

different

COPY # 00060

**SVCC MATH CONTEST
GEOMETRY**

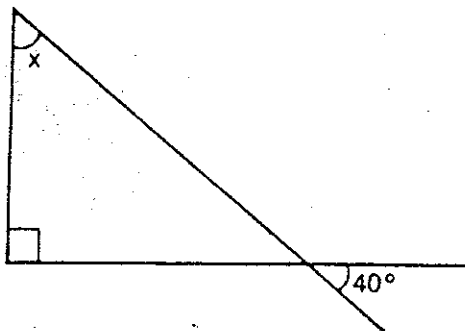
TIME: 50 Minutes

60 Problems

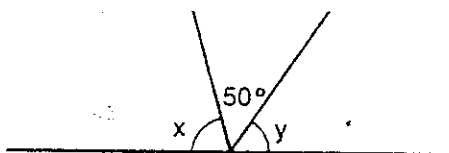
DIRECTIONS: For this test, solve each problem. Then indicate the best answer in the appropriate space on the answer sheet. Plan and use your time wisely.

Please do not write on this test booklet.

1 What is the measure of angle x ?

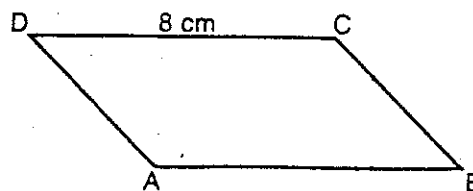


- A 40°
 - B 50°
 - C 80°
 - D 90°
 - E NONE OF THE ABOVE
- 2 What is the circumference of a circle that has a diameter of 6 ?
- A 6π
 - B 9π
 - C 12π
 - D 36π
 - E NONE OF THE ABOVE
- 3 What is the measure of angle x plus angle y ?

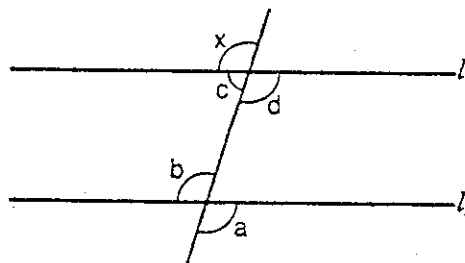


- A 80°
- B 100°
- C 115°
- D 130°
- E NONE OF THE ABOVE

4 The perimeter of parallelogram $ABCD$ is 26 centimeters. What is the length of \overline{AD} ?

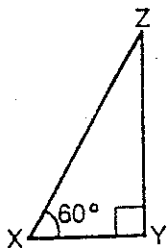


- A 5 cm
 - B 9 cm
 - C 10 cm
 - D 18 cm
 - E NONE OF THE ABOVE
- 5 Which of the following statements concerning the diagonals of a square are true?
- I. The diagonals are equal.
 - II. The diagonals are perpendicular to each other.
 - III. The diagonals bisect each other.
- A I and II only
 - B I and III only
 - C II and III only
 - D I, II, and III
 - E NONE OF THE ABOVE
- 6 In this figure l_1 is parallel to l_2 . Which of the following angles is *not* equal to angle x ?

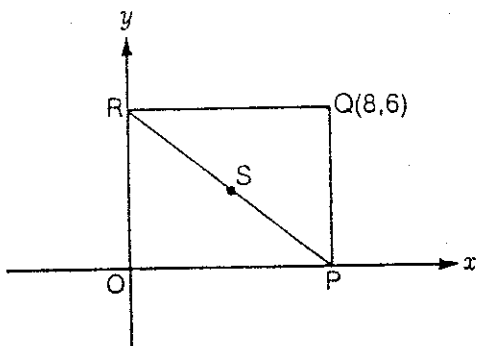


- A a
- B b
- C c
- D d
- E NONE OF THE ABOVE

- 7 In triangle XYZ, if $XZ = 10$, what is the length of \overline{XY} ?

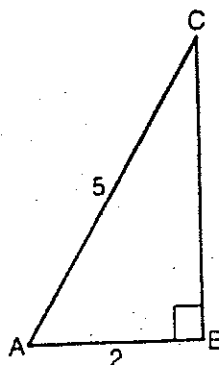


- A 5
 B $5\sqrt{2}$
 C 6
 D $5\sqrt{3}$
 E NONE OF THE ABOVE
- 8 In this figure, OPQR is a rectangle and point S is the midpoint of diagonal PR. What are the coordinates of point S?



- A (4, 4)
 B (4, 3)
 C (3, 4)
 D (3, 3)
 E NONE OF THE ABOVE

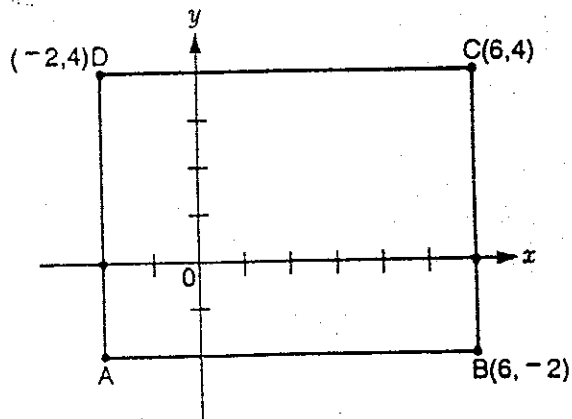
- 9 In triangle ABC, what is the length of \overline{BC} ?



- A $\sqrt{3}$
 B $\sqrt{7}$
 C $\sqrt{21}$
 D $\sqrt{29}$
 E NONE OF THE ABOVE
- 10 If the radius of a semicircular region is 5 centimeters, what is the area of the region in square centimeters?

- A $\frac{5\pi}{2}$
 B 5π
 C 10π
 D $\frac{25\pi}{2}$
 E NONE OF THE ABOVE

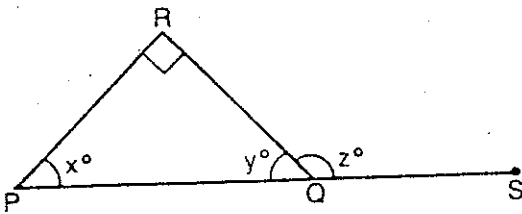
- 11 What is the area of rectangle ABCD?



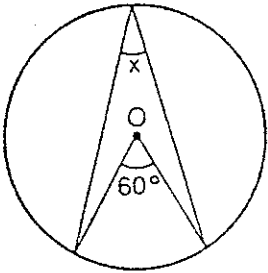
- A 24
 B 32
 C 36
 D 48
 E NONE OF THE ABOVE

Go On

- 12 In this figure, $PR = RQ$. Which of the following must be true?

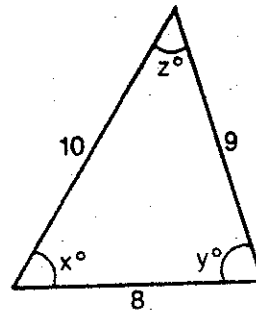


- I. $\angle x = \angle y$
 II. $\angle z = 135^\circ$
 III. $\frac{PR}{PQ} = \sqrt{3}$
- A I only.
 B II only
 C I and II only
 D I, II, and III
 E NONE OF THE ABOVE
- 13 This circle has its center at point O. What is the measure of angle x ?



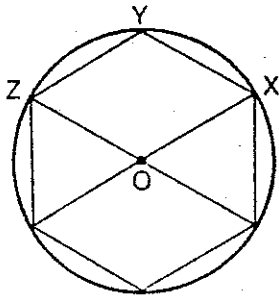
- A 15°
 B 30°
 C 60°
 D 120°
 E NONE OF THE ABOVE

- 14 In this triangle, x , y , and z are angle measures. Which of the following statements is true?

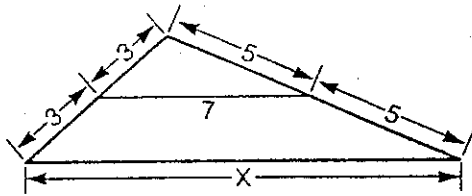


- A $x^\circ < y^\circ < z^\circ$
 B $y^\circ < x^\circ < z^\circ$
 C $z^\circ < y^\circ < x^\circ$
 D $z^\circ < x^\circ < y^\circ$
 E NONE OF THE ABOVE
- 15 In a plane, the set of all points that are equidistant from points P and Q is
- A the midpoint of \overline{PQ}
 B a circle with center on \overline{PQ}
 C a pair of segments parallel to \overline{PQ}
 D the perpendicular bisector of \overline{PQ}
 E NONE OF THE ABOVE

- 16 In this circle with its center at point O , the perimeter of an inscribed regular hexagon is 36. What is the perimeter of quadrilateral $OXYZ$?

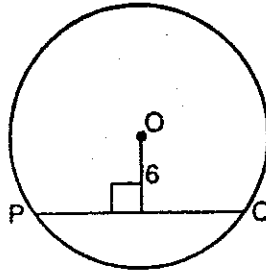


- A 12
 B 18
 C 24
 D The perimeter cannot be determined from the information given.
 E NONE OF THE ABOVE
- 17 In this triangle, what is the value of X ?

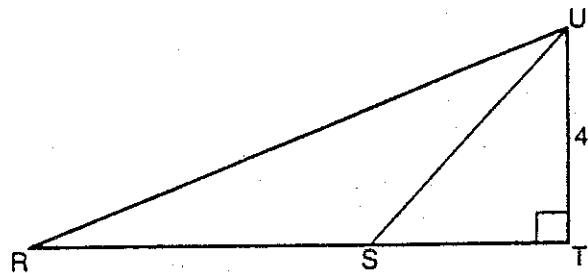


- A 7
 B 10
 C 12
 D 14
 E NONE OF THE ABOVE

- 18 In this circle with its center at point O and radius of 10, what is the length of chord PQ ?



- A 8
 B 12
 C 16
 D 20
 E NONE OF THE ABOVE
- 19 If the sum of the angle measures of a polygon is 540 degrees, how many sides does the polygon have?
- A five
 B six
 C seven
 D eight
 E NONE OF THE ABOVE
- 20 In this figure $RT = 10$, and the area of $\triangle RSU$ is 14. What is the area of $\triangle STU$?

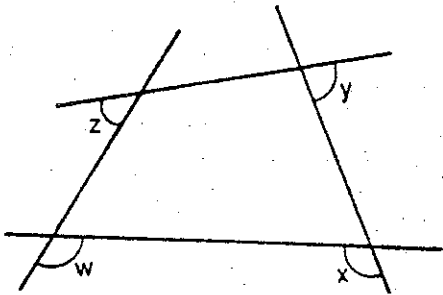


- A 6
 B 7
 C 20
 D 26
 E NONE OF THE ABOVE

21 In a circle a central angle of 12 degrees intercepts an arc of length 7. What is the circumference of the circle?

- A 84
- B 105
- C 140
- D 210
- E NONE OF THE ABOVE

22 What is the sum of the measure of the angles w , x , y , and z ?

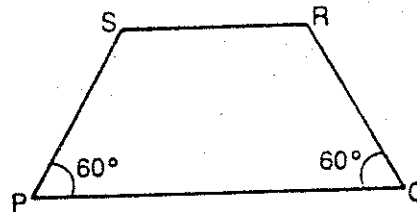


- A 180°
 - B 270°
 - C 360°
 - D 540°
 - E NONE OF THE ABOVE
- 23 If two sides of a triangle have lengths of 8 and 3, which of the following could *not* be the length of the third side?

- A 4
- B 6.5
- C 8
- D 10
- E NONE OF THE ABOVE

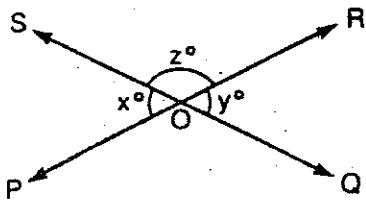
24 Each of the following statements is true. For which statement is the converse also true?

- A If triangles X and Y are congruent, then X and Y have the same area.
 - B If triangles X and Y are similar, then the corresponding sides of X and Y are proportional.
 - C If quadrilateral S is a square, then S is a rectangle.
 - D If quadrilateral R is a rectangle, then the diagonals of R are equal.
 - E NONE OF THE ABOVE
- 25 Trapezoid PQRS has a perimeter of 30, $PS = SR$, and $PQ = PS + SR$. What is the length of the longest side of PQRS?



- A 15
- B 12
- C $7\frac{1}{2}$
- D 6
- E NONE OF THE ABOVE

26 In this proof, what is the reason for statement 3?



Given: Lines SQ and PR intersect at O.

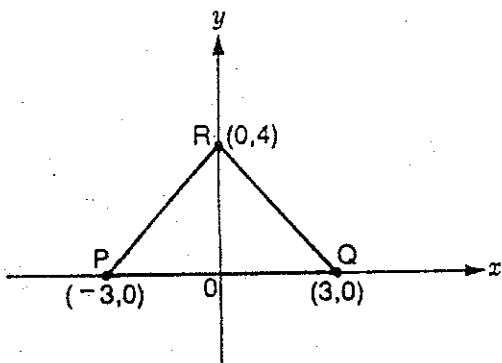
Prove: $\angle x = \angle y$

STATEMENTS

1. $\angle x + \angle z = 180^\circ$
2. $\angle y + \angle z = 180^\circ$
3. $\angle x + \angle z = \angle y + \angle z$
4. $\angle x = \angle y$

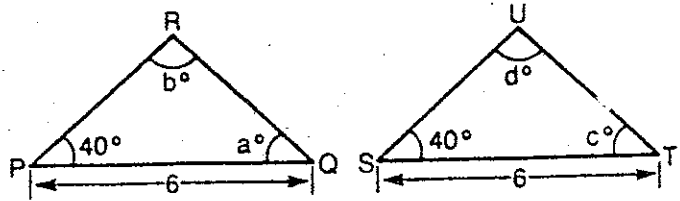
- A Supplements of equal angles are equal.
- B Things equal to the same thing are equal to each other.
- C If equals are added to equals, the results are equal.
- D If equals are subtracted from equals, the results are equal.
- E NONE OF THE ABOVE

27 What is the perimeter of $\triangle PQR$?

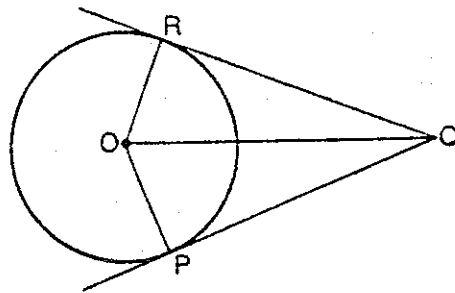


- A 10
- B 13
- C 16
- D 20
- E NONE OF THE ABOVE

28 Which of the following information, in addition to that given in the figures below, is sufficient to prove $\triangle PQR \cong \triangle STU$?

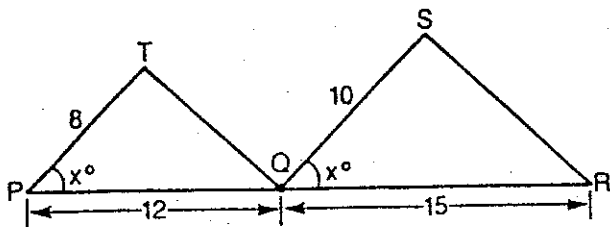


- A $QR = TU$
 - B $\angle b = \angle d$
 - C $\angle c = \angle b$
 - D $PR = TU$
 - E NONE OF THE ABOVE
- 29 What is the distance between two points with coordinates (3, 4) and (-3, -4)?
- A 5
 - B 8
 - C 10
 - D 14
 - E NONE OF THE ABOVE
- 30 In this figure, \overline{PQ} and \overline{RQ} are tangents to a circle with its center at point O and radius of 5. If the length of OQ is 13, what is the perimeter of quadrilateral OPQR?

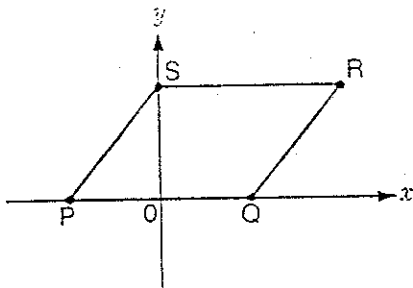


- A 30
- B 34
- C 36
- D 47
- E NONE OF THE ABOVE

- 31 In the figure, Q is a point on \overline{PR} . Which one of the following statements is false?



- A \overline{TQ} is parallel to \overline{SR} .
 B $\triangle PQT$ is similar to $\triangle QRS$.
 C The perimeter of $\triangle PQT$ is $\frac{4}{5}$ the perimeter of $\triangle QRS$.
 D The area of $\triangle PQT$ is $\frac{4}{5}$ the area of $\triangle QRS$.
 E NONE OF THE ABOVE
- 32 The perimeter of parallelogram PQRS can be determined if the coordinates of which of the following pairs of points are known?



- A P and S
 B P and R
 C P and Q
 D S and Q
 E NONE OF THE ABOVE

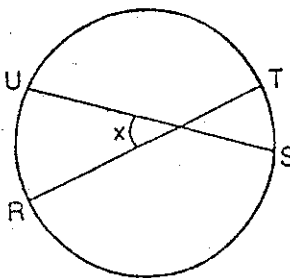
- 33 What is the slope of the line that contains the points $(-3, 2)$ and $(4, -4)$?

- A $-\frac{6}{7}$
 B $-\frac{7}{6}$
 C $\frac{6}{7}$
 D $\frac{7}{6}$
 E NONE OF THE ABOVE

- 34 The equation of line k is $y = 2x + 3$. Which of the following is the equation of a line that is parallel to line k ?

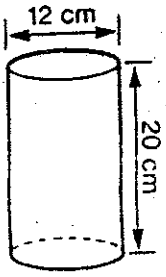
- A $y = 3x + 2$
 B $y = -2x + 3$
 C $y = 2x + 5$
 D $y = -\frac{1}{2}x + 5$
 E NONE OF THE ABOVE

- 35 In this circle, the measure of arc RU is 50° and the measure of angle x is 40° . What is the degree measure of arc ST?

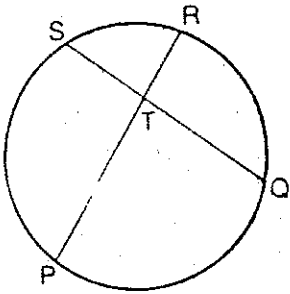


- A 30°
 B 40°
 C 45°
 D 50°
 E NONE OF THE ABOVE

- 36 What is the volume, in cubic centimeters, of this right circular cylinder?

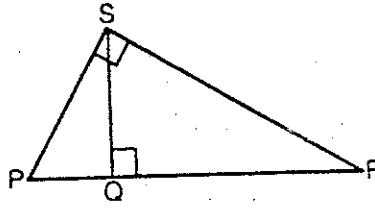


- A 240π
 B 360π
 C 720π
 D $2,880\pi$
 E NONE OF THE ABOVE
- 37 In this figure $SQ = 10$, $ST = 4$, and $TR = 3$. Which is the length of \overline{PT} ?

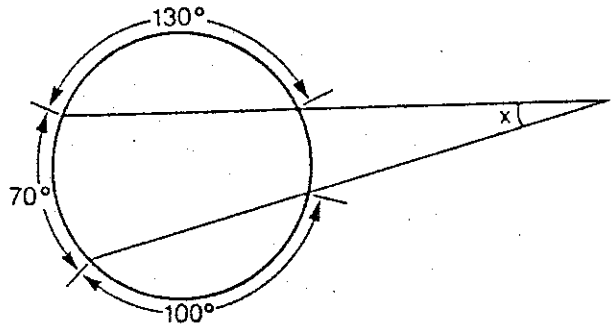


- A 7
 B 8
 C 9
 D 11
 E NONE OF THE ABOVE

- 38 Given this figure, it can be proved that the ratio PQ/PS is equal to which of the following ratios?

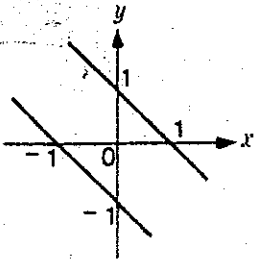


- A $\frac{SQ}{QR}$
 B $\frac{SQ}{PQ}$
 C $\frac{QR}{SR}$
 D $\frac{PS}{PR}$
 E NONE OF THE ABOVE
- 39 This figure shows the degree measures of three arcs of the circle. What is the measure of angle x ?

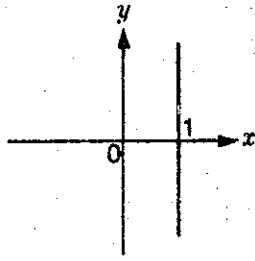


- A 5°
 B 30°
 C 35°
 D 60°
 E NONE OF THE ABOVE

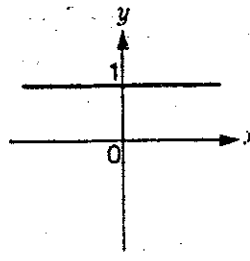
- 40 Which of the following is a graph of the set of all points exactly one unit away from the x -axis?



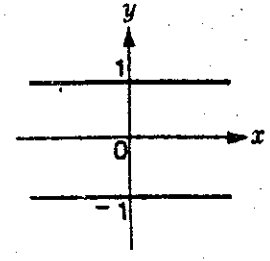
A



B



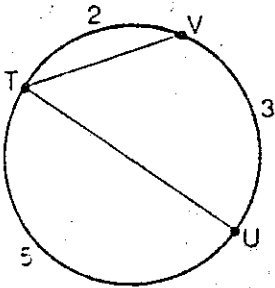
C



D

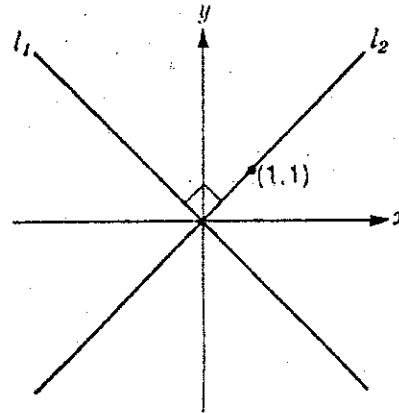
E NONE OF THE ABOVE

- 41 This circle consists of three arcs of lengths 2, 3, and 5 as shown. What is the degree measure of $\angle UTV$?



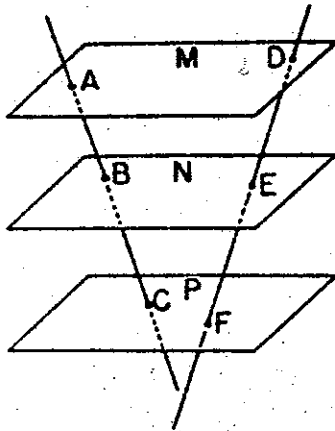
- A 60°
 B 54°
 C 45°
 D 30°
 E NONE OF THE ABOVE

- 42 In this figure, what is the sum of the slopes of lines l_1 and l_2 ?



- A 2
 B 1
 C 0
 D -2
 E NONE OF THE ABOVE

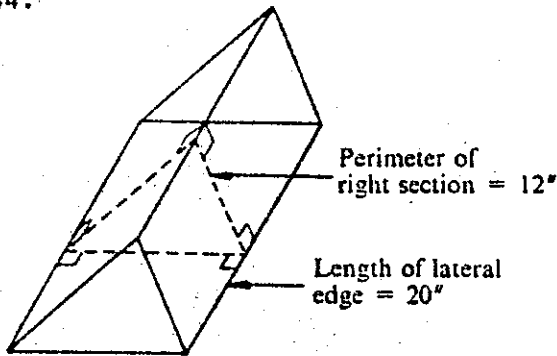
43.



In the figure above, planes M, N, and P are parallel. ABC and DEF are straight lines. If $AB = 8$, $BC = 6$, and $DF = 21$, find DE.

- A 8 B 10 C 11
D 12 E 28

44.



The perimeter of a right section of a prism is 12 inches and the length of a lateral edge is 20 inches. The lateral area of the prism in square inches is

- A 64 B 120 C 240
D 320 E 480

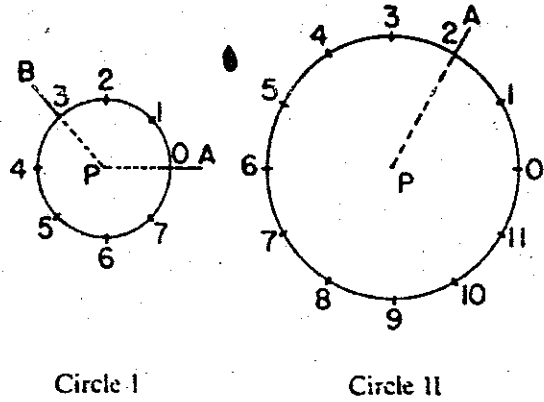
45. When the circumference of a circle is increased from 100π inches to 150π inches, by how many inches is the radius increased?

- A 25 B 50 C 75
D 100 E 200

46. The statement "p implies q and q implies p" means exactly the same as all of the following except

- A. "if p then q and conversely"
B. "p if and only if q"
C. "p and q are equivalent"
D. "p and q are unrelated"
E. "p is necessary and sufficient for q"

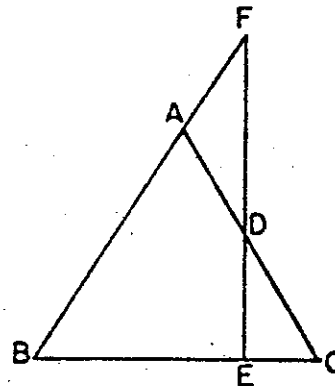
47.



In the figure above, $\angle APB$ has its vertex at the center of Circle I. If the same angle were similarly placed at the center of Circle II but with side PA crossing the 2-mark, what number corresponds to the point at which PB would cross Circle II?

- A $4\frac{1}{2}$ B $4\frac{5}{7}$ C 5
D $6\frac{1}{2}$ E $6\frac{5}{7}$

48.



In $\triangle ABC$ above, $AB = AC$, $FE \perp BC$, and BF is a straight line. $\triangle DAF$ is isosceles because

- A $\angle F = \angle ADF$, since both are complements of the equal angles B and C
B $DA = FA$, since both equal $AC - DC$
C its sides are parallel to the sides of $\triangle ABC$
D its sides are perpendicular to the sides of $\triangle ABC$
E $\angle F = \angle ADF$, since both equal one-half the supplement of angle C

49. What is the converse of the statement, "If two angles are vertical, then they are equal"?

- A If two angles are vertical, then they are not equal.
- B If two angles are equal, then they are vertical.
- C If $\angle x$ and $\angle y$ are vertical angles, then $\angle x = \angle y$.
- D If two angles are not vertical, then they are not equal.
- E If two angles are not equal, then they are not vertical.

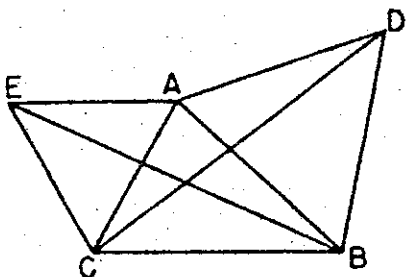
50. Which of the following is true for any parallelogram ABCD which has an acute angle at B and diagonals AC and BD?

- A $AB < BC$
- B $AB = BC$
- C $AB > BC$
- D $AC < BD$
- E $AC > BD$

51. Chords of the same length are drawn in two circles of unequal radii. Which of the following is true?

- A The chord in the larger circle could be equal to the radius of the smaller circle.
- B The chord in the smaller circle could not be a diameter.
- C The distance from the center to the chord is less in the larger circle.
- D The minor arc intercepted on the larger circle is longer.
- E The minor arc intercepted on the larger circle contains the greater number of degrees.

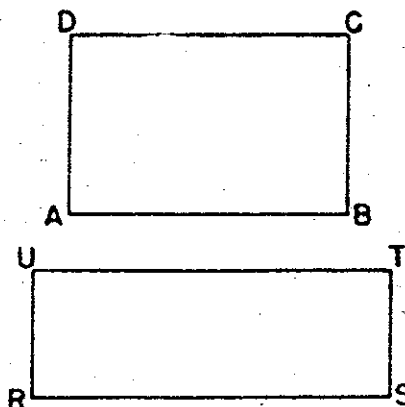
52.



In the figure above, equilateral triangles AEC and ABD were drawn on AC and AB, as shown. We can prove triangle AEB congruent to triangle ACD by which of the following authorities?

- A AAA
- B SAS
- C ASA
- D SAA
- E HL

53.



In the figure above, ABCD and RSTU are rectangles. If the length of RS is $1\frac{1}{4}$ times that of AB and the length of RU is $\frac{4}{5}$ that of AD, how do the areas of the rectangles compare?

- A Area ABCD = area RSTU
- B Area ABCD = $\frac{4}{5}$ area RSTU
- C Area ABCD = $\frac{5}{4}$ area RSTU
- D Area ABCD = $\frac{16}{25}$ area RSTU
- E Area ABCD = $\frac{25}{16}$ area RSTU

54. Two distinct planes x and y are each perpendicular to plane t . Which of the following statements is true?

- A Plane x is perpendicular to plane y .
- B The line of intersection of x and t is parallel to the line of intersection of y and t .
- C The line of intersection of x and t is perpendicular to the line of intersection of y and t .
- D If x and y intersect, their line of intersection is perpendicular to t .
- E If x and y intersect, their line of intersection is parallel to t .

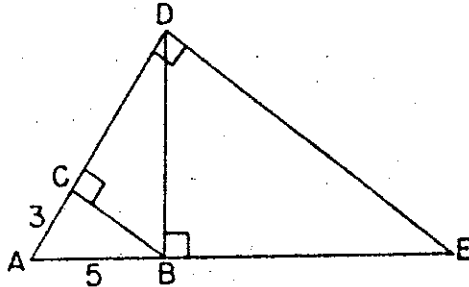
55. If $\triangle ABC$ is inscribed in a circle of diameter 10 and $\angle A$ is acute, then what can be concluded about the length of BC?

- A $BC < 5$
- B $BC = 5$
- C $BC < 10$
- D $BC = 10$
- E $BC > 10$

56. The height of a rectangle is 7 inches. The diagonal is 3 inches longer than the base. What is the length of the base in inches?

A 10
 B 20
 C 26
 D $6\frac{2}{3}$
 E $4\sqrt{13}$

57.



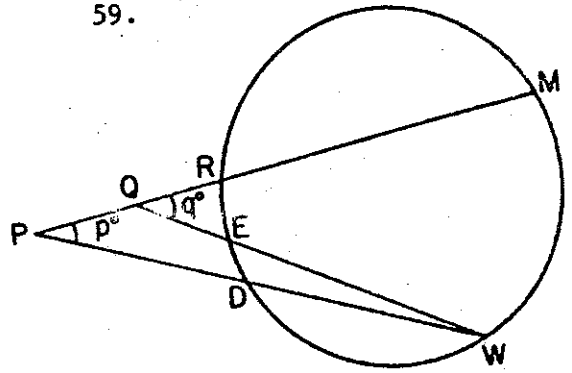
If, in the figure above, $AD \perp DE$, $DB \perp AE$, $BC \perp AD$, $AC = 3$ and $AB = 5$, then $BE = (?)$

A $\frac{32}{9}$
 B $\frac{4\sqrt{10}}{3}$
 C $\frac{16}{3}$
 D $\frac{20}{3}$
 E $\frac{80}{9}$

58. The ratio of the volumes of two similar cones is 8 to 27. The ratio of their total surface areas is

A 2 to 3
 B 4 to 9
 C 8 to 27
 D $2\sqrt{2}$ to $3\sqrt{3}$
 E 16 to 81

59.



In the figure above, points R, M, W, D, and E are on the circle, P and Q are outside the circle, and PM, PW, and QW are straight lines. If minor arc ED has n degrees, then what is $p - q$ in terms of n ?

A $-n$
 B $-\frac{n}{2}$
 C 0
 D n
 E $2n$

60. Each exterior angle of a regular polygon can not be

A 120°
 B 90°
 C 80°
 D 72°
 E 60°

Look over your work on this part.
 Do not go back to Part I.