The University of the State of New York

10

REGENTS HIGH SCHOOL EXAMINATION

TENTH YEAR MATHEMATICS

Tuesday, August 17, 1965 — 8:30 to 11:30 a.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. When you have finished the heading, you may begin the examination immediately.

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet.

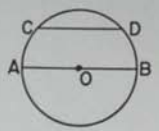
1 Each exterior angle of a regular polygon contains 40 degrees. Find the number of sides of the polygon.

2 Triangle ABC is inscribed in a circle. If arc $AB = 140°$ and arc $BC = 60°$, find the number of degrees in angle ABC.

3 The perimeter of an equilateral triangle is 18. Find the length of the line segment joining the midpoints of two sides of the triangle.

4 A side of a rhombus is 20 and the longer diagonal is 32. Find the length of the shorter diagonal.

5 In circle O, chord CD is parallel to diameter AB and arc $BD = 40°$. Find the number of degrees in minor arc CD.



6 The bases of a trapezoid are 10 and 18. If the area of the trapezoid is 112, find the length of the altitude of the trapezoid.

7 In rectangle $ABCD$, diagonal AC makes an angle of 37° with base AB. If $AC = 20$, find the length of BC to the *nearest integer*.

8 How many points are there which are equidistant from two intersecting lines and also 5 inches from their point of intersection?

9 If the coordinates of points A and B are $(-2,3)$ and $(5,1)$, respectively, find in radical form the length of the segment AB.

10 The perimeters of two similar polygons are in the ratio 2:5. Find the ratio of the area of the smaller polygon to the area of the larger polygon.

11 From external point P two tangents are drawn to circle O so as to intercept an arc of 60°. Find the number of degrees in angle P.

12 Chords AB and CD intersect at point R within circle O. If $AR = 8$, $RB = 3$ and $CR = 6$, find the length of RD.

13 The hypotenuse of an isosceles right triangle is 2. Find in radical form the length of one of the legs.

14 In triangle ABC, D is a point on AC and E is a point on BC such that $DE \parallel AB$. If $AD = 12$, $DC = 4$ and $BC = 12$, find the length of EC.

15 Find in radical form the length of the altitude of an equilateral triangle whose side is 6.

16 Find the coordinates of the midpoint of the line segment joining the points whose coordinates are $(2,4)$ and $(0,-3)$.

17 In triangle ABC, angle B is 60° and angle A is less than angle B. Which is the longest side of the triangle?

18 In right triangle ABC, D is the midpoint of the hypotenuse AB. If the length of AB is represented by $2x + 6$, express the length of CD in terms of x.

19 Two parallel lines are cut by a transversal. The interior angles on the same side of the transversal are represented by x degrees and $2x - 60$ degrees. Find x.

20 In a circle whose radius is 15, a minor arc is intercepted by a central angle of 120°. Find in terms of π the length of this arc.

21 In right triangle ABC with the right angle at C, CD is the altitude to AB. If $AD = 4$ and $DB = 5$, find the length of AC.

22 A tangent and a secant are drawn to a circle from an external point. The circle divides the secant into internal and external segments of lengths 6 and 2, respectively. Find the length of the tangent.

23 Two adjacent sides of a parallelogram are 10 and 12 and the included angle is 30°. Find the area of the parallelogram.

Directions (24–28): For *each* statement or question, write on the separate answer sheet the *number* preceding the word or expression that, of those given, best completes the statement or answers the question.

24 In *scalene* triangle ABC, median AD divides $\triangle ABC$ into two triangles that are
(1) congruent
(2) equal in area
(3) similar
(4) right

25 In triangle ABC with right angle at C, the perpendicular bisectors of sides AC and BC
(1) intersect outside the triangle
(2) intersect inside the triangle
(3) intersect on the hypotenuse
(4) do not intersect

26 If the length of the diameter of a circle is represented by $2x$, the area is represented by
(1) πx^2
(2) $2\pi x^2$
(3) $2\pi x$
(4) $4\pi x^2$

27 Given: "All class officers are members of the student council." Which statement expresses a conclusion that follows logically from this given statement?
(1) All members of the student council are class officers.
(2) If a student is not a member of the student council, he is not a class officer.
(3) If a student is not a class officer, he is not a member of the student council.
(4) If a student is a member of the student council, he is a class officer.

28 Two right triangles are *not* necessarily congruent if
(1) the legs of one are equal respectively to the legs of the other
(2) the acute angles of one are equal respectively to the acute angles of the other
(3) the hypotenuse and leg of one are equal respectively to the hypotenuse and leg of the other
(4) the hypotenuse and an acute angle of one are equal respectively to the hypotenuse and an acute angle of the other.

Directions (29–30): Leave all construction lines on the answer sheet.

29 *On the answer sheet,* inscribe a square in circle O.

30 *On the answer sheet,* construct a circle that passes through the points A, B and C.

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

Part II

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

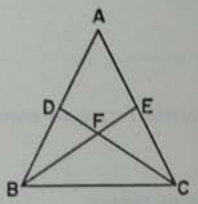
31 Prove *either* *a* or *b* but *not* both: [10]

a The sum of the angles of a triangle is equal to a straight angle.

OR

b The square of the hypotenuse of a right triangle is equal to the sum of the squares of the legs.

32 In the accompanying figure, the points D and E are the midpoints of the equal sides AB and AC of the isosceles triangle ABC. The lines BE and CD intersect in F.



Prove:

$\triangle BFD \cong \triangle CFE$ [10]

33 The vertices of triangle ABC are A (1,—2), B (5,6) and C (—3,2).

a Using graph paper, draw triangle ABC. [1]

b Find the coordinates of the midpoint D of the side AC. [2]

c Find in radical form the length of the median BD. [2]

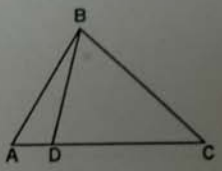
d Show by coordinate geometry that median BD is perpendicular to side AC. [5]

34 The diagonals AC and BD of the rectangle $ABCD$ intersect in point E. If angle $AEB = 108°$ and $AB = 44$, find to the *nearest integer*

a the length of BC [6]

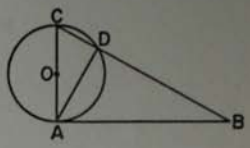
b the length of AC [4]

35 In the accompanying figure of triangle ABC, $BC > AB$. Point D is on AC and BD is drawn.



Prove: $BC > BD$ [10]

36 In the accompanying figure, AC is a diameter, AB is tangent to circle O at point A and BDC is a secant. If $CD = 4$ and $DB = 12$, find



a in radical form the length of AD [3]

b the length of the diameter AC [2]

c the number of degrees in the minor arc AD [2]

d in terms of π the length of the minor arc AD [3]

*37 Given the trapezoid $ABCD$ with the longer base AB and the shorter base DC. The coordinates of the vertices are

A (7,—3), B $(2k,2)$, C $(k,5)$ and D (3,2).

If k is positive,

a express the slope of AB and DC in terms of k [2, 2]

b write an equation which can be used to solve for k [2]

c solve for k the equation written in answer to part *b* [2]

d write an equation of the line passing through B and D [2]

*This question is based on an optional topic in the syllabus.

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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.....	9.....	17.....
2.....	10.....	18.....
3.....	11.....	19.....
4.....	12.....	20.....
5.....	13.....	21.....
6.....	14.....	22.....
7.....	15.....	23.....
8.....	16.....	24.....

Part I Score:.....

Rater's Initials:

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Questions 25 through 30 should be answered on the back of this page.

[OVER]

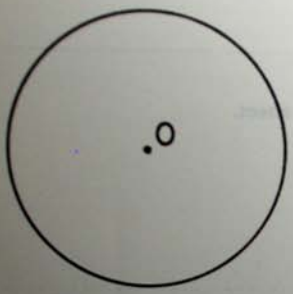
25.....

26.....

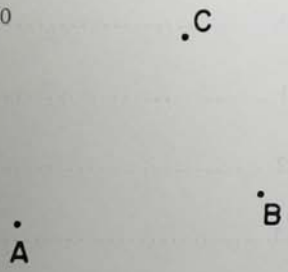
27.....

28.....

29



30



I do so declare.....
(Signature)

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FOR TEACHERS ONLY

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SCORING KEY

TENTH YEAR MATHEMATICS

Tuesday, August 17, 1965 — 8:30 to 11:30 a.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 24–28, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3 or 4.

(1) 9

(2) 80

(3) 3

(4) 24

(5) 100

(6) 8

(7) 12

(8) 4

(9) $\sqrt{53}$

(10) $\frac{4}{25}$

(11) 120

(12) 4

(13) $\sqrt{2}$

(14) 3

(15) $3\sqrt{3}$ *or* $\sqrt{27}$

(16) $(1, \frac{1}{2})$

(17) AB

(18) $x + 3$

(19) 80

(20) 10π

(21) 6

(22) 4

(23) 60

(24) 2

(25) 3

(26) 1

(27) 2

(28) 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.

(33) *b* (−1, 0) [2]
c $6\sqrt{2}$ *or* $\sqrt{72}$ [2]

(34) *a* 32 [6]
b 54 [4]

(36) *a* $4\sqrt{3}$ *or* $\sqrt{48}$ [3]
b 8 [2]
c 120 [2]
d $\frac{8\pi}{3}$ [3]

(37) *a* $\frac{5}{2k-7}, \frac{3}{k-3}$ [2, 2]
b $\frac{5}{2k-7} = \frac{3}{k-3}$ [2]
c $k = 6$ [2]
d $y = 2$ [2]