Name of pupil..Name of school..

Name and author of textbook used..

Name of teacher..

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed.

1 Two consecutive angles of a parallelogram contain x degrees and $(x + 20)$ degrees. Find the value of x.

1................

2 The area of a trapezoid is 42 square inches and the bases are 6 inches and 8 inches. Find the number of inches in the length of the altitude of the trapezoid.

2................

3 Find the number of degrees in the sum of the interior angles of a polygon of 13 sides.

3................

4 From point P outside a circle, tangent PA and secant PBC are drawn. If $PB = 3$ and $BC = 9$, find the length of tangent PA.

4................

5 Find the distance between the points whose coordinates are $(-2,4)$ and $(2,7)$.

5................

6 The circumference of a circle is 24π. If a central angle of $45°$ intercepts arc AB, find in terms of π the length of minor arc AB.

6................

7 The number of degrees in angle ABC inscribed in circle O is 70. Find the number of degrees in central angle AOC.

7................

8 Two tangents, PA and PB, are drawn to circle O from an external point P. If major arc AB contains $250°$, find the number of degrees in angle P.

8................

9 In parallelogram $ABCD$, $AB = 8$ inches, $AD = 6$ inches and angle $A = 30°$. Find the number of square inches in the area of the parallelogram.

9................

10 The side of a regular polygon of n sides is 3 and its apothem is a. Express the area of the polygon in terms of a and n.

10................

11 Find in radical form the number of square inches in the area of an equilateral triangle whose perimeter is 6 inches.

11................

12 Find the number of square units in the area of the triangle whose vertices are the points A $(2,0)$, B $(6,0)$ and C $(6,5)$.

12................

13 Write an equation of the locus of points whose ordinates are 3 less than twice their abscissas.

13................

[1]

[OVER]

14 The angle of a sector of a circle contains $120°$ and the area of the sector is 27π square inches. Find the number of inches in the length of the radius of this circle.

14...............

15 In $\triangle ABC$, a line parallel to AC intersects AB at D and CB at E. If $DB = 10$, $AD = 5$ and $AC = 6$, find the length of DE.

15...............

16 In rectangle $ABCD$, E is the midpoint of AB and F is the midpoint of AD. If $EF = 8$, find the length of a diagonal.

16...............

17 Find in radical form the length of a side of a square whose diagonal is 4.

17...............

18 In circle O, chord AB bisects chord CD at E. If $AE = 4$ and $EB = 9$, find the length of chord CD.

18...............

19 The circumference of a circle is 10π. Find the perimeter of a regular hexagon inscribed in this circle.

19...............

20 In triangle ABC, angle $C = 90°$, $AB = 12$ and angle $A = 31°$. Find BC to the nearest tenth.

20...............

21 The areas of two similar triangles are in the ratio $4:9$. If a side of the smaller triangle is 10, find the length of the corresponding side of the larger triangle.

21...............

Directions (22–29): Write on the line at the right of *each* of the following the *number* preceding the expression that best completes the statement or answers the question.

22 Which arrangement represents the sequence in which the definition of the terms below should be given?
  (1) polygon, triangle, right triangle, hypotenuse
  (2) polygon, triangle, hypotenuse, right triangle
  (3) triangle, hypotenuse, polygon, right triangle
  (4) triangle, polygon, right triangle, hypotenuse

22.......

23 If the radius of a circle is doubled, then the
  (1) circumference and the area are both doubled
  (2) circumference and the area are both multiplied by 4
  (3) circumference is doubled and the area is multiplied by 4
  (4) circumference is multiplied by 4 and the area is doubled

23.......

24 Which set of numbers may represent the lengths of the sides of a right triangle?
  (1) 20, 30, 40   (3) 30, 40, 60
  (2) 30, 40, 50   (4) 40, 50, 90

24.......

25 The center of a circle inscribed in a triangle must be the intersection of the
  (1) altitudes   (3) medians
  (2) angle bisectors   (4) perpendicular bisectors of the sides

25.......

26 A median of a triangle divides that triangle into two triangles which must be
  (1) isosceles   (3) similar
  (2) congruent   (4) equal in area

26.......

[2]

27 The total number of points which are equidistant from two intersecting lines and also 5 inches from their point of intersection is

   (1) 1   (3) 3

   (2) 2   (4) 4   27......

28 If, in $\triangle ABC$, angle $A = 60°$ and angle $B > 60°$, which statement concerning the sides of the triangle is true?

   (1) AB is the shortest.   (3) BC is the shortest.

   (2) AB is the longest.   (4) BC is the longest.   28......

29 Two right triangles must be congruent if

   (1) the hypotenuse of the one triangle is equal to the hypotenuse of the other

   (2) an acute angle of the one triangle is equal to an acute angle of the other

   (3) two legs of the one triangle are equal to the two legs of the other

   (4) the altitude on the hypotenuse of the one triangle is equal to the altitude on the hypotenuse of the other   29......

Directions (30) : Leave all construction lines on the paper.

30 Inscribe a square in circle O.
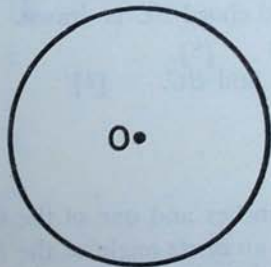
Part II

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

31 Prove *either* a or b but *not* both: [10]
  a An angle inscribed in a circle is measured by one-half its intercepted arc. [Consider only the case where one side of the angle is a diameter.]

  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, BD is tangent to the circle at D. $\angle ABD = 60°$, arc $CF = 130°$ and arc $DF = 40°$.
  a Find the number of degrees in $\angle BDC$. [3]
  b Find the number of degrees in minor arc AD. [4]
  c Find the number of degrees in $\angle CDA$. [3]

33 a Using graph paper, plot the points A (8,0) and B (0,4). [1]
  b Find the coordinates of the midpoint of line segment AB. [2]
  c Describe fully the locus of points equidistant from A and B. [2]
  d Show by means of coordinate geometry that point P (1,–3) is *not* equidistant from A and B. [5]

34 In the accompanying figure, BD is a diameter of circle O. Chord AC is perpendicular to BD at E and chord BC is drawn.
  a Prove: $BE \times BD = \overline{BC}^2$ [8]
  b If $BE = 8$ and $ED = 10$, find BC. [2]
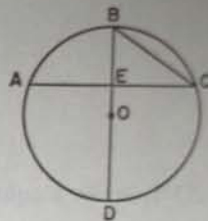
35 A side of a rhombus is 7.5 inches and one of the diagonals is 12.4 inches.
  a Find to the *nearest degree* an *acute* angle of the rhombus. [6]
  b Find to the *nearest tenth of an inch* the length of the other diagonal. [4]

36 In the accompanying figure, $EF = DF$ and $\angle EFC = \angle DFC$.
  Prove $AC = BC$. [10]
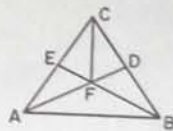
*37 The vertices of quadrilateral $ABCD$ are A (4,0), B (12,6), C (8,10) and D (0,4).
  a Using graph paper, plot these vertices and draw the quadrilateral. [2]
  b Show that quadrilateral $ABCD$ is a parallelogram. [4]
  c Write an equation for DC. [4]

*This question is based on one of the optional topics in the syllabus.

[4]

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

SCORING KEY
TENTH YEAR MATHEMATICS
Tuesday, June 16, 1964 — 1:15 to 4:15 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 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 22–29, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3 or 4.

(1) 80

(2) 6

(3) 1,980

(4) 6

(5) 5

(6) 3π

(7) 140

(8) 70

(9) 24

(10) $\dfrac{3}{2} a n$

(11) $\sqrt{3}$

(12) 10

(13) $y = 2x - 3$

(14) 9

(15) 4

(16) 16

(17) $2\sqrt{2}$

(18) 12

(19) 30

(20) 6.2

(21) 15

(22) 1

(23) 3

(24) 2

(25) 2

(26) 4

(27) 4

(28) 1

(29) 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* 85   [3]
      b 160   [4]
      c 15   [3]

(33) *b* (4,2)   [2]
      c A line which is the perpendicular bisector of *AB*   [2]

(34) *b* 12   [2]

(35) *a* 68   [6]
      b 8.4   [4]

(37) *c* $y = \tfrac{1}{4}x + 4$ [4]