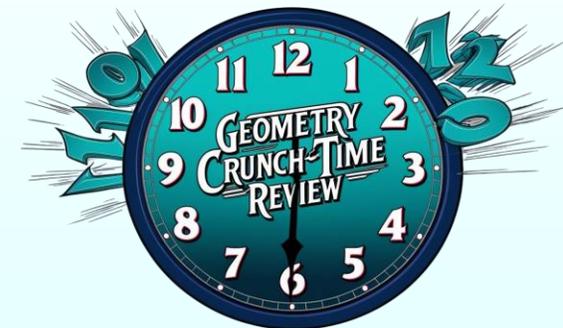




# Reporting Category Review

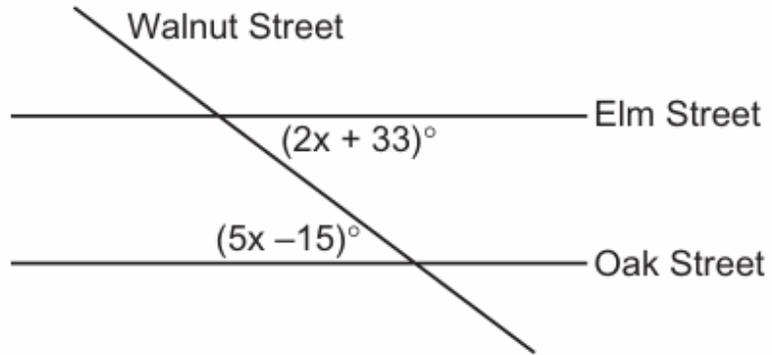
## Logic, Relationships, and Theorems





## Logic, Relationships, and Theorems

- Two parallel roads, Elm Street and Oak Street, are crossed by a third, Walnut Street, as shown in the accompanying diagram. Find the measure of the acute angle formed by the intersection of Walnut Street and Elm Street.

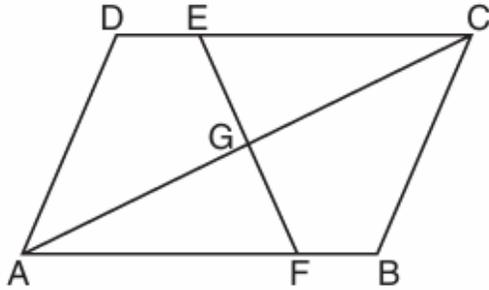


65



## Logic, Relationships, and Theorems

2. In the accompanying diagram of parallelogram  $ABCD$ ,  $\overline{DE} \cong \overline{FB}$ .



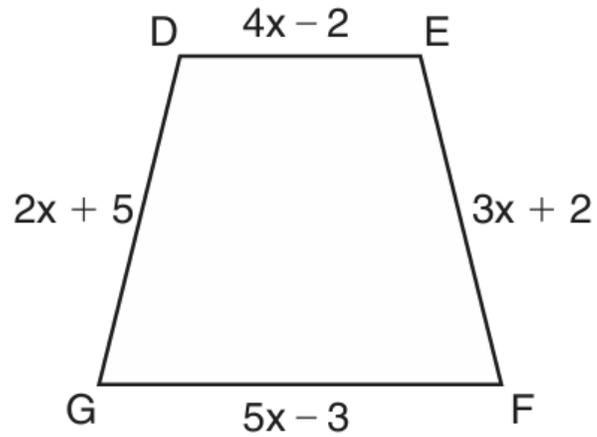
Triangle  $EGC$  can be proved congruent to triangle  $FGA$  by \_

- A. Hypotenuse-Leg
- B. Angle-Angle
- C. Angle-Angle-Side - correct
- D. Side-Side-Angle



## Logic, Relationships, and Theorems

3. In the diagram below of isosceles trapezoid  $DEFG$ ,  $\overline{DE} \parallel \overline{GF}$ ,  $DE = 4x - 2$ ,  $EF = 3x + 2$ ,  $FG = 5x - 3$ , and  $GD = 2x + 5$ . Find the value of  $x$ .



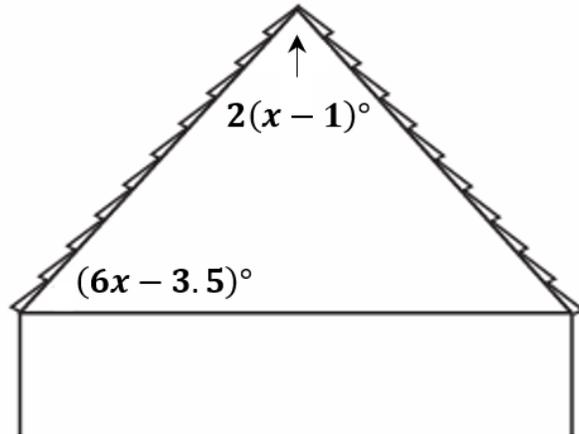
$x =$

3



## Logic, Relationships, and Theorems

4. The accompanying diagram shows the roof of a house that is in the shape of an isosceles triangle. What is the measure, in degrees, of the angle formed at the peak of the roof?

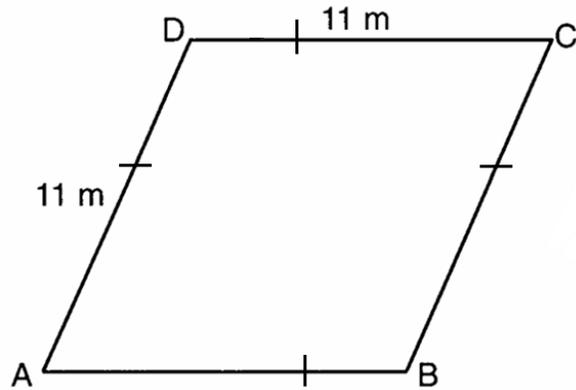


25



## Logic, Relationships, and Theorems

5. A plot of land is in the shape of rhombus  $ABCD$  as shown below.



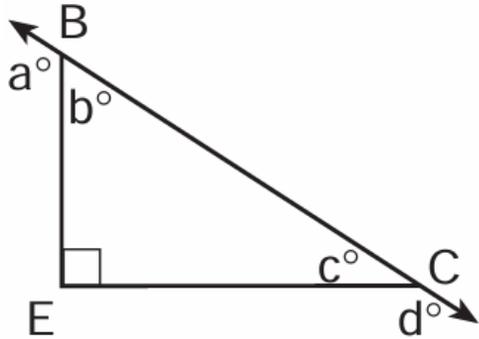
Which cannot be the length of diagonal  $AC$ ?

- A.  $4\text{ m}$
- B.  $11\text{ m}$
- C.  $18\text{ m}$
- D.  $24\text{ m}$  - correct

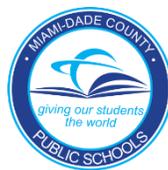


## Logic, Relationships, and Theorems

6. In triangle ABC below, what does  $a^\circ + d^\circ$  equal?



- A.  $135^\circ$
- B.  $160^\circ$
- C.  $180$
- D.  $270^\circ$  - correct



## Logic, Relationships, and Theorems

7. Isosceles trapezoid  $ABCD$  has diagonals  $\overline{AC}$  and  $\overline{BD}$ . If  $AC = 5x + 13$  and  $BD = 11x - 5$ , what is  $BD$ ?

- A.  $BD = 2$
- B.  $BD = 3$
- C.  $BD = 17$
- D.  $BD = 28$  - correct

## Logic, Relationships, and Theorems



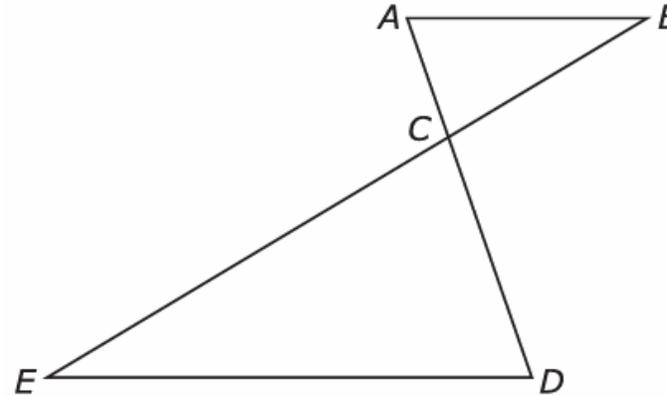
8. Which reason justifies Step 2 in this *AA* Similarity proof?

Given:  $\overline{AB}$  is parallel  $\overline{ED}$

Step 1:  $\angle ACB \cong \angle DCE$

Step 2:  $\angle ABE \cong \angle DEB$

Step 3:  $\triangle ABC \sim \triangle DEC$



- A. Corresponding angles are congruent.
- B. Vertical angles are congruent.
- C. Alternate interior angles are congruent. - correct
- D. Adjacent angles are congruent.



## Logic, Relationships, and Theorems

9. The following statements describe triangles  $ABC$  and  $PQR$ .

- For  $\triangle ABC$ :  $AC = 2$ ,  $AB = 4$ , and  $BC = 5$ .
- For  $\triangle PQR$ :  $QR = 7.5$ ,  $PR = 3$ , and  $PQ = 6$ .

Which statement explains why  $\triangle ABC$  and  $\triangle PQR$  are either similar or not similar?

- A.  $\triangle ABC$  and  $\triangle PQR$  are not similar because  $\frac{AC}{QR} \neq \frac{AB}{PR}$ .
- B.  $\triangle ABC$  and  $\triangle PQR$  are similar because  $\frac{AC}{PR} = \frac{PQ}{AB} = \frac{BC}{QR}$ .
- C.  $\triangle ABC$  and  $\triangle PQR$  are similar because  $\frac{AB}{PR} = \frac{BC}{QR}$ .
- D.  $\triangle ABC$  and  $\triangle PQR$  are similar because  $\frac{AC}{PR} = \frac{BC}{QR} = \frac{AB}{PQ}$ . - correct



## Logic, Relationships, and Theorems

10. A student claims:

*"If a quadrilateral has one pair of congruent sides, then it is a rectangle."*

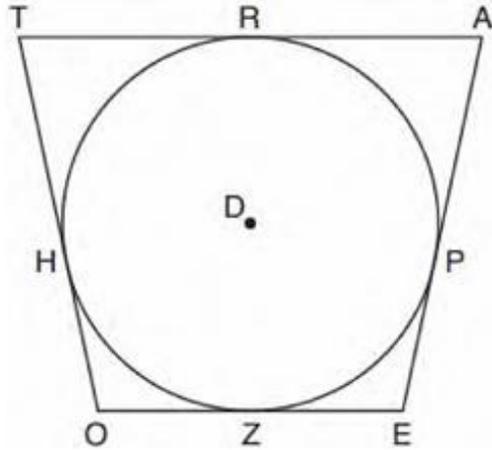
Which of the following quadrilaterals provides a counterexample to the student's claim?

- A. A rectangle
- B. A parallelogram
- C. An isosceles trapezoid - correct
- D. A rhombus



## Logic, Relationships, and Theorems

11. In the figure shown below, quadrilateral  $TAE O$  is circumscribed around circle  $D$ . The midpoint of  $\overline{TA}$  is  $R$ , and  $\overline{HO} \cong \overline{PE}$ .



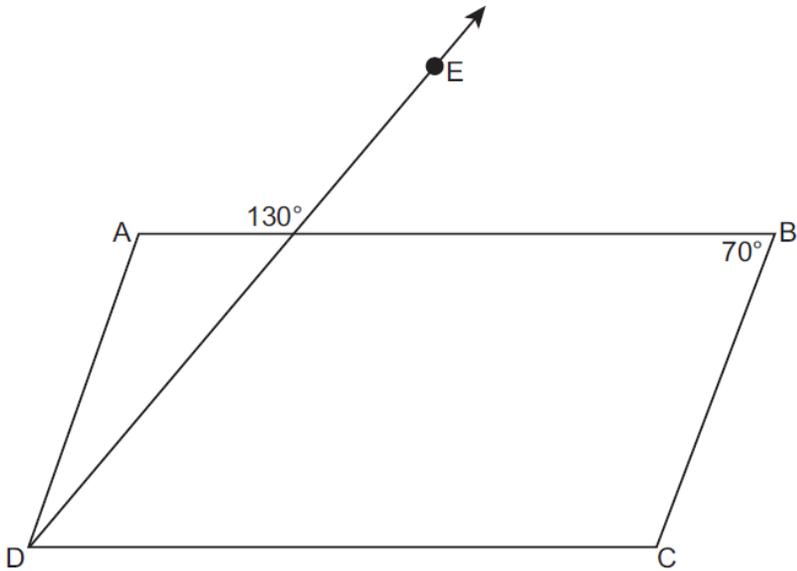
If  $AP = 10$  and  $EO = 12$ , what is the perimeter of quadrilateral  $TAE O$ ?

- A. 56
- B. 64 - correct
- C. 72
- D. 76

## Logic, Relationships, and Theorems

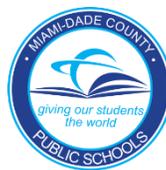


12. Parallelogram ABCD is shown below.



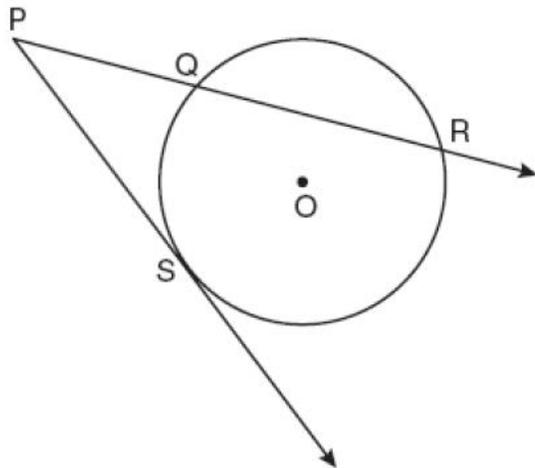
Ray  $DE$  passes through the vertex of  $\angle ADC$ . What is the measure of  $\angle ADE$ ?

- A.  $20^\circ$  - correct
- B.  $40^\circ$
- C.  $50^\circ$
- D.  $70^\circ$



## Logic, Relationships, and Theorems

13. In the diagram below,  $\overline{PS}$  is a tangent to circle  $O$  at point  $S$ ,  $\overline{PR}$  is a secant,  $PS = x$ ,  $PQ = 3$ , and  $PR = x + 18$ .



What is the length of  $\overline{PS}$ ?

- A. 3
- B. 6
- C. 9 - correct
- D. 27



## Logic, Relationships, and Theorems

14. In rectangle ABCD,  $AC = 3x + 15$  and  $BD = 4x - 5$ . Find the length of  $\overline{AC}$ .

75



## Logic, Relationships, and Theorems

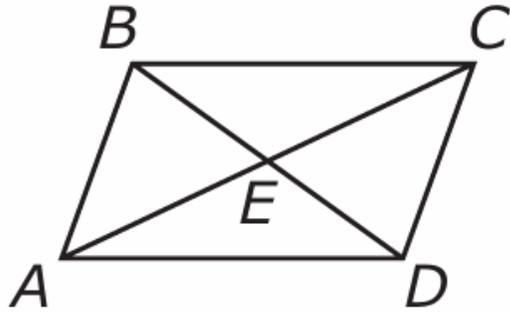
15. The circumference of a circle measures  $22\pi$  units. Find the exact number of square units in the area of the circle.

$$121\pi$$

## Logic, Relationships, and Theorems

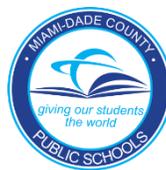


16. Segments  $AC$  and  $BD$  are diagonals of parallelogram  $ABCD$ .



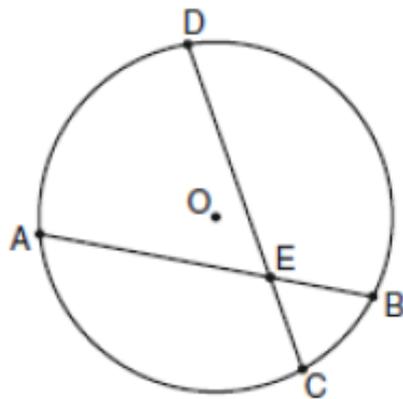
Using  $\overline{AD} \cong \overline{BC}$ , which pairs of angles must be congruent to prove  $\triangle AED \cong \triangle CEB$  by the Angle-Side-Angle theorem? Select all that apply.

- A.  $\angle BCA \cong \angle BDA$
- B.  $\angle BEC \cong \angle AED$
- C.  $\angle CAD \cong \angle BCA$  - correct
- D.  $\angle DAC \cong \angle DBC$
- E.  $\angle DBC \cong \angle BDA$  - correct



## Logic, Relationships, and Theorems

17. In the diagram of circle O below, chord  $\overline{AB}$  intersects chord  $\overline{CD}$  at  $E$ ,  $DE = 2x + 8$ ,  $EC = 3$ ,  $AE = 4x + 3$ , and  $EB = 4$ .



What is the value of  $x$ ?

- A. 1
- B. 1.2 - correct
- C. 5
- D. 10.25



## Logic, Relationships, and Theorems

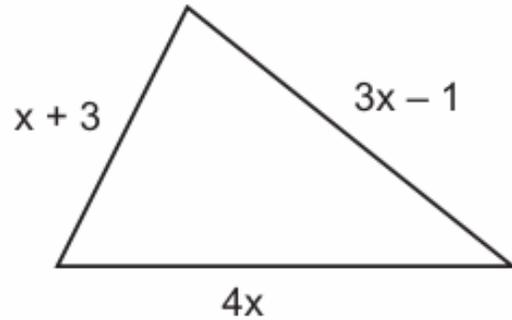
18. In rhombus  $ABCD$ , the measure, in inches, of  $AB$  is  $3x + 2$  and  $BC$  is  $x + 12$ . Find the number of inches in the length of  $DC$ .

17



## Logic, Relationships, and Theorems

19. The plot of land illustrated in the accompanying diagram has a perimeter of 34 yards. Find the length, in yards, of each side of the figure. Could these measures represent the measures of the sides of a triangle? Explain your answer.



- A. Yes. The side lengths are 7 yards, 11 yards, and 16 yards, and they do form a triangle because  $7 + 11 > 16$ . - correct
- B. No. The side lengths are 7 yards, 11 yards, and 16 yards, and they do not form a triangle because  $7 + 11 < 16$ .
- C. Yes. The side lengths are 7 yards, 11 yards, and 16 yards, and they do form a triangle because  $16 + 11 < 7$ .
- D. No. The side lengths are 7 yards, 11 yards, and 16 yards, and they do not form a triangle because  $16 + 11 > 7$ .



## Logic, Relationships, and Theorems

20. A true conditional statement is given.

*'If  $\triangle ABC$  is equilateral, then it is isosceles.'*

Which of the following statements are correct. Select all that apply.

- A. The converse of the conditional statement is true.
- B. The contrapositive of the conditional statement is false.
- C. The statement "If  $\triangle ABC$  is not equilateral, then it is not isosceles" is false. - correct
- D. The inverse of the conditional statement is "If  $\triangle ABC$  is isosceles, then it is equilateral."
- E. The contrapositive of the conditional statement is "If  $\triangle ABC$  is not isosceles, then it is not equilateral." - correct



## Logic, Relationships, and Theorems

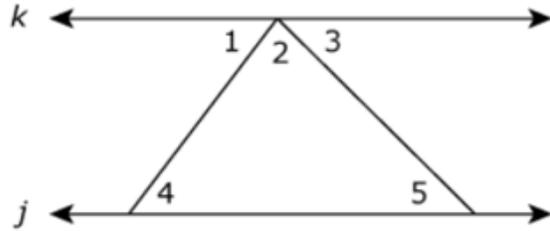
21. Carlos buys a large circular pizza that is divided into eight equal slices. He measures along the outer edge of the crust from one slice and finds it to be  $5\frac{1}{2}$  in. What is the diameter of the pizza to the nearest inch?

- A. 4
- B. 7
- C. 8
- D. 14 - correct



## Logic, Relationships, and Theorems

22. In this diagram, lines  $k$  and  $j$  are parallel.



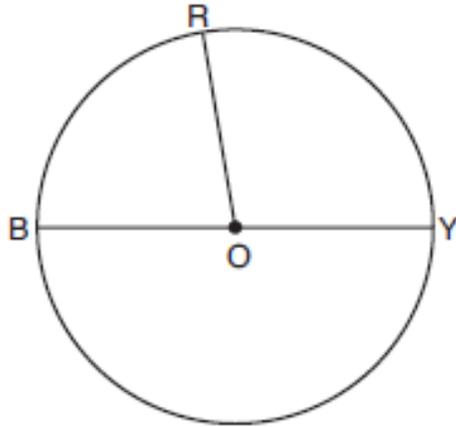
Which statement proves that  $\angle 1 \cong \angle 4$  and  $\angle 3 \cong \angle 5$ ?

- A. The vertical angles formed by the intersection of two lines are congruent.
- B. The corresponding angles formed by the intersection of a transversal and two parallel lines are congruent.
- C. The alternate interior angles formed by the intersection of a transversal and two parallel lines are congruent. - correct
- D. The measure of an exterior angle of a triangle is equal to the sum of the measures of the two opposite interior angles.



## Logic, Relationships, and Theorems

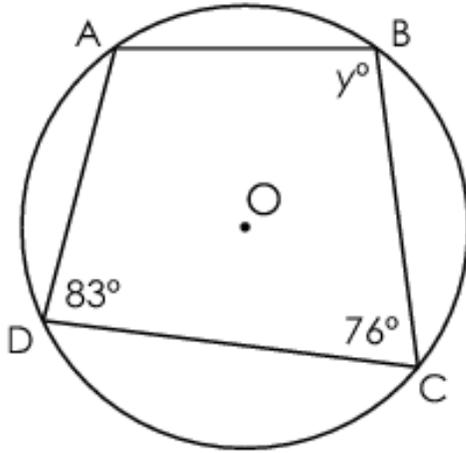
23. In the accompanying diagram,  $\overline{BY}$  is a diameter of circle  $O$ , the measure of central angle  $ROY$  is  $(x + 60)^\circ$ , and the measure of central angle  $ROB$  is  $(3x - 20)^\circ$ . Find the number of degrees in the measure of central angle  $ROY$ .



95

## Logic, Relationships, and Theorems

24. Quadrilateral ABCD is inscribed in circle O, as shown.



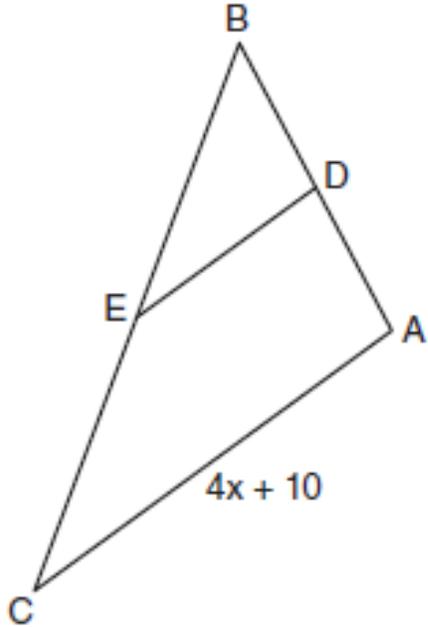
What is the value of  $y$ ?

$$y = \boxed{97}^\circ$$

## Logic, Relationships, and Theorems

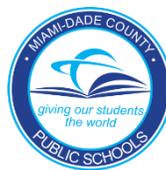


25. In the diagram below of  $\triangle ABC$ , D is the midpoint of  $\overline{AB}$  and E is the midpoint of  $\overline{BC}$ .



If  $AC = 4x + 10$ , which expression represents  $DE$ ?

- A.  $x + 2.5$
- B.  $2x + 5$  - correct
- C.  $2x + 10$
- D.  $8x + 20$

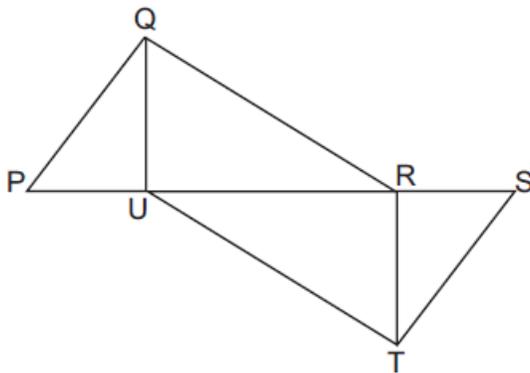


## Logic, Relationships, and Theorems

26. The diagram shown is used in the incomplete proof below.

Given: ?

Prove  $\triangle QUR \cong \triangle TRU$



Statements	Reasons
1. ?	Given
2. $\overline{QR} \cong \overline{TU}$ , $\angle QRP \cong \angle TUS$	
3. ?	Reflexive property of congruence
4. $\triangle QUR \cong \triangle TRU$	Side-angle-side triangle congruence

What could be statement 1 and statement 3 to complete the proof?

A. Statement 1:  $QUR$  is a triangle

Statement 2:  $\overline{UR} \cong \overline{RU}$

B. Statement 1:  $QUTR$  is a parallelogram

Statement 2:  $\overline{UR} \cong \overline{RT}$

C. Statement 1:  $QUTR$  is a triangle

Statement 2:  $\overline{UR} \cong \overline{RT}$

D. Statement 1:  $QUTR$  is a parallelogram - correct

Statement 2:  $\overline{UR} \cong \overline{RU}$

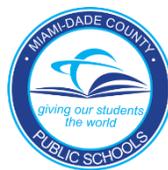


## Logic, Relationships, and Theorems

27. Given: “If a polygon is a triangle, then the sum of its interior angles is  $180^\circ$ .”

What is the contrapositive of this statement?

- A. If the sum of the interior angles of a polygon is not  $180^\circ$ , then it is not a triangle. - correct
- B. A polygon is a triangle if and only if the sum of its interior angles is  $180^\circ$ .
- C. If a polygon is not a triangle, then the sum of the interior angles is not  $180^\circ$ .
- D. If the sum of the interior angles of a polygon is  $180^\circ$ , then it is a triangle.



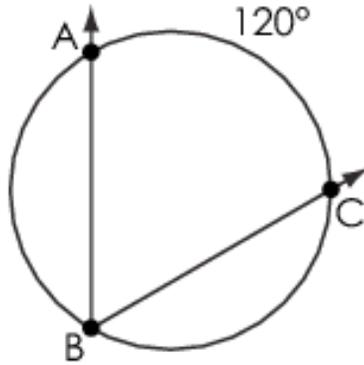
## Logic, Relationships, and Theorems

28. In  $\triangle ABC$ ,  $\angle A \cong \angle C$  and  $m\angle B = 96^\circ$ . What is  $m\angle A$ ?

- A.  $42^\circ$  - correct
- B.  $68^\circ$
- C.  $60^\circ$
- D.  $84^\circ$

## Logic, Relationships, and Theorems

29. Angle  $ABC$  is inscribed in a circle as shown.



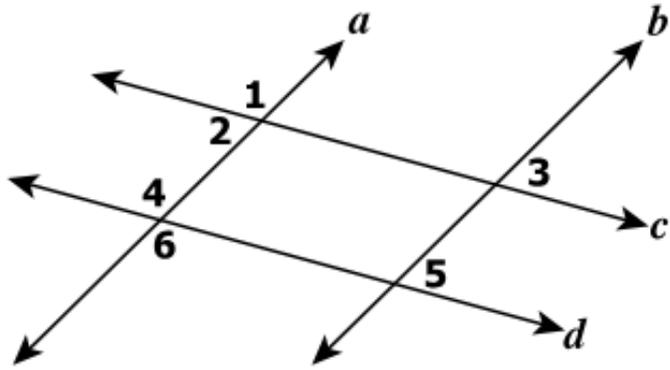
What is the measure, in degrees, of  $\angle ABC$ ?

**60** *degrees*



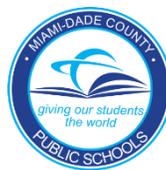
## Logic, Relationships, and Theorems

30. Lines  $a$  and  $b$  intersect lines  $c$  and  $d$ .



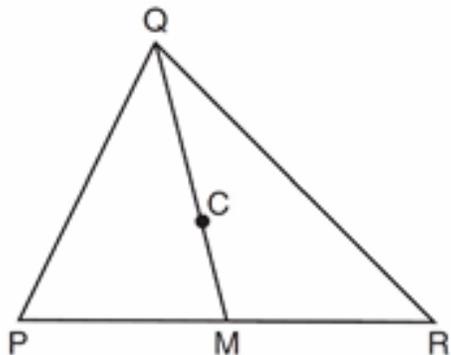
Which of the following statements could be used to prove that  $a \parallel b$  and  $c \parallel d$ ?

- A.  $\angle 1 \cong \angle 6$ ,  $\angle 3 \cong \angle 5$
- B.  $\angle 1 \cong \angle 6$ ,  $\angle 4$  and  $\angle 5$  are supplementary - correct
- C.  $\angle 1 \cong \angle 4$ ,  $\angle 1$  and  $\angle 2$  are supplementary
- D.  $\angle 1$  and  $\angle 3$  are supplementary,  $\angle 1$  and  $\angle 6$  are supplementary



## Logic, Relationships, and Theorems

31. In the diagram below,  $\overline{QM}$  is a median of triangle  $PQR$  and point  $C$  is the centroid of triangle  $PQR$ .



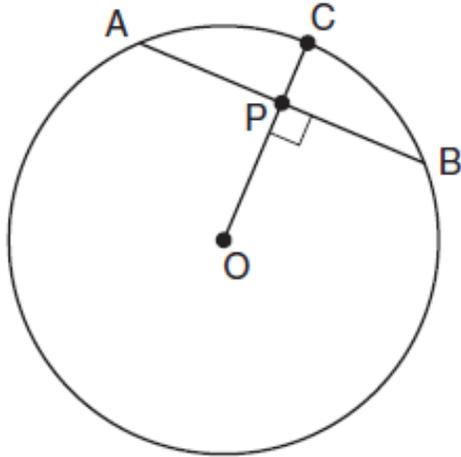
If  $QC = 5x$  and  $CM = x + 12$ , determine the length of  $QM$ .

60

## Logic, Relationships, and Theorems



32. In the diagram below of circle  $O$ , radius  $\overline{OC}$  is 5 cm. Chord  $\overline{AB}$  is 8 cm and is perpendicular to  $\overline{OC}$  at point  $P$ .



What is the length of  $\overline{CP}$ , in centimeters?

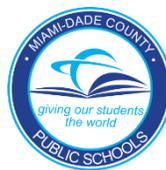
- A. 8
- B. 2 - correct
- C. 3
- D. 4



## Logic, Relationships, and Theorems

33. Isosceles trapezoid  $ABCD$  has diagonals  $AC$  and  $BD$ . If  $AC = 5x + 13$  and  $BD = 11x - 5$ , what is the value of  $x$ ?

- A. 28
- B.  $10\frac{3}{4}$
- C. 3 - correct
- D.  $\frac{1}{2}$



## Logic, Relationships, and Theorems

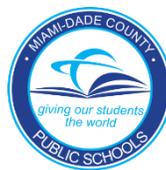
34. Circle  $P$  has a radius of 1 unit. A central angle of circle  $P$  is  $225^\circ$ . What is the length of the minor arc?

A.  $\frac{5\pi}{4}$

B.  $\frac{3\pi}{4}$  - correct

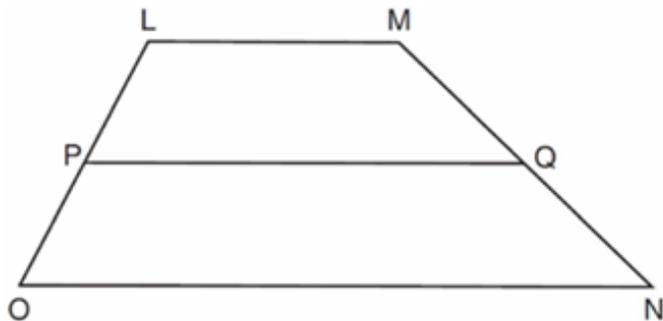
C.  $\frac{5\pi}{8}$

D.  $\frac{3\pi}{8}$



## Logic, Relationships, and Theorems

35. In trapezoid  $LMNO$  below,  $P$  is the midpoint of  $LO$  and  $Q$  is the midpoint of  $MN$ .



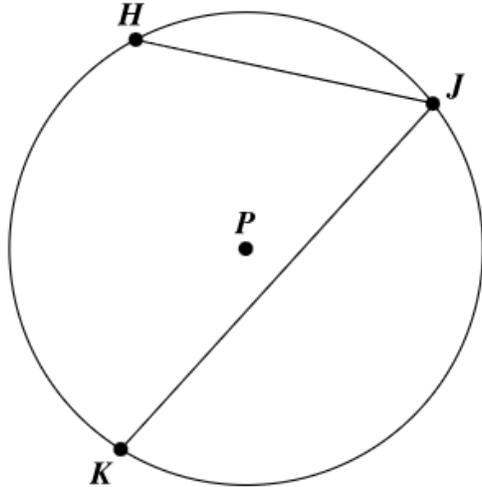
If  $LM = x + 7$ ,  $ON = 3x + 11$ , and  $PQ = 25$ , what is the value of  $x$ ?

- A. 1.75
- B. 3.5
- C. 8 - correct
- D. 17

## Logic, Relationships, and Theorems



36. In circle  $P$ ,  $m\angle HJK = 60^\circ$  and  $m\widehat{JK} = 2 \cdot m\widehat{HJ}$ .



What is  $m\widehat{HJ}$ ?

- A.  $80^\circ$  - correct
- B.  $120^\circ$
- C.  $150^\circ$
- D.  $160^\circ$



## Logic, Relationships, and Theorems

37.  $\overleftrightarrow{JK}$  is perpendicular to  $\overline{XY}$  at its midpoint  $M$ . Choose the answer that includes the correct response(s).

I.  $JX = JY$

II.  $JK = KY$

III.  $KX = KY$

IV.  $JX = KX$

V.  $XM = YM$

VI.  $JM = KM$

A. V only

B. II, IV, VI

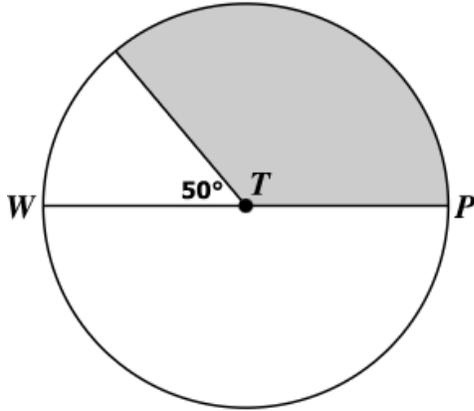
C. I, III, V - correct

D. V and VI

## Logic, Relationships, and Theorems

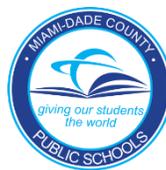


38. Given: Circle  $T$  with  $WP = 36$  centimeters ( $cm$ ).



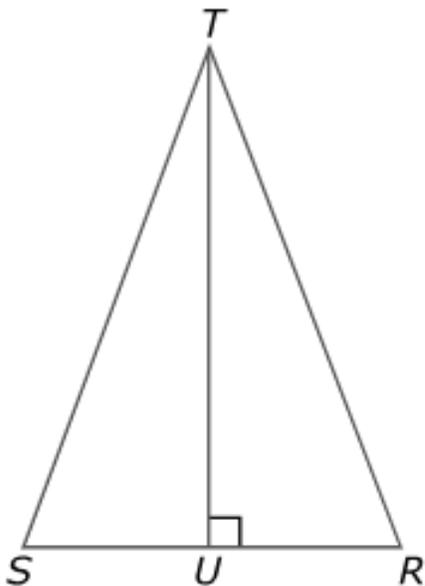
Which best represents the area of the shaded sector?

- A.  $468\pi \text{ cm}^2$
- B.  $234\pi \text{ cm}^2$
- C.  $180\pi \text{ cm}^2$
- D.  $117\pi \text{ cm}^2$  - correct



## Logic, Relationships, and Theorems

39. In the figure below,  $\triangle RST$  is isosceles, and  $\overline{TU} \perp \overline{RS}$ .



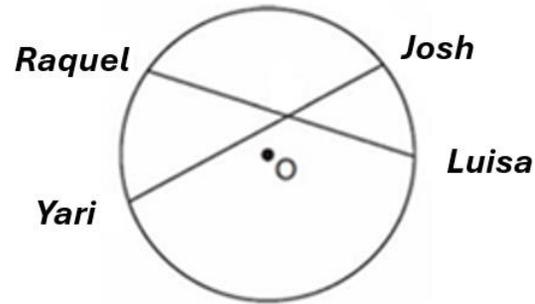
To prove that base angles of an isosceles triangle are congruent, Martha first proved  $\triangle TUR \cong \triangle TUS$ . She then concluded  $\angle R \cong \angle S$ . Which of the following reasons supports this conclusion?

- A. Vertical angles are congruent.
- B. Side-Side-Angle congruence theorem.
- C. Isosceles triangles have 3 congruent angles.
- D. Corresponding angles of congruent angles are congruent. - correct
- E. The sum of the measures of the 2 angles that form a linear pair is  $180^\circ$ .



## Logic, Relationships, and Theorems

40. A toy truck is located within a circular play area. Luisa and Raquel are sitting on opposite endpoints of a chord that contains the truck. Luisa is 4 feet from the truck, and Raquel is  $(1.5x + 2)$  feet from the truck. Josh and Yari are sitting on opposite endpoints of another chord containing the truck. Josh is 8 feet from the truck and Yari is  $(0.5x + 3.5)$  feet from the truck. How many feet, to the nearest tenth of a foot, is Yari from the truck?



*Note: Figure not drawn to scale.*

**8.5** feet