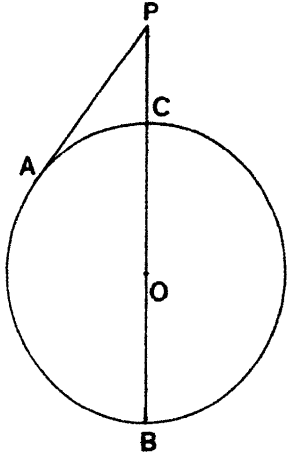


12 Triangle ABC is inscribed in a circle. If $m\angle A = 80$ and $m\angle C = 30$, which side of triangle ABC is nearest the center of the circle?

13 In the accompanying diagram, figure $ABCD$ is a rhombus and $m\angle CAB = 42$. Find $m\angle ABC$.



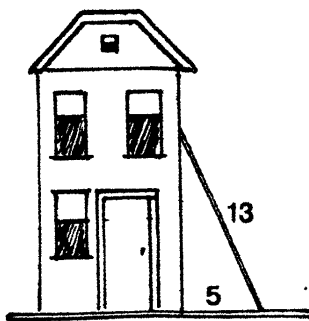
- 14 In the accompanying diagram, diameter BC is 12 centimeters. If \overline{BC} is extended 4 centimeters to point P and tangent \overline{PA} is drawn to circle O , find the number of centimeters in the length of \overline{PA} .



- 15 Two tangents drawn to a circle from the same external point intercept a major arc of 220° . Find the number of degrees in the measure of the angle formed by the two tangents.

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.

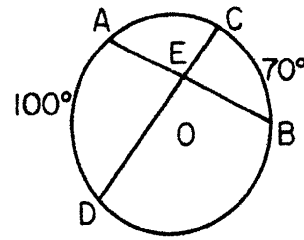
- 16 As shown in the accompanying diagram, a ladder 13 feet long is leaning against the side of a building so that the foot of the ladder is 5 feet from the building. How far up the building does the ladder reach?



- (1) 7 feet (3) 12 feet
(2) 8 feet (4) 18 feet

- 17 The degree measures of two vertical angles are $2x$ and $x + 3$. The value of x is
- (1) 29 (3) 3
(2) 59 (4) 4

- 18 In the accompanying figure, chords \overline{AB} and \overline{CD} of circle O intersect at E . If $m\widehat{AD} = 100$ and $m\widehat{CB} = 70$, what is $m\angle AED$?



- (1) 170 (3) 30
(2) 85 (4) 15

- 19 What are the coordinates of the midpoint of a line segment whose endpoints are $(2, 6)$ and $(-4, 8)$?
- (1) $(-2, 14)$ (3) $(-2, 7)$
(2) $(2, 14)$ (4) $(-1, 7)$

- 20 Which is the converse of the statement, "If Lisa is in the tenth grade, she is taking geometry"?
- (1) If Lisa is taking geometry, she is in the tenth grade.
(2) If Lisa is not taking geometry, she is not in the tenth grade.
(3) If Lisa is not in the tenth grade, she is taking geometry.
(4) If Lisa is not in the tenth grade, she is not taking geometry.

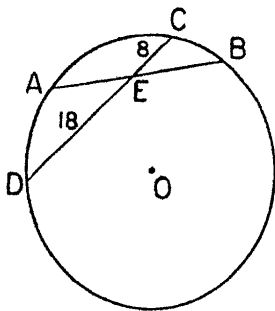
- 21 If the points $(-1, 1)$, $(3, -2)$, and $(q, 4)$ are collinear, the value of q is

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

- 22 In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$. Which statement *must* be true?
- (1) The diagonals bisect the angles of the quadrilateral.
(2) The quadrilateral is a parallelogram.
(3) The diagonals are equal in length.
(4) The diagonals are perpendicular.

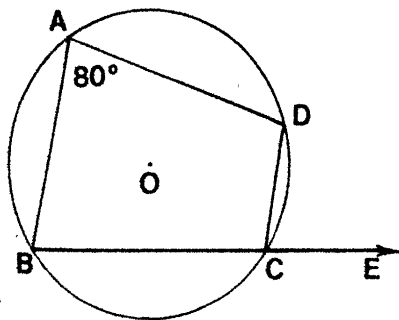
- 23 Rays \vec{BA} and \vec{BC} are noncollinear. What is the locus of points equidistant from \vec{BA} and \vec{BC} ?
- (1) the bisector of angle B
 - (2) a circle with center at B
 - (3) the perpendicular bisector of \vec{BA}
 - (4) one line parallel to \vec{BA} and one line parallel to \vec{BC}

- 24 In the accompanying diagram, chords \overline{AB} and \overline{CD} of circle O intersect at point E , the midpoint of \overline{AB} . If $CE = 8$ and $ED = 18$, what is the length of \overline{AE} ?



- (1) 16
- (2) 14
- (3) 12
- (4) 10

- 25 In the accompanying diagram, quadrilateral $ABCD$ is inscribed in circle O , $m\angle BAD = 80^\circ$, and \vec{BCE} is drawn. What is $m\angle DCE$?



- (1) 60
- (2) 80
- (3) 100
- (4) 120

- 26 If the perimeter of an equilateral triangle is 15, the area of the triangle is

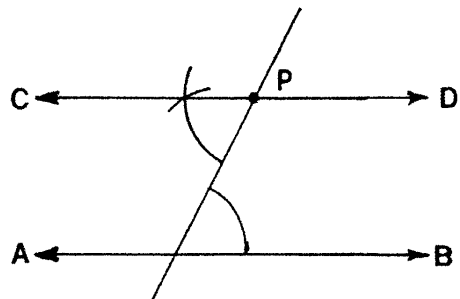
- (1) $5\sqrt{3}$
- (2) $\frac{15}{4}\sqrt{3}$
- (3) $25\sqrt{3}$
- (4) $\frac{25}{4}\sqrt{3}$

- 27 An equation of the locus of points equidistant from the points $(1,2)$ and $(5,2)$ is
- (1) $x = 3$
 - (2) $y = 3$
 - (3) $x = 5$
 - (4) $x = y$

- 28 If the lengths of the sides of a regular polygon are doubled, then the area of the polygon would be multiplied by
- (1) 1
 - (2) 2
 - (3) 8
 - (4) 4

- 29 In triangle ABC , \overline{AC} is extended through C to D . If $m\angle BCD = 2x + 35$, $m\angle BAC = x - 3$, and $m\angle ABC = 3x - 20$, what is the value of x ?
- (1) 28
 - (2) 29
 - (3) 30
 - (4) 31

- 30 The accompanying diagram shows the construction of line \overleftrightarrow{CD} through given point P and parallel to given line \overleftrightarrow{AB} . Which principle is used in the proof for this construction?



- (1) If two lines are parallel, then the alternate exterior angles are congruent.
- (2) If two lines are cut by a transversal so that a pair of alternate interior angles are congruent, then the lines are parallel.
- (3) If two lines are cut by a transversal so that the interior angles on the same side of the transversal are supplementary, then the lines are parallel.
- (4) If two lines are parallel, then the corresponding angles are congruent.

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.

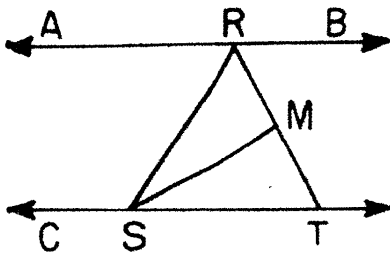
31 Prove either *a* or *b* but not both.

a The sum of the measures of the angles of a triangle is 180 degrees. [10]

OR

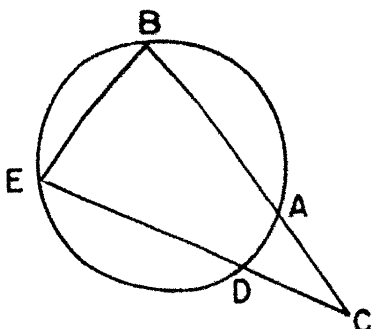
b The square of the length of the hypotenuse of a right triangle is equal to the sum of the squares of the lengths of the legs. [10]

32 Given: \overline{RS} intersects \overleftrightarrow{ARB} and \overleftrightarrow{CST} ,
 $\overleftrightarrow{ARB} \parallel \overleftrightarrow{CST}$, \overline{RT} bisects $\angle BRS$, M is the midpoint of \overline{RT} , and \overline{SM} is drawn.



Prove: *a* $\overline{RS} \cong \overline{ST}$ [5]
b \overline{SM} bisects $\angle RST$ [5]

33 Given: secants \overline{CAB} and \overline{CDE} , $\overline{AB} \cong \overline{DE}$.



Prove: *a* $\angle B \cong \angle E$ [6]
b $\overline{CA} \cong \overline{CD}$ [4]

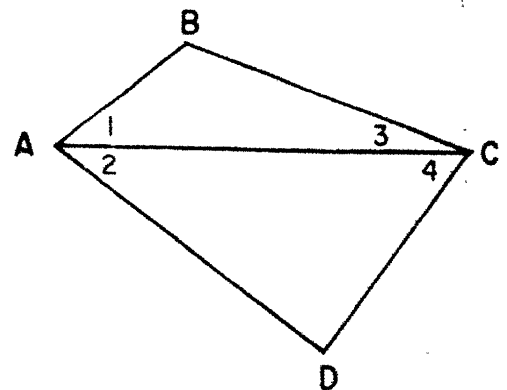
34 Point T is 6 units from line s .

a Describe fully the locus of points, in a plane, x units from point T . [3]
b Describe fully the locus of points, in a plane, 2 units from line s . [3]
c How many points satisfy the conditions of both parts *a* and *b* if
 (1) $x = 4$ [2]
 (2) $x = 8$ [2]

35 The length of a side of a rhombus is 8 and the length of the shorter diagonal is 6.

a Find the measure of an acute angle of the rhombus to the nearest degree. [4]
b Find the length of the other diagonal to the nearest integer. [3]
c Using the result in part *b*, find the area of the rhombus. [3]

36 Given: quadrilateral $ABCD$, \overline{AC} bisects $\angle BAD$, $\angle BAD \cong \angle BCD$, and $m\angle 4 > m\angle 1$.



Prove: \overline{AC} does not bisect $\angle BCD$. [10]

37 The coordinates of the vertices of quadrilateral $ABCD$ are $A(3,1)$, $B(11,-3)$, $C(10,3)$, and $D(6,5)$.

a Show, by means of coordinate geometry, that $ABCD$ is a trapezoid and state a reason for your conclusion. [6]
b Show, by means of coordinate geometry, that $ABCD$ is not an isosceles trapezoid. [4]

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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The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

TENTH YEAR MATHEMATICS

Wednesday, August 17, 1983 — 8:30 to 11:30 a.m., only

Part I Score:..... Rater's Initials:
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ANSWER SHEET

PupilTeacher

School

Name and author of textbook used

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

100-1001

FOR TEACHERS ONLY

10

SCORING KEY

TENTH YEAR MATHEMATICS

Wednesday, August 17, 1983 — 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) 50	(11) 5.3	(21) 2
(2) 80	(12) \overline{BC} or BC or a	(22) 2
(3) 16	(13) 96	(23) 1
(4) 6	(14) 8	(24) 3
(5) 33	(15) 40	(25) 2
(6) 12	(16) 3	(26) 4
(7) 89	(17) 3	(27) 1
(8) 45	(18) 2	(28) 4
(9) 60	(19) 4	(29) 2
(10) 6	(20) 1	(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.

(34) *a* A circle with center at T having a radius of x units [3]

b Two lines parallel to s and two units from it [3]

c (1) 1 [2]

(2) 3 [2]

(35) *a* 44 [4]

b 15 [3]

c 45 [3]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE II

Wednesday, August 17, 1983 — 8:30 to 11:30 a.m., only

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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 radical form.

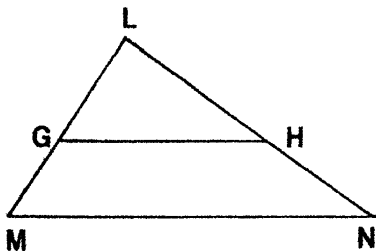
1 The measures of three angles of a quadrilateral are 80, 50, and 130. What is the measure of the fourth angle?

2 Determine the value of $(T \notin O) \notin S$ in the system defined below.

\notin	S	T	O	P
S	P	O	T	S
T	O	S	P	T
O	T	P	S	O
P	S	T	O	P

3 The sides of a triangle have lengths 4, 5, and 8. If the length of the shortest side of a similar triangle is 12, find the perimeter of the larger triangle.

4 In the accompanying figure, $\overline{GH} \parallel \overline{MN}$. If $LG = 14$, $LM = 24$, and $LN = 36$, find LH .

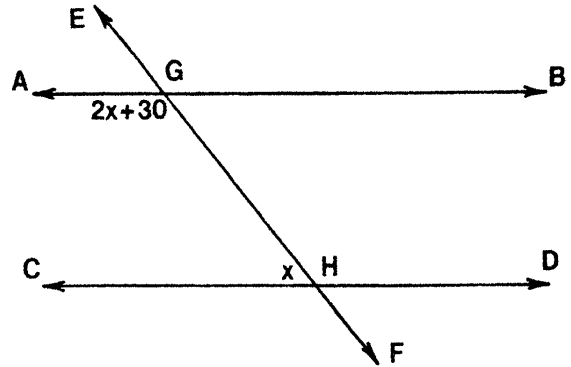


5 The measures of the angles of a triangle are in the ratio 5:3:1. What is the measure of the *smallest* angle of the triangle?

6 Lines \overleftrightarrow{AB} and \overleftrightarrow{CD} intersect at E . How many points are 3 units from E and also equidistant from \overleftrightarrow{AB} and \overleftrightarrow{CD} ?

7 How many different four-letter arrangements can be formed from the letters in the word "BOOK"?

8 In the accompanying figure, \overleftrightarrow{EF} intersects \overleftrightarrow{AB} and \overleftrightarrow{CD} at G and H , respectively. If $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $m\angle CHG = x$ and $m\angle AGH = 2x + 30$, find x .



9 The endpoints of a diameter of a circle are $(2,5)$ and $(12,-7)$. Find the coordinates of the center of the circle.

10 In $\triangle ABC$, $m\angle A = 70$ and $m\angle C = 50$. If D is a point on \overline{AB} such that \overline{CD} bisects $\angle ACB$, find $m\angle CDB$.

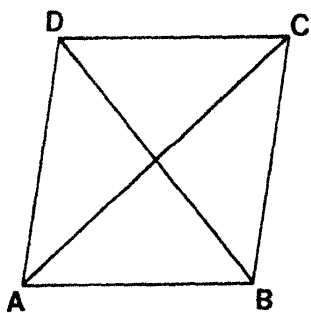
11 The length of a side of an equilateral triangle is 12. Express in radical form the length of an altitude of the triangle.

12 Two marbles are selected at random, without replacement, from a bag containing 7 red and 3 blue marbles. What is the probability that the two marbles selected will both be blue?

13 If $x = 2$ is an equation of the axis of symmetry of the graph of $y = x^2 - 4x + 13$, what is the y -coordinate of the turning point?

14 The bases of a trapezoid have lengths of 4 and 7, and the height is 6. What is the area of the trapezoid?

- 15 In the accompanying diagram, figure $ABCD$ is a rhombus and $m\angle CAB = 42$. Find $m\angle ABC$.



- 16 If $*$ is an operation defined by $a * b = a^b$, find the value of $5 * 2$.
- 17 Find the distance between the points $A(7,0)$ and $B(1,8)$.

Directions (18–34): 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.

- 18 Which is an example of a valid argument?
- (1) All girls are brave.
Robin is not a girl.
Therefore, Robin is not brave.
 - (2) All girls are brave.
Robin is brave.
Therefore, Robin is a girl.
 - (3) All girls are brave.
Robin is a girl.
Therefore, Robin is brave.
 - (4) All girls are brave.
Robin is a boy.
Therefore, Robin is not brave.
- 19 In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$. Which statement *must* be true?
- (1) The diagonals bisect the angles of the quadrilateral.
 - (2) The quadrilateral is a parallelogram.
 - (3) The diagonals are equal in length.
 - (4) The diagonals are perpendicular.

- 20 Given the set $\{0,1,2,3,4\}$ in the clock 5 (mod 5) system of arithmetic, what is the value of x in the equation $x + 3 = 2$?
- (1) 1
 - (2) 2
 - (3) 3
 - (4) 4

- 21 Which equation represents the locus of all points 5 units below the x -axis?

- (1) $y = -5$
- (2) $y = 5$
- (3) $x = -5$
- (4) $x = 5$

- 22 If the equation of the axis of symmetry of a parabola is $x = 1$, which could be an equation of the parabola?

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

- 23 Given: $m \rightarrow \sim n$ and $\sim m \rightarrow t$
Which statement is a logically valid conclusion?

- (1) $t \rightarrow m$
- (2) $t \rightarrow \sim m$
- (3) $\sim n \rightarrow \sim m$
- (4) $n \rightarrow t$

- 24 From a group of 3 teachers and 5 students, how many committees of 3 people can be formed?

- (1) 336
- (2) 56
- (3) 3
- (4) 10

- 25 Given the true statement $[(p \vee q) \wedge (\sim q)]$. Which statement must also be true?

- (1) p
- (2) $\sim p$
- (3) q
- (4) $p \rightarrow q$

- 26 The roots of the equation $2x^2 - 5x + 1 = 0$ are

- (1) $\frac{5 \pm \sqrt{17}}{4}$
- (2) $\frac{-5 \pm \sqrt{17}}{4}$
- (3) $\frac{5 \pm \sqrt{33}}{4}$
- (4) $\frac{-5 \pm \sqrt{33}}{4}$

- 27 Which is a solution for the system of equations $y = x - 2$ and $y = x^2 - 4x - 8$?

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

- 28 The statement $\sim(p \vee \sim q)$ is logically equivalent to

- (1) $\sim p \vee q$
- (2) $\sim p \vee \sim q$
- (3) $\sim p \wedge q$
- (4) $\sim p \wedge \sim q$

29 Which set of numbers could represent the lengths of the sides of a right triangle?

- (1) {5,7,8} (3) {7,9,11}
(2) {7,8,12} (4) {8,15,17}

30 The coordinates of the endpoints of \overline{PQ} are $P(3a,4b)$ and $Q(2a,3b)$. The length of \overline{PQ} must equal

- (1) $a + b$ (3) $\sqrt{a^2 + b^2}$
(2) $a^2 + b^2$ (4) $\sqrt{25a^2 + 49b^2}$

31 Which is true for the set of integers?

- (1) It is commutative under addition and commutative under multiplication.
(2) It is closed under division.
(3) It contains a multiplicative inverse for each member.
(4) It is not closed under subtraction.

32 In a right triangle, the altitude drawn to the hypotenuse divides the hypotenuse into two segments whose lengths are 8 and 2. What is the length of the altitude?

- (1) 16 (3) 10
(2) 2 (4) 4

33 The graphs of the equations $x^2 + y^2 = 64$ and $x + y = 2$ are drawn on the same set of axes. What is the total number of points common to both graphs?

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

34 What is the slope of the line $2y - 3x = 4$?

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

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

35 *On the answer sheet,* construct the perpendicular bisector of side \overline{AB} .

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

Part II

Answer three questions from this part. Show all work unless otherwise directed.

- 36 In the accompanying table, the operation $*$ is defined as $a * b = \text{minimum of } \{a, b\}$. For example, $6 * 4 = 4$, the minimum of 6 and 4.

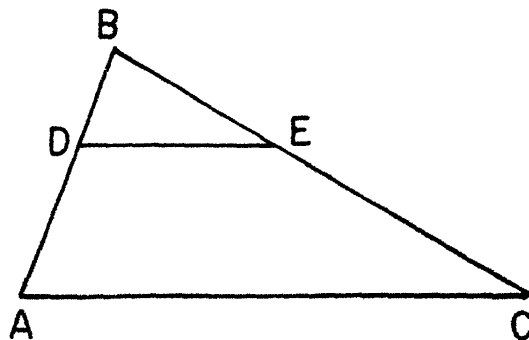
$*$	1	3	5	7
1	1	1		
3		3	3	
5			5	5
7				7

- a On your answer paper, copy and complete the table. [2]
 b What is the identity element in this set for operation $*$? [2]
 c Solve for all x : $5 * x = 5$ [1,1]
 d Find the value of $(1 * 5) * 3$. [2]
 e Which property of a group is not found in this set with operation $*$? [2]
- 37 A pet shop owner bought 3 parakeets, 5 canaries, and 4 doves. He selects 8 birds at random to display in his front window.
- a How many different 8-bird selections could he make? [2]
 b How many 8-bird selections will contain 3 parakeets, 2 canaries, and 3 doves? [4]
 c What is the probability the 8-bird selection will contain 3 parakeets, 2 canaries, and 3 doves? [2]
 d What is the probability the 8-bird selection will contain *no* doves? [2]

- 38 Given the equation: $y = x^2 + 2x - 3$
- a Write an equation for the axis of symmetry. [2]
 b Draw the graph of the equation, using all values of x such that $-4 \leq x \leq 2$. [6]
 c What are the roots of $x^2 + 2x - 3 = 0$? [1,1]

- 39 a On the same set of axes, graph the three lines whose equations are:
 $y = -x$
 $y = x + 8$
 $x = 5$ [2,2,1]
 b Find the area of the triangle formed in part a. [5]

- 40 In the accompanying diagram of $\triangle ABC$, D is a point on \overline{AB} , E is a point on \overline{BC} , and $\overline{DE} \parallel \overline{AC}$. If $BD = 5$, $DA = x + 2$, $BE = x + 4$, and $EC = 2x + 4$, find x . [Only an algebraic solution will be accepted.] [4,6]



➡ 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. Show all work unless otherwise directed.

- 41 Triangle ABC has vertices $A(1,2)$, $B(7,0)$, and $C(3,-2)$.
- a* Prove triangle ABC is an isosceles triangle.
[5]
- b* Prove triangle ABC is a right triangle.
[5]

- 42 Given:
- If Dana goes to camp then she will sleep in a tent.
If Dana's family does not take a vacation then she will learn to swim.
Either Dana's family does not take a vacation or Dana goes to camp.
She does not sleep in a tent.
- Let C represent: "Dana goes to camp."
Let T represent: "She sleeps in a tent."
Let F represent: "Dana's family takes a vacation."
Let S represent: "She learns to swim."
- a* Using C , T , F , S , and proper connectives, express each sentence in symbolic form.
[2]
- b* Prove: She learns to swim. [8]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE II

Wednesday, August 17, 1983 — 8:30 to 11:30 a.m., only

Part I Score:
Rater's Initials:

ANSWER SHEET

Pupil.....Teacher.....

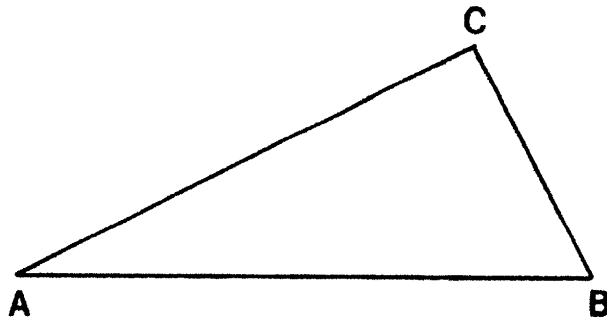
School.....Grade.....

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

Part I

Answer 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 | |



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 17, 1983 — 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 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 18–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 100	(11) $6\sqrt{3}$ or $\sqrt{108}$	(21) 1	(31) 1
(2) 8	(12) $\frac{1}{15}$	(22) 2	(32) 4
(3) 51	(13) 9	(23) 4	(33) 2
(4) 21	(14) 33	(24) 2	(34) 3
(5) 20	(15) 96	(25) 1	
(6) 4	(16) 25	(26) 1	
(7) 12	(17) 10	(27) 2	
(8) 50	(18) 3	(28) 3	
(9) $(7, -1)$ or $\begin{matrix} x = 7 \\ y = -1 \end{matrix}$	(19) 2	(29) 4	
(10) 95	(20) 4	(30) 3	

[OVER]

SEQUENTIAL MATH—COURSE II — *concluded*

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.

Part II

$$(36) \begin{array}{c|cccc} a * & 1 & 3 & 5 & 7 \\ \hline 1 & 1 & 1 & 1 & 1 \\ 3 & 1 & 3 & 3 & 3 \\ 5 & 1 & 3 & 5 & 5 \\ 7 & 1 & 3 & 5 & 7 \end{array} \quad [2]$$

$$(38) \begin{array}{l} a \ x = -1 \quad [2] \\ c \ -3, 1 \quad [1,1] \end{array}$$

$$(39) \ b \ 81 \quad [5]$$

$$b \ 7 \quad [2]$$

$$(40) \ 6 \quad [4,6]$$

$$c \ 5,7 \quad [1,1]$$

$$d \ 1 \quad [2]$$

$$e \ \text{All elements do not have inverses.} \quad [2]$$

$$(37) \ a \ 495 \quad [2]$$

$$b \ 40 \quad [4]$$

$$c \ \frac{40}{495} \quad [2]$$

$$d \ \frac{1}{495} \quad [2]$$

Part III

$$(42) \ a \ \begin{array}{l} C \rightarrow T \\ \sim F \rightarrow S \\ \sim F \vee C \\ \sim T \end{array} \quad [2]$$