The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

TENTH YEAR MATHEMATICS

Tuesday, August 14, 1984 — 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.

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NEW YORK

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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 In the accompanying diagram of $\triangle AEC$ and $\triangle PXT$, $\angle A \cong \angle P$ and $\angle C \cong \angle T$. Which side of $\triangle PXT$ corresponds to side $\overline{CE}$?
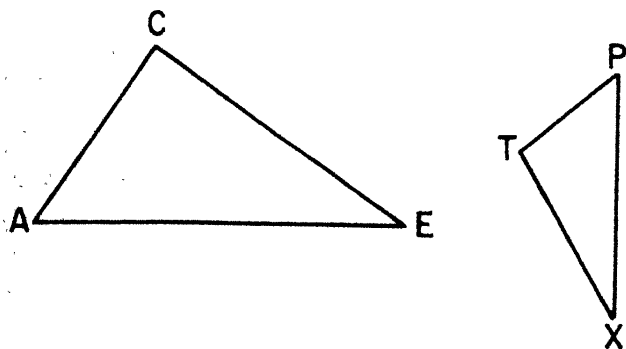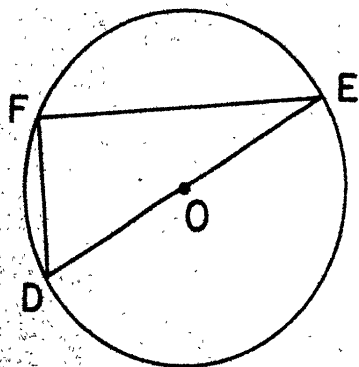
2 In the accompanying diagram, $\overline{AB} \parallel \overline{EF} \parallel \overline{DC}$. Find FB if $AE = 3$, $ED = 5$, and $CB = 16$.
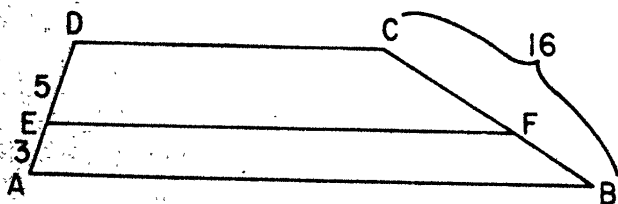
3 Triangle ABC is circumscribed about a circle. If $\overline{AB}$ is tangent to the circle at R, $\overline{AC}$ is tangent to the circle at S, $BR = 3$, and $CS = 8$, find BC.

4 In the accompanying diagram of circle O, diameter $\overline{DE}$, chords $\overline{FE}$ and $\overline{FD}$ are drawn. If $DE = 17$ and $FE = 15$, find FD.

5 In the accompanying diagram, two tangents are drawn to circle O from external point P. The tangents divide the circle into two arcs whose degree measures are x and $3x$. Find $m\angle P$.
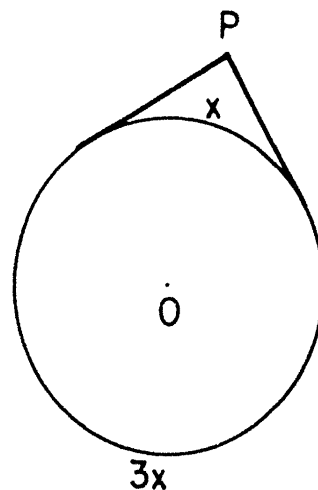
6 In the accompanying diagram of circle O, $\overleftrightarrow{DE}$ is tangent to the circle at C. Radii $\overline{OA}$ and $\overline{OC}$ and chord $\overline{AC}$ are drawn. If $m\angle AOC = 70$, find $m\angle DCA$.
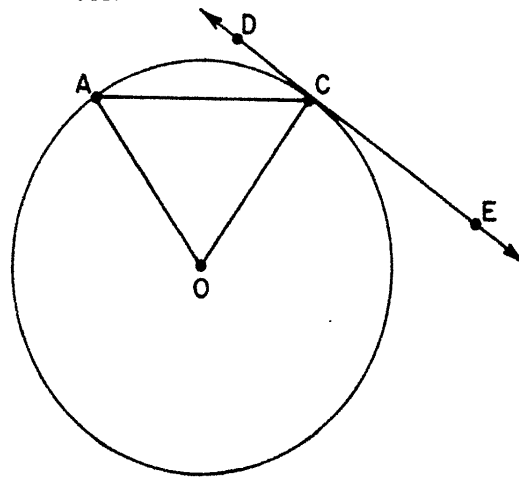
7 In a triangle, the measures of the angles are $30°$, $60°$, and $90°$, and the length of the side opposite the $30°$ angle is 3. What is the length of the side opposite the $90°$ angle?

8 The length of the line segment joining the midpoints of sides $\overline{AB}$ and $\overline{BC}$ of parallelogram $ABCD$ is 10. Find the length of diagonal $\overline{AC}$.

[2]

9 The perimeter of a regular polygon is 80 and the length of its apothem is 10. Find the area of the polygon.

10 In the accompanying figure, the measure of arc AB of circle O is 60°. If the length of arc AB is 4π, what is the circumference of the circle in terms of π?
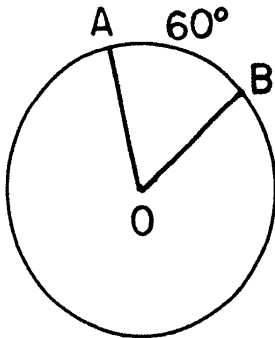
11 In the accompanying diagram, a tangent $\overline{PA}$ and a secant $\overline{PBC}$ are drawn to a circle from the same external point. If $PC = 8$ and $PB = 2$, find the length of tangent $\overline{PA}$.
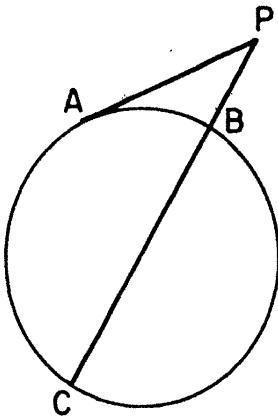
12 A ladder on level ground leans against a building and makes an angle of 72° with the ground. If the ladder is 10 feet long, find the distance between the base of the ladder and the base of the building to the *nearest foot*.

Directions (13–30): Write in the space provided on the separate answer sheet the *numeral* preceding the expression that best completes *each* statement or answers *each* question.

13 A circle has center (1,1) and passes through the point (3,3). Which point is in the interior of the circle?
(1) (0,0)   (3) (3,4)
(2) (−3,−3)   (4) (4,0)

14 Which pair of points determine a line parallel to the y-axis?
(1) (1,1) and (3,3)   (3) (3,4) and (3,7)
(2) (2,6) and (5,6)   (4) (1,1) and (2,3)

15 The ratio of two corresponding sides of two similar polygons is 2:5. If the perimeter of the larger polygon is 25, the perimeter of the smaller polygon is
(1) 50   (3) 5
(2) 10   (4) 4

16 Central angle AOB and inscribed angle ACB are drawn in circle O. If m$\angle ACB = 50$, then m$\angle AOB$ may be
(1) 50   (3) 130
(2) 100   (4) 310

17 What is the length of a segment whose endpoints have the coordinates $(-1,2)$ and $(3,-1)$?
(1) $\sqrt{5}$ (3) 5
(2) $\sqrt{7}$ (4) 25

18 If the lengths of two sides of a triangle are 2 and 3, which *cannot* be the length of the third side of the triangle?
(1) 1   (3) 3
(2) 2   (4) 4

19 In right triangle ABC, m$\angle C = 90$ and m$\angle B = 40$. What is the measure of an exterior angle at vertex A?
(1) 50°   (3) 130°
(2) 90°   (4) 140°

20 The diagonals are *not* necessarily congruent in
(1) a parallelogram
(2) an isosceles trapezoid
(3) a square
(4) a rectangle

21 If the length of a diagonal of a square is 12, the length of a side of the square is
(1) 6   (3) $3\sqrt{2}$
(2) $6\sqrt{2}$ (4) $12\sqrt{2}$

22 The area of a rhombus is 100 and the length of one of its diagonals is 10. What is the length of the other diagonal?
(1) 10
(3) 50
(2) 20
(4) 40

23 Which point lies on the locus of points equidistant from $A(2,0)$ and $B(6,0)$?
(1) (0,4)
(3) (5,4)
(2) (2,5)
(4) (4,5)

24 The area of a circle is 16π. What is the length of a side of a regular hexagon inscribed in the circle?
(1) 8
(3) 6
(2) 2
(4) 4

25 A proof which lists all possibilities and then demonstrates that all possibilities except one lead to a contradiction is an example of
(1) circular reasoning
(2) indirect reasoning
(3) reasoning from the inverse
(4) reasoning from the converse

26 If both pairs of opposite sides of a quadrilateral are parallel and the diagonals are perpendicular, the quadrilateral *must* be a
(1) trapezoid
(3) rhombus
(2) rectangle
(4) square

27 If a line is vertical, its slope is
(1) zero
(3) negative
(2) positive
(4) undefined

28 Which is a regular polygon?
(1) equilateral triangle
(2) rhombus
(3) isosceles triangle
(4) isosceles trapezoid

29 What is the area of parallelogram $ABCD$ if $AB = 8$, $AD = 6$, and $m\angle A = 30$?
(1) 96
(3) $24\sqrt{3}$
(2) 48
(4) 24

30 In the diagram below of scalene triangle ADM, if $\overleftrightarrow{DR}$ is constructed as illustrated, what does $\overleftrightarrow{DR}$ represent?
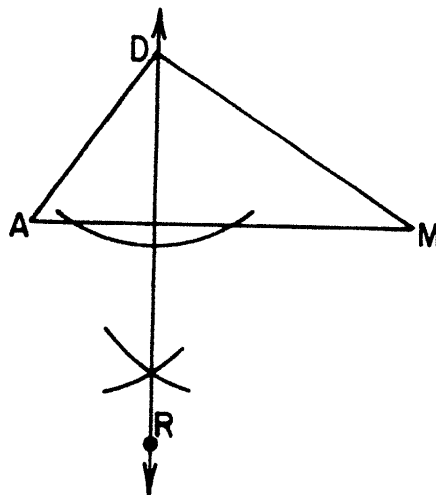
(1) the perpendicular bisector of $\overline{AM}$
(2) the bisector of $\angle ADM$
(3) a perpendicular to $\overline{AM}$
(4) the median to $\overline{AM}$

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 If two sides of a triangle are congruent, the angles opposite these sides are congruent. [10]

OR

   b If in a right triangle the altitude is drawn upon the hypotenuse, the two triangles thus formed are similar to the given triangle and similar to each other. [10]

32 Given: circle O with tangent $\overleftrightarrow{EAG}$, secant $\overline{EFC}$, and $m\widehat{AF}:m\widehat{FC}:m\widehat{CB}:m\widehat{BA}=3:5:6:4$.
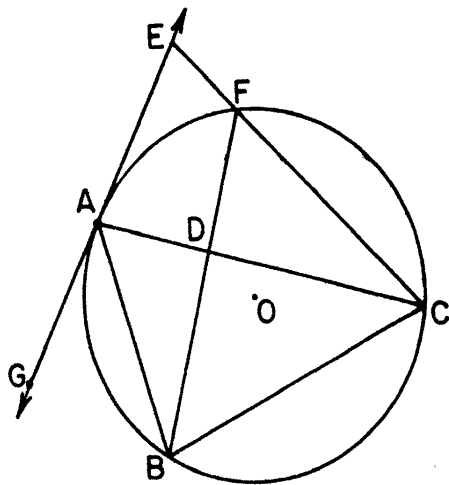
Find: a $m\widehat{AF}$ [2]
   b $m\angle BAC$ [2]
   c $m\angle AEC$ [2]
   d $m\angle FDC$ [2]
   e $m\angle GAB$ [2]

33 Given: $\triangle ABC$, $\overline{AC} \cong \overline{BC}$, and $\overline{CE} \cong \overline{CD}$. In $\triangle BCD$, $\overline{DF}$ is a median to $\overline{BC}$, and in $\triangle ACE$, $\overline{EG}$ is a median to $\overline{AC}$.
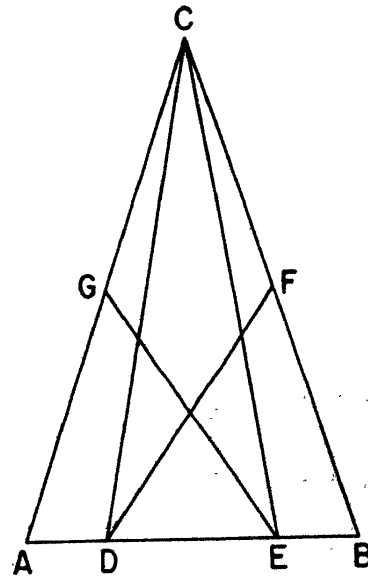
Prove: $\overline{EG} \cong \overline{DF}$ [10]

34 In quadrilateral $ABCD$, the coordinates of the vertices are $A(3,10)$, $B(11,10)$, $C(3,-2)$, and $D(-5,-2)$.
   a Using graph paper, draw quadrilateral $ABCD$. [1]
   b Show that $ABCD$ is a parallelogram, and state a reason for your conclusion. [6]
   c Find the area of $ABCD$. [3]

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35 Given: circle O with diameter $\overline{AB} \perp$ chord $\overline{CD}$, point P on $\overset{\frown}{AC}$. Chords $\overline{PC}$, $\overline{PD}$, $\overline{BC}$, and $\overline{PB}$ are drawn. Chords $\overline{PB}$ and $\overline{CD}$ intersect at S.
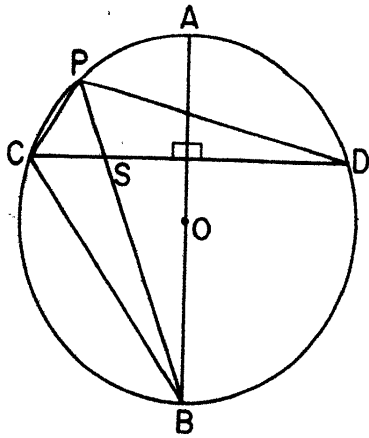
a Prove: $PS:PC = PD:PB$ [8]
b If $PS = 4$, $PC = 6$, and $PD = 9$, find PB. [2]

36 Given: isosceles triangle DEF with vertex $\angle F$, $\overline{FE}$ extended to G and $\overline{FD}$ extended to H so that $DH > EG$, and $\overline{HG}$ is drawn.
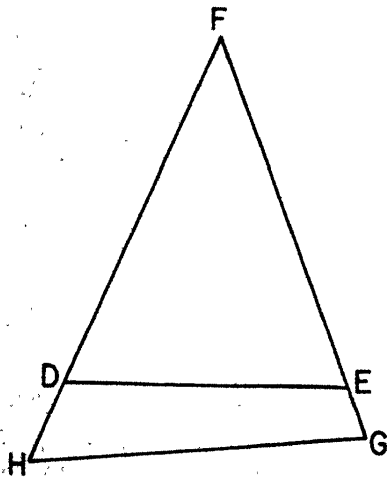
Prove: $m\angle FGH > m\angle FHG$ [10]

*37 Triangle ABC has vertices $A(5,7)$, $B(11,-1)$, and $C(3,3)$.
a Show that ABC is a right triangle and state a reason for your conclusion.   [5]
b Find the area of $\triangle ABC$.   [3]
c Write an equation of $\overset{\leftrightarrow}{AC}$.   [2]
* This question is based on an optional topic in the syllabus.

[7]

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

Tuesday, August 14, 1984 — 8:30 to 11:30 a.m., only

ANSWER SHEET

Pupil ....Teacher ....

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

[12]

FOR TEACHERS ONLY

10

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 13–30, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\overline{TX}$ or TX or p	(11) 4	(21) 2
(2) 6	(12) 3	(22) 2
(3) 11	(13) 1	(23) 4
(4) 8	(14) 3	(24) 4
(5) 90	(15) 2	(25) 2
(6) 35	(16) 2	(26) 3
(7) 6	(17) 3	(27) 4
(8) 20	(18) 1	(28) 1
(9) 400	(19) 3	(29) 4
(10) 24π	(20) 1	(30) 3

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 60   [2]

    b 60   [2]

    c 70   [2]

    d 90   [2]

    e 40   [2]

(35) b $13\frac{1}{2}$ [2]

(37) b 20   [3]

    c $y - 3 = 2(x - 3)$

                  or   [2]

       $y = 2x - 3$

(34) c 96   [3]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE II

Tuesday, August 14, 1984 — 8:30 to 11:30 a.m., only

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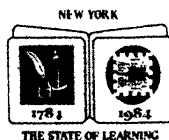
Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet. Where applicable, answers may be left in radical form.

1 If $a * b$ is a binary operation defined as $\dfrac{a - b}{2}$, evaluate $5 * 3$.

2 Using the accompanying table, find $(s * t) * (x * w)$.

*	s	t	w	x
s	x	s	t	w
t	s	t	w	x
w	t	w	x	s
x	w	x	s	t

3 Two parallel lines are cut by a transversal, forming a pair of alternate interior angles with measures $3x + 10$ and $7x - 30$. Find the value of x.

4 What is the positive root of the equation $x^2 + 7x - 8 = 0$?

5 Find the midpoint of the segment whose endpoints are $(3,2)$ and $(-7,4)$.

6 In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{DEB}$. If $m\angle CDE = m\angle DEA = 130$, find $m\angle BAE$.
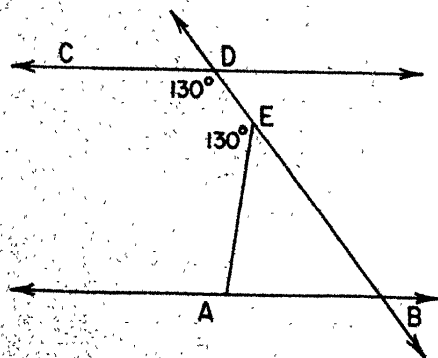

7 In rhombus $ABCD$, diagonal $AC = 16$ and diagonal $BD = 12$. Find the length of side $\overline{CD}$.

8 What is the length of the radius of a circle whose center is the origin and which passes through the point $(3,4)$?

9 How many different 5-letter permutations can be formed from the letters in the word "TITLE"?

10 In the accompanying diagram, rectangle $ABCD$ has length 12 and width 8. The midpoints of sides $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{DA}$ are connected to form quadrilateral $MNPQ$. Find the area of quadrilateral $MNPQ$.
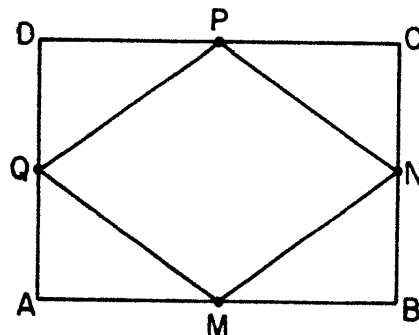
11 Write an equation of the line that is parallel to the x-axis and passes through the point $(-3,7)$.

12 Given the equations: $x = 0$
$$y = 0$$
$$y = x$$
$$y = x^2$$

If one of the equations is picked at random, what is the probability that the graph of the equation will pass through the origin?

13 Given isosceles trapezoid $ABCD$, with $\overline{AB} \parallel \overline{CD}$, $AB = 14$, $CD = 4$, and $AD = 13$. Find the length of an altitude of trapezoid $ABCD$.

Directions (14–34): 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.

14 In the accompanying diagram, *ABCD* is a square with diagonal $\overline{BD}$. Which statement is *not* true?
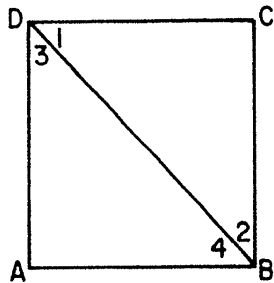
(1) $\angle 1 \cong \angle 2$ (3) $\overline{BD} \cong \overline{AD}$
(2) $\angle 2 \cong \angle 3$ (4) $\overline{CD} \cong \overline{BC}$

15 The lengths of the sides of a triangle are 14, 10, and 8. If the length of the shortest side of a similar triangle is 4, the length of the longest side of the similar triangle is
(1) 7   (3) 32
(2) 28   (4) 56

16 Given the true statements, "Jay loves the math team," and "If the math team does not win, then Jay does not love the math team." Which statement must also be true?
(1) The math team loses.
(2) The math team wins.
(3) The math team loves Jay.
(4) Jay does not love the math team.

17 Given the true statements:
   $J \vee \sim N$
   N

Which statement must also be true?
(1) J (3) $J \wedge \sim N$
(2) $\sim J$ (4) $\sim J \wedge N$

18 Which set of numbers can *not* represent the lengths of the sides of a triangle?
(1) $\{2,3,4\}$ (3) $\{3,1,1\}$
(2) $\{3,4,5\}$ (4) $\{3,4,4\}$

19 If the slope of $\overleftrightarrow{AB}$ is $\frac{2}{3}$ and $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$, what is the slope of $\overleftrightarrow{CD}$?

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

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

20 In $\triangle ABC$, $\overline{BD}$ and $\overline{AE}$ are medians. If $\overline{ED}$ is drawn, what is the ratio of $ED:AB$?
(1) 1:2   (3) 1:3
(2) 2:1   (4) 3:1

21 If $a \rightarrow b$ and $\sim c \rightarrow \sim b$ are both true statements, then which must also be true?
(1) $a \rightarrow c$ (3) $c \rightarrow a$
(2) $b \rightarrow a$ (4) $c \rightarrow b$

22 The table below defines the operation $\otimes$ for the set $S = \{1,3,5,7,9\}$. According to this table, which statement is *false*?

$\otimes$	1	3	5	7	9
1	1	3	5	7	9
3	3	9	5	1	7
5	5	5	5	5	5
7	7	1	5	9	3
9	9	7	5	3	1

(1) The identity element is 1.

(2) The set S is closed under $\otimes$.

(3) The operation $\otimes$ is commutative.

(4) Every element has an inverse.

23 In $\triangle ABC$, side $\overline{AC}$ is extended through point C to D, forming an exterior angle whose measure is 40. Which angle has the greatest measure?
(1) $\angle A$ (3) $\angle ACB$
(2) $\angle B$ (4) $\angle BCD$

24 Which quadrilateral always has congruent diagonals?
(1) parallelogram   (3) rhombus
(2) trapezoid   (4) rectangle

25 In clock 5, with elements $\{0,1,2,3,4\}$, the solution set of the equation $2x + 3 = 2$ is

(1) $\{1\}$ (3) $\{0\}$

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

26 The number of different 5-member cheerleading squads that can be selected from 8 people is represented by

(1) $_8P_3$ (3) $_5C_3$

(2) $_8P_5$ (4) $_8C_5$

27 In parallelogram $QRST$, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at point E. Which statement is always true?

(1) $\overline{QS} \perp \overline{RT}$ (3) $\triangle RES \cong \triangle TEQ$

(2) $\angle RQS \cong \angle SQT$ (4) $\triangle TQE \cong \triangle RQE$

28 What are the coordinates of the center of the circle whose equation is $(x + 2)^2 + (y - 1)^2 = 25$?

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

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

29 Which is an equation of the axis of symmetry of the parabola whose equation is $y = -3x^2 + 6x - 3$?

(1) $x = 1$ (3) $x = -1$

(2) $x = 2$ (4) $x = -2$

30 Which of the following is the negation of the statement $\forall_x \ x^2 > 25$?

(1) $\forall_x \ x^2 > 25$ (3) $\exists_x \ x^2 > 25$

(2) $\forall_x \ x^2 \le 25$ (4) $\exists_x \ x^2 \le 25$

31 When the altitude is drawn to the hypotenuse of a right triangle, the triangles formed *must* be

(1) congruent   (3) isosceles

(2) similar   (4) equal in area

32 The roots of $x^2 + 8x + 1 = 0$ are

(1) $-4 \pm \sqrt{15}$ (3) $4 \pm \sqrt{17}$

(2) $4 \pm \sqrt{15}$ (4) $-4 \pm \sqrt{17}$

33 Which statement is logically equivalent to $\sim(p \lor \sim q)$?

(1) $p \land \sim q$ (3) $\sim p \lor q$

(2) $\sim p \land q$ (4) $\sim p \land \sim q$

34 In a plane, the total number of points equidistant from two parallel lines 6 centimeters apart, and also 3 centimeters from a point on one of the lines is

(1) 1   (3) 3

(2) 2   (4) 0

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

35 *On the answer sheet*, construct an angle congruent to $\angle ABC$ using $\overrightarrow{EF}$ as one side.

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 Given: elements P, Q, R, and S and operations @ and $*$ as defined by the accompanying tables.

@	P	Q	R	S
P	S	Q	P	R
Q	Q	Q	Q	Q
R	P	Q	R	S
S	R	Q	S	P

$*$	P	Q	R	S
P	Q	P	S	R
Q	P	Q	R	S
R	S	R	Q	P
S	R	S	P	Q

a What is the identity element for @? [2]
b What is the inverse of P under the operation $*$? [2]
c Evaluate: $S @ (P * R)$ [2]
d Evaluate: $(S @ P) * (S @ R)$ [2]
e Solve for x: $(x @ R) * S = Q$ [2]

37 a Draw the graph of the equation $y = x^2 - 5$ including all values of x from $x = -4$ to $x = 4$. [5]

b Using a compass, construct the graph of $x^2 + y^2 = 25$ on the same set of axes used in part a. [2]

c Determine the coordinates of all points of intersection of the graphs drawn in parts a and b. [3]

38 In triangle ABC, $m\angle C = 90$, $AC = x$, $BC = x + 3$, and $AB = x + 5$.

a Write an equation in terms of x which can be used to find AC. [3]
b Find AC. [Answer may be left in radical form.] [7]

39 The vertices of $\triangle ABC$ are $A(-2,2)$, $B(5,-3)$, and $C(1,7)$. Median $\overline{AE}$ is drawn to side $\overline{BC}$.

a Find the coordinates of point E. [2]
b Write an equation of line $\overleftrightarrow{AE}$. [2]
c Find the slope of the line passing through points A and C. [2]
d Write an equation of the line which passes through point E and is parallel to side $\overline{AC}$. [2]
e Find the area of $\triangle ACE$. [2]

40 A committee of 6 is to be chosen from a group of 5 sophomores and 4 juniors.
a How many different 6-member committees are possible? [3]
b How many of these committees consist of 4 sophomores and 2 juniors? [3]
c What is the probability that one of the 6-member committees consists of 4 sophomores and 2 juniors? [2]
d What is the probability that a 6-member committee contains no junior? [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. Show all work unless otherwise directed.

41 Given: quadrilateral $ABCD$, $\overline{AC}$ bisects $\overline{BD}$ at E, and $\angle 1 \cong \angle 2$.
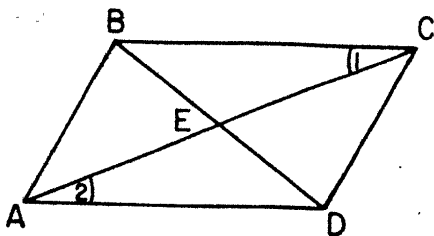
Prove: $ABCD$ is a parallelogram. [10]

42 The vertices of triangle ABC are $A(1,2)$, $B(5,4)$, and $C(7,0)$. Prove that ABC is an isosceles right triangle. [10]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE II

Tuesday, August 14, 1984 — 8:30 to 11:30 a.m., only

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
6 . . . .   16 . . . .   26 . . . .   other side of
                                                                                                                      this sheet.
7 . . . .   17 . . . .   27 . . . .

8 . . . .   18 . . . .   28 . . . .

9 . . . .   19 . . . .   29 . . . .

10 . . . .   20 . . . .   30 . . . .

35

A

B   C

E   F

FOR TEACHERS 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 14–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 1	(11) $y = 7$	(21) 1	(31) 2
(2) x	(12) 1	(22) 4	(32) 1
(3) 10	(13) 12	(23) 3	(33) 2
(4) 1	(14) 3	(24) 4	(34) 1
(5) $(-2,3)$ *or* $\begin{array}{l} x = -2 \\ y = 3 \end{array}$	(15) 1	(25) 2	(35) construction
(6) 80	(16) 2	(26) 4	
(7) 10	(17) 1	(27) 3	
(8) 5	(18) 3	(28) 2	
(9) 60	(19) 4	(29) 1	
(10) 48	(20) 1	(30) 4	

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.

(36) a R   [2]
     b P   [2]
     c P   [2]
     d P   [2]
     e S   [2]

(37) c (3, 4)
        (−3, 4)
        (0, −5)   [3]

(38) a $x^2 + (x + 3)^2 = (x + 5)^2$ [3]

     b $2 + 2\sqrt{5}$ *or* $\dfrac{4 + \sqrt{80}}{2}$.   [7]

(39) a (3, 2)   [2]
     b $y = 2$ [2]
     c $\dfrac{5}{3}$ [2]
     d $y - 2 = \dfrac{5}{3}(x - 3)$ *or* $3y - 5x = -9$ [2]
     e $12\dfrac{1}{2}$ [2]

(40) a 84   [3]
     b 30   [3]
     c $\dfrac{30}{84}$ [2]
     d 0   [2]