## The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## TENTH YEAR MATHEMATICS

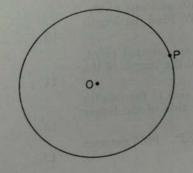
Tuesday, January 20, 1959 — 9:15 a.m. to 12:15 p.m., only

Name of pupil	Name of school	
Name and author of textbook used		
	Part I	
	ch correct answer will receive 2 credits. No partial credit newers may be left in terms of $\pi$ or in radical form.	wil
1 The hypotenuse of a right triangle is a of the other leg.	7 and one leg is 4. Find the length 1	
2 Find the area of an equilateral triangle	whose side is 10.	
3 Find the area of a right triangle wh and $C(0, 5)$ .		
4 Find the radius of a circle whose circ	umference is 16π. 4	
5 How many degrees are there in an e of 9 sides?		
6 The angles of a triangle are represented and $(2x + 30)$ degrees. Find $x$ .	ed by $x$ degrees, $(x-10)$ degrees 6	-
7 Two sides of a parallelogram are 8 ar Find the area of the parallelogram.	nd 12 and include an angle of 30°.	
8 The perimeter of a regular polygon is the area of the polygon.	60 and its apothem is $5\sqrt{3}$ . Find	
9 Tangents PA and PB drawn from an an angle of 80°. If radii OA and O degrees in angle AOB.	b are drawn, and the number of	
10 The altitude to the hypotenuse of a segments of the hypotenuse made by of the other segment.	the attitude is 3. Find the length	
11 A tangent and a secant are drawn to The secant is 16 and its external segretangent.	o a circle from an external point. ment is 4. Find the length of the	
12 The areas of two similar triangles are triangle is 8. Find the length of the triangle.	11	
13 In a circle whose radius is 10, the angle of the sector.	e of a sector is 72°. Find the area	
	13	

[OVER]

- 2	4 Find the distance from point A(6, 5) to point B(1, 2).	14
1	S M is the midpoint of line segment $AB$ . The coordinates of point A are $(S, -3)$ and of point M are $(S, 7)$ . Find the coordinates of point B.	15
10	Write an equation of the locus of points whose ordinates are four times their abscissas.	16
	Directions (17-24): Indicate the correct completion for each of the fithe line at the right the letter a, b, or c.	ollowing by writing or
1	7 A circle whose radius is 7 has its center at the origin. The point (5, (a) outside the circle (b) on the circle (c) inside the circle	5) is 17
1	8 The diagonals of parallelogram $ABCD$ intersect in point $P$ . Triangles and $DPC$ must be (a)congruent (b)similar (c)equal in area	APD 18
1	9 In triangle ABC, D is a point on AB, E is a point on AC and DE is d $AD = 6$ , $DB = 4$ , $AC = 15$ . In order for DE to be parallel to BC, the l of EC must be (a) 4 (b) 6 (c) 10	rawn. ength
2	O In triangle ABC, the exterior angle at A is equal to 120°. If angle B is grathan angle C, the longest side of the triangle is (a) AB (b) BC (c)	eater AC 20
2	The locus of points at a given distance from a line consists of $(a)$ a consists of $(b)$ a line $(c)$ two lines	ircle 21
2	22 All members of the Parabola Club must be majoring in mathematics. Elle majoring in mathematics. Therefore, Ellen is a member of the Parabola C This argument is an illustration of (a) indirect reasoning (b) reason from a converse (c) reasoning from a contrapositive	lub.
	A student gives the following statement as a definition of a parallelogram: parallelogram is a quadrilateral whose opposite sides are equal and parallelogram to finformation contained in this statement as a definition is (a)t little (b) just enough (c) too much	23
2	The bisectors of angle $A$ and angle $B$ of triangle $ABC$ intersect in point $ABC$ . The bisector of angle $B$ intersect in point $B$ through $B$ intersect in point $B$ through $B$ intersect in point $B$ in $B$ intersect in point $B$ intersect in $B$ in $B$ intersect in $B$ in $B$ intersect in $B$ intersect in $B$ in $B$ intersect in $B$ in $B$ in $B$ intersect in $B$ in	P. es 24
-	25 Construct a tangent to circle O at point P.	

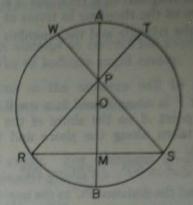
25 Construct a tangent to circle O at point P.



### Part II

Answer three questions from this part.

26 Prove: An angle formed by two chords intersecting inside the circle is measured by one-half the sum of the intercepted arcs. [10]



27 In circle O, diameter AB is perpendicular to chord RS at M. Chords SW and RT both intersect AB at P.

a Prove:  $\angle R = \angle S$ . [4] b Prove: RT = SW. [6]

28 In triangle ABC, medians AD and BE drawn to sides BC and AC, respectively, intersect at K. ED is drawn.

a Prove: ED is parallel to AB. [3]

b Prove:  $\frac{ED}{AB} = \frac{EK}{KB}$ . [5]

 $\varepsilon$  Find the numerical value of the ratio  $\frac{EK}{KB}$ . [2]

29 Prove: The area of a trapezoid is equal to one-half the product of the altitude and the sum of the bases. [10]

30 In circle O, radii OA and OB and chord AB are drawn. The point P is taken on radius OA and PB is drawn.

Prove: PB is greater than PA. [10]

\*31 The points A(-3, -1), B(9, 3), C(4, 6) and D(1, k) are the vertices of a trapezoid whose bases are AB and DC.

a Find the slope of AB. [2]

b Express the slope of DC in terms of k. [2]

c Using the results found in answer to parts a and b, find the value of k. [2]

d Show by means of slopes that AB passes through the origin. [2]

e Write an equation of AB. [2]

\* This question is based on one of the optional topics in the syllabus and may be used in place of any question in either part II or part III.



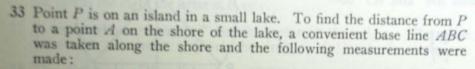
#### Part III

Answer two questions from this part. Show all work.

32 a The base of a triangle is represented by x and its altitude by x + 4. Express the area of the

b One diagonal of a rhombus is 6 and the other diagonal is represented by x + 8. Express the

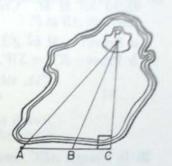
c If the triangle and the rhombus are equal in area, find the length of the base of the triangle. [6]



$$\angle A = 50^{\circ}$$
,  $\angle PBC = 70^{\circ}$ ,  $\angle C = 90^{\circ}$  and  $BC = 150$  yards.

a Find the distance PC to the nearest yard. [4]

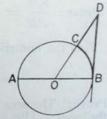
b Using the result found in answer to part a, find the distance AP to the nearest yard. [6]



34 In circle O, AB is a diameter. Radius OC is extended to meet the tangent BD at D. Arc AC and arc CB are in the ratio 2:1, and AB = 16.

a Find the number of degrees in arc BC. [2]

b Find, to the nearest integer, the perimeter of the figure bounded by BD, DC and arc CB. [Use the approximation  $\pi = 3.14$ .] [8]



35 A triangle whose vertices are A(1, 2), B(7, 10) and C(-1, 6) is inscribed in a circle.

a Using the lengths of the sides, show that triangle ABC is a right triangle. [6]

b Find the coordinates of the center of the circumscribed circle. [2]

c Find the area of the circle. [Answer may be expressed in terms of  $\pi$ .]

# FOR TEACHERS ONLY

10

# INSTRUCTIONS FOR RATING TENTH YEAR MATHEMATICS

Tuesday, January 20, 1959 — 9:15 a.m. to 12:15 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 check marks 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 17-24, allow credit if the pupil has written the correct answer instead of the letter a, b, or c.

(1)	$\sqrt{33}$	or	5.7
-----	-------------	----	-----

(2) 
$$25\sqrt{3}$$
 or 43.3

(8) 
$$150\sqrt{3}$$
 or  $259.5$ 

(14) 
$$\sqrt{34}$$
 or 5.8

(16) 
$$y = 4x$$