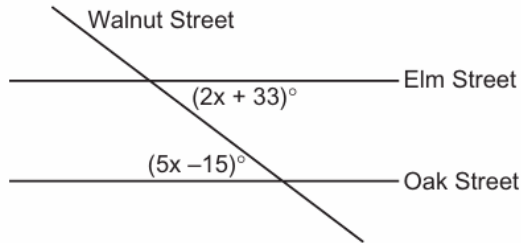


Geometry

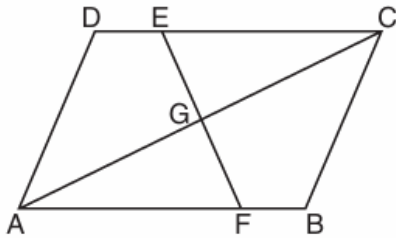
Logic, Relationships, and Theorems

Name: _____ Date: _____

1. 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.



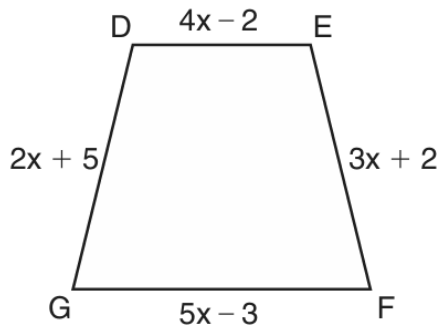
2. In the accompanying diagram of parallelogram $ABCD$, $\overline{DE} \cong \overline{FB}$.



Triangle EGC can be proved congruent to triangle FGA by _

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

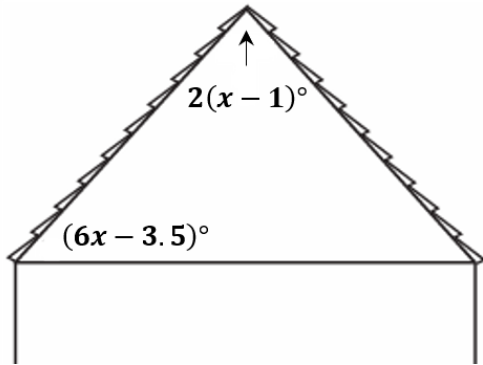
3. In the diagram below of isosceles trapezoid $DEFG$, $\overline{DE} \parallel \overline{GF}$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of x .



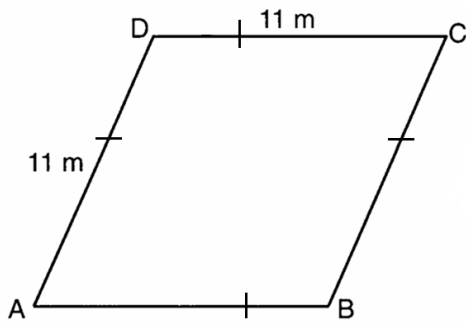
$x =$

Geometry
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?

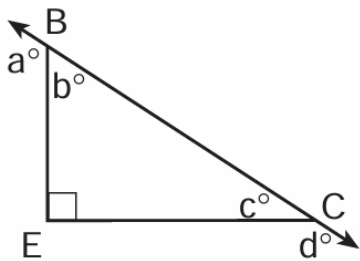


5. A plot of land is in the shape of rhombus $ABCD$ as shown below.



Which cannot be the length of diagonal AC ?

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



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. $BD = 28$

Geometry
Logic, Relationships, and Theorems

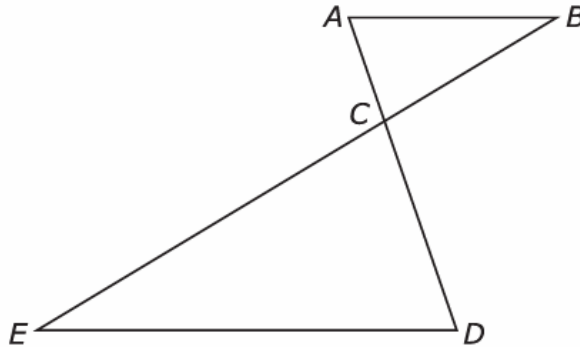
8. Which reason justifies Step 2 in this *AA* Similarity proof?

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.
D. Adjacent angles are congruent.
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 $\frac{AC}{PR} = \frac{BC}{QR} = \frac{AB}{PQ}$.
10. A student claims:

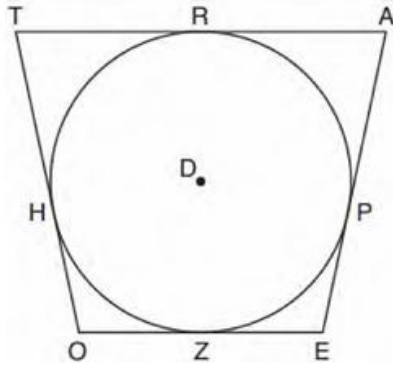
"If a quadrilateral has one pair of congruent sides, then it is a rectangle."

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

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

Geometry
Logic, Relationships, and Theorems

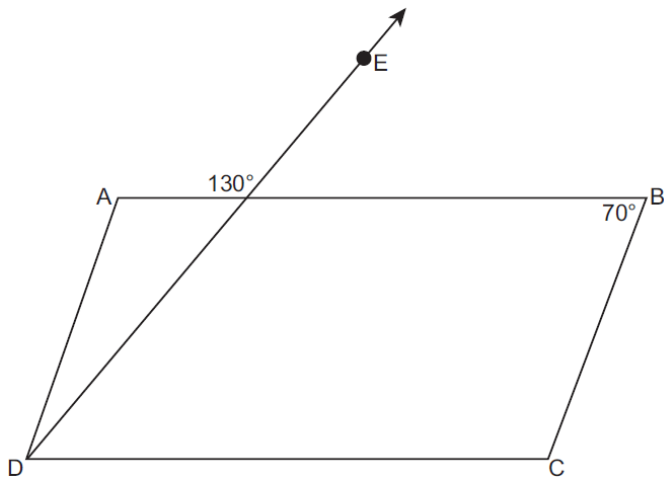
11. In the figure shown below, quadrilateral $TAE O$ is circumscribed around circle D . The midpoint of \overline{TA} is R , and $\overline{HO} \cong \overline{PE}$.



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

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

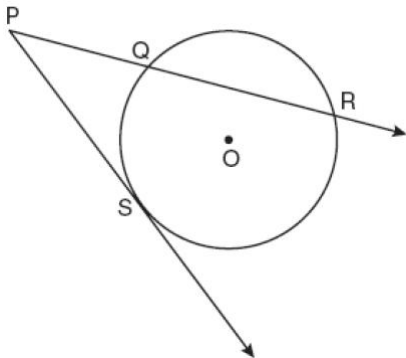
12. Parallelogram $ABCD$ is shown below.



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

- A. 20°
- B. 40°
- C. 50°
- D. 70°

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} ?

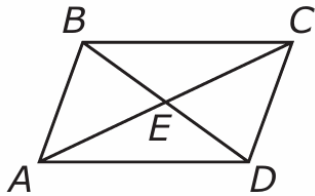
- A. 3
- B. 6
- C. 9
- D. 27

Geometry
Logic, Relationships, and Theorems

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

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

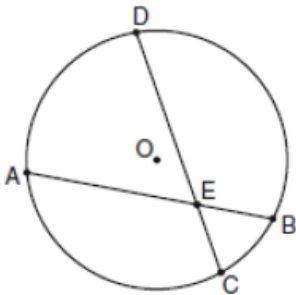
16. Segments AC and BD are diagonals of parallelogram $ABCD$.



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. $\angle CAD \cong \angle BCA$
- D. $\angle DAC \cong \angle DBC$
- E. $\angle DBC \cong \angle BDA$

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 $EB = 4$.



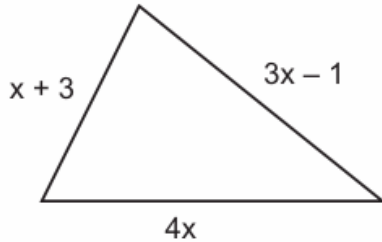
What is the value of x ?

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

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 .

Geometry
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 $7 + 11 > 16$.
- 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 $16 + 11 > 7$.

20. A true conditional statement is given.

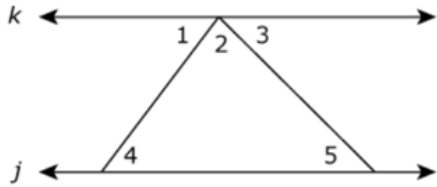
"If $\triangle ABC$ is equilateral, then it is isosceles."

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.
 - 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."
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

Geometry **Logic, Relationships, and Theorems**

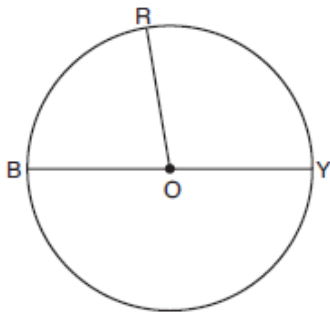
22. In this diagram, lines k and j are parallel.



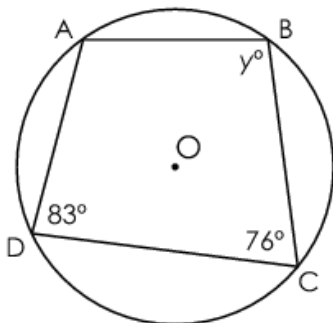
Which statement proves that $\angle 1 \cong \angle 4$ and $\angle 3 \cong \angle 5$?

- 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.
- D. The measure of an exterior angle of a triangle is equal to the sum of the measures of the two opposite interior angles.

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 .



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



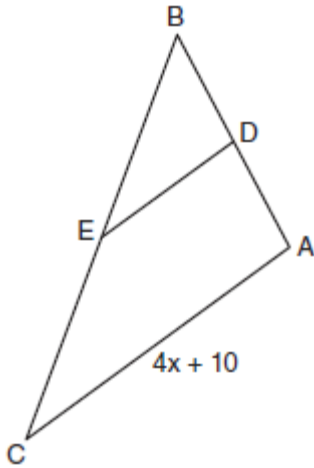
What is the value of y ?

$y =$ $^\circ$

Geometry

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} .



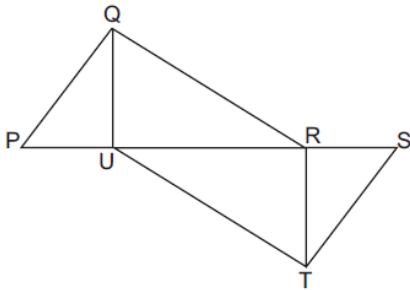
If $AC = 4x + 10$, which expression represents DE ?

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

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

Geometry

Logic, Relationships, and Theorems

27. Given: "If a polygon is a triangle, then the sum of its interior angles is 180° ."

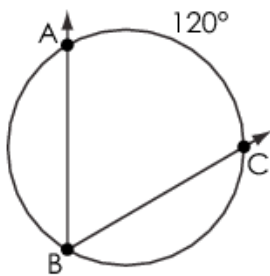
What is the contrapositive of this statement?

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

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

- A. 42°
- B. 68°
- C. 60°
- D. 84°

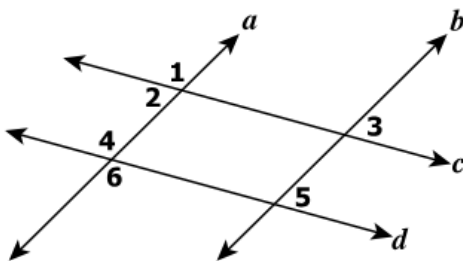
29. Angle ABC is inscribed in a circle as shown.



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

Type ec **degrees**

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

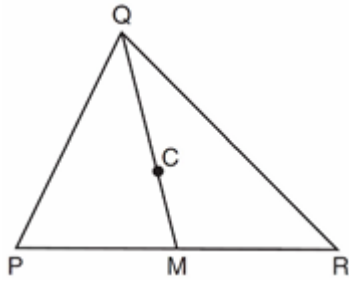


Which of the following statements could be used to prove that $a \parallel b$ and $c \parallel d$?

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

Geometry
Logic, Relationships, and Theorems

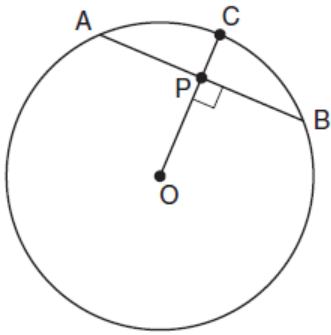
31. In the diagram below, \overline{QM} is a median of triangle PQR and point C is the centroid of triangle PQR .



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



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
- C. 3
- D. 4

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

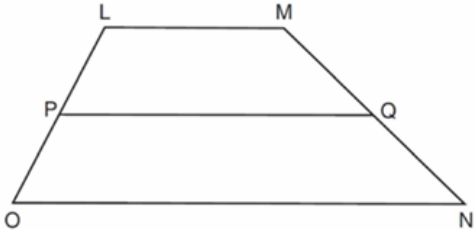
- A. 28
- B. $10\frac{3}{4}$
- C. 3
- D. $\frac{1}{2}$

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

- A. $\frac{5\pi}{4}$
- B. $\frac{3\pi}{4}$
- C. $\frac{5\pi}{8}$
- D. $\frac{3\pi}{8}$

Geometry
Logic, Relationships, and Theorems

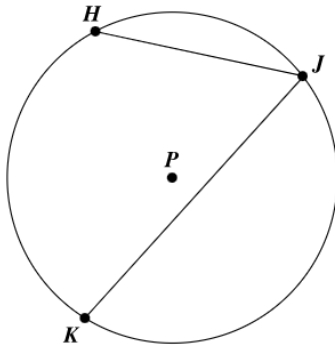
35. In trapezoid $LMNO$ below, P is the midpoint of LO and Q is the midpoint of MN .



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

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

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°
- B. 120°
- C. 150°
- D. 160°

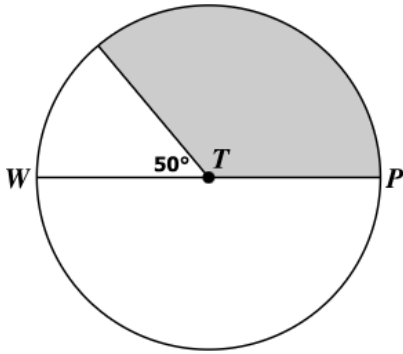
37. \overleftrightarrow{JK} is perpendicular to \overleftrightarrow{XY} at its midpoint M . Choose the answer that includes the correct response(s).

- 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
- D. V and VI

Geometry
Logic, Relationships, and Theorems

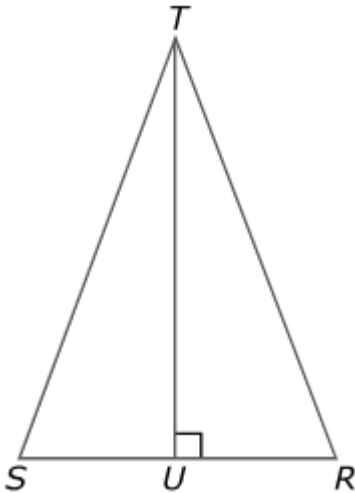
38. Given: Circle T with $WP = 36$ centimeters (cm).



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. $117\pi \text{ cm}^2$

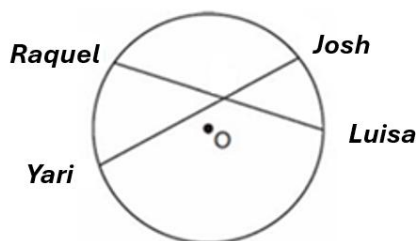
39. In the figure below, $\triangle RST$ is isosceles, and $\overline{TU} \perp \overline{RS}$.



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.
- E. The sum of the measures of the 2 angles that form a linear pair is 180° .

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?



Type ec **feet**

Note: Figure not drawn to scale.