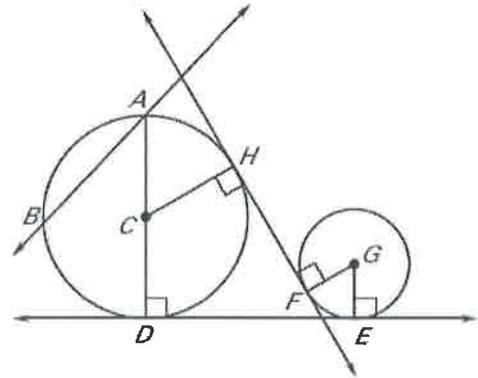


Unit 7 Review Problems

Matching Match the notation with the term that best describes it.

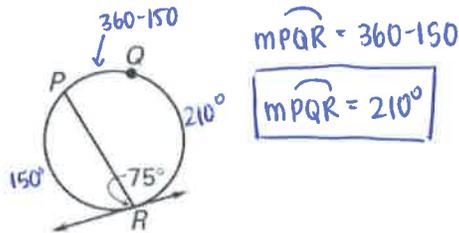
- | | | |
|---|------------------------------|---------------------------------------|
| E | 1. D | A. Center |
| G | 2. \overleftrightarrow{FH} | B. Chord |
| D | 3. \overline{CD} | C. Diameter |
| B | 4. \overline{AB} | D. Radius |
| A | 5. C | E. Point of tangency |
| C | 6. \overline{AD} | F. Common external tangent |
| H | 7. \overleftrightarrow{AB} | G. Common internal tangent |
| F | 8. \overline{DE} | H. Secant |



Multiple Choice Choose the letter of the best answer.

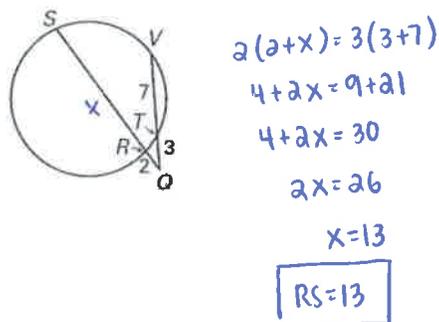
9. Find $m\widehat{PQR}$.

- A) 285°
- B) 105°
- C) 210°**
- D) 185°



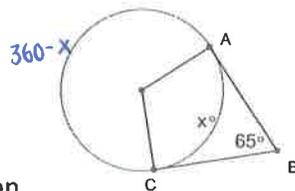
10. Find RS .

- A) 10
- B) 8
- C) 12
- D) 13**



11. How many arc degrees are in the minor arc?

- A) 32.5°
- B) 65°
- C) 115°**
- D) Not enough information



$$65 = \frac{1}{2}(360 - x - x)$$

$$130 = 360 - 2x$$

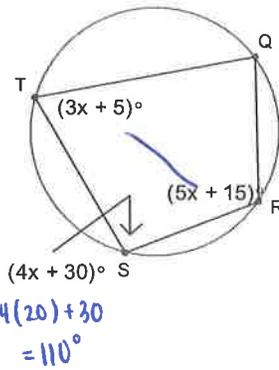
$$-230 = -2x$$

$$x = 115$$

minor arc = 115°

12. What is $m\angle TQR$?

- A) 65°
- B) 70°**
- C) 110°
- D) 115°



opp. angles are supplementary

$$3x + 5 + 5x + 15 = 180$$

$$8x + 20 = 180$$

$$8x = 160$$

$$x = 20$$

$$110 + m\angle TQR = 180$$

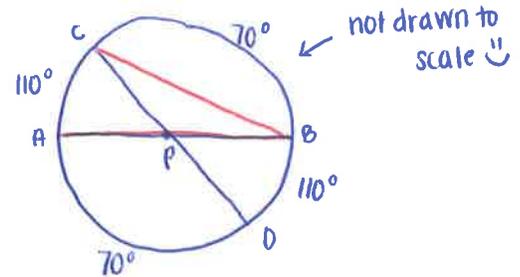
$$m\angle TQR = 70^\circ$$

13. Two diameters of $\odot P$ are \overline{AB} and \overline{CD} . Given that $m\widehat{BC} = 70^\circ$, what is $m\angle ABC$? (hint: draw a picture!)

- A) 35°
- B) 55°**
- C) 70°
- D) 110°

$\angle ABC$ is inscribed to \widehat{AC}

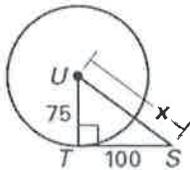
$$\text{so } m\angle ABC = \frac{1}{2}(110) = 55^\circ$$



Open Ended

\overline{TU} is a radius of $\odot U$ and \overline{ST} is tangent to $\odot U$. Find the value of x .

14.



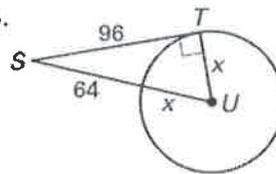
$$75^2 + 100^2 = x^2$$

$$5625 + 10000 = x^2$$

$$15625 = x^2$$

$$x = 125$$

15.



$$x^2 + 96^2 = (x + 64)^2$$

$$x^2 + 9216 = (x + 64)(x + 64)$$

$$x^2 + 9216 = x^2 + 128x + 4096$$

$$9216 = 128x + 4096$$

$$5120 = 128x$$

$$x = 40$$

\overline{PS} and \overline{QT} are diameters of $\odot U$. Find the indicated measure.

16. $m\angle QUR = 120.9^\circ$

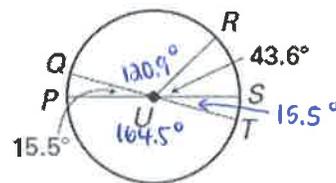
17. $m\widehat{PQR} = 136.4^\circ$

18. $m\widehat{STQ} = 195.5^\circ$

19. $m\widehat{RST} = 59.1^\circ$

20. $m\widehat{TP} = 164.5^\circ$

21. $m\widehat{RQT} = 300.9^\circ$



#17. $15.5 + 120.9 = 136.4$

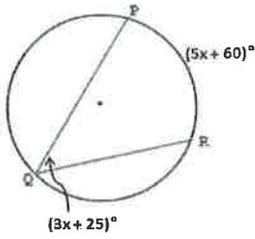
#18. $15.5 + 164.5 + 15.5 = 195.5^\circ$

#19. $43.6 + 15.5 = 59.1$

#21. $120.9 + 15.5 + 164.5$

Find the value(s) of the variables.

22.



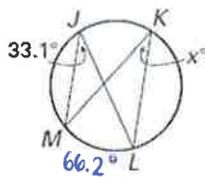
$$2(3x+25) = 5x+60$$

$$6x+50 = 5x+60$$

$$x+50 = 60$$

$$x = 10$$

23.



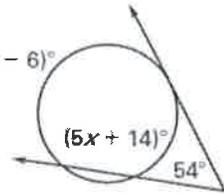
$$m\widehat{ML} = 2(33.1)$$

$$m\widehat{ML} = 66.2$$

$$m\angle LKM = \frac{1}{2}(66.2)$$

$$m\angle LKM = 33.1$$

24. $(13x - 6)^\circ$



$$54 = \frac{1}{2}(13x - 6 - (5x + 14))$$

$$54 = \frac{1}{2}(13x - 6 - 5x - 14)$$

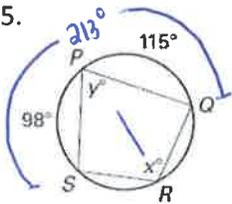
$$54 = \frac{1}{2}(8x - 20)$$

$$108 = 8x - 20$$

$$128 = 8x$$

$$x = 16$$

25.



$$x = \frac{1}{2}(98 + 115)$$

$$x = \frac{1}{2}(213)$$

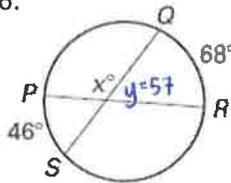
$$x = 106.5$$

$$x + y = 180$$

$$106.5 + y = 180$$

$$y = 73.5$$

26.



$$y = \frac{1}{2}(46 + 68)$$

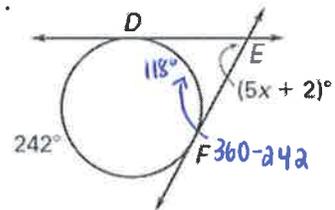
$$y = \frac{1}{2}(114)$$

$$y = 57$$

$$x + 57 = 180$$

$$x = 123$$

27.



$$5x + 2 = \frac{1}{2}(242 - 118)$$

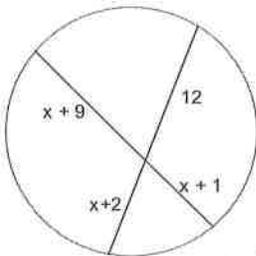
$$5x + 2 = \frac{1}{2}(124)$$

$$5x + 2 = 62$$

$$5x = 60$$

$$x = 12$$

28.



$$(x+9)(x+1) = 12(x+2)$$

$$x^2 + 10x + 9 = 12x + 24$$

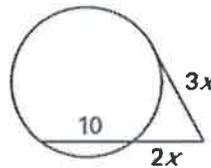
$$x^2 - 2x - 15 = 0$$

$$(x-5)(x+3) = 0$$

$$x = 5$$

$$x = -3$$

29.



$$(3x)(3x) = (2x)(2x + 10)$$

$$9x^2 = 4x^2 + 20x$$

$$5x^2 - 20x = 0$$

$$5x(x-4) = 0$$

$$5x = 0$$

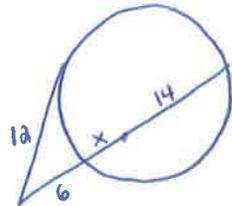
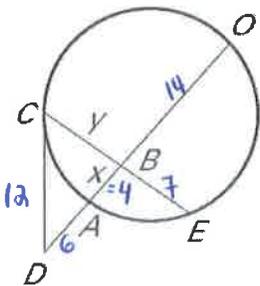
$$x - 4 = 0$$

$$x = 0$$

$$x = 4$$

↑
cant have zero lengths

30. In the diagram below, $BE = 7$, $BO = 14$, $AD = 6$, and $CD = 12$. Find the values of x and y .



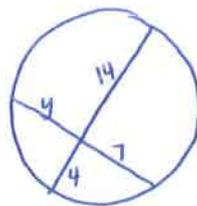
$$(12)(12) = 6(6 + x + 14)$$

$$144 = 6(x + 20)$$

$$144 = 6x + 120$$

$$24 = 6x$$

$$x = 4$$

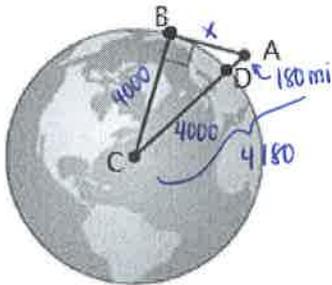


$$(4)(14) = (y)(7)$$

$$56 = 7y$$

$$y = 8$$

31. Suppose a space shuttle is orbiting at an altitude 180 miles above Earth (\overline{AD}). Use the diagram to find AB , the distance from the shuttle to the horizon? The radius of Earth is about 4000 miles. Round your answer to the nearest tenth.



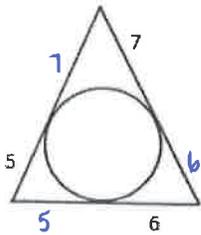
$$x^2 + 4000^2 = 4180^2$$

$$x^2 + 16000000 = 17472400$$

$$x^2 = 1472400$$

$$x = 1213.4 \text{ miles}$$

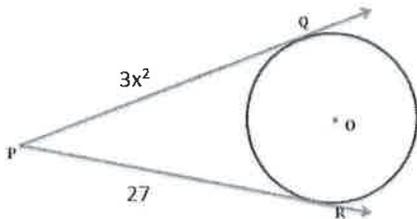
32. Find the perimeter of the circumscribed triangle.



$$P = 7 + 7 + 6 + 6 + 5 + 5$$

$$P = 36 \text{ units}$$

33. Given that Q and R are both points of tangency, please solve for x .



$$3x^2 = 27$$

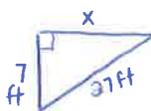
$$x^2 = 9$$

$$x = 3 \text{ or } x = -3$$

↑ because $3(-2)^2 = 3(9) = 27$ ✓

34. A hummingbird is flying toward a large tree. When it is 27 feet from the **center of the tree**, its lines of sight form two tangents.

- a) If the radius of the tree is 7 feet, then please find AC and BC to the nearest foot.



$$x^2 + 7^2 = 27^2$$

$$x^2 + 49 = 729$$

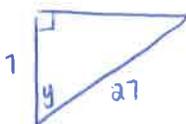
$$x^2 = 680$$

$$x = 26 \text{ ft}$$

$$AC = 26 \text{ ft}$$

$$BC = 26 \text{ ft}$$

- b) What is the portion ($m\widehat{AB}$) of the tree's surface that the hummingbird can see? Round to the nearest tenth.



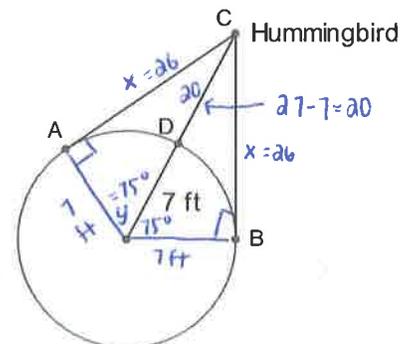
$$\cos y = \frac{7}{27}$$

$$y = \cos^{-1}\left(\frac{7}{27}\right)$$

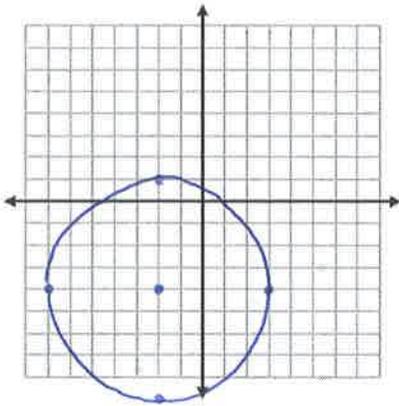
$$y = 75^\circ$$

$$m\widehat{AB} = 75^\circ + 75^\circ$$

$$m\widehat{AB} = 150^\circ$$



35. Find the center and radius of the circle defined by $x^2 + y^2 + 4x + 8y = 5$. Then graph the circle.



$$\underbrace{x^2 + 4x + 4}_{(x+2)^2} + \underbrace{y^2 + 8y + 16}_{(y+4)^2} = 5 + 4 + 16$$

$$\frac{1}{2}(4) = a^2 = 4$$

$$\frac{1}{2}(8) = b^2 = 16$$

$$(x+2)(x+2) + (y+4)(y+4) = 25$$

$$(x+2)^2 + (y+4)^2 = 25$$

$$\text{center: } (-2, -4)$$

$$\text{radius} = \sqrt{25} = 5$$

36. Prove or disprove whether or not the point $(1, 8)$ lies on the circle $(x + 2)^2 + (y + 4)^2 = 25$.

$$(1+2)^2 + (8+4)^2 \stackrel{?}{=} 25$$

$$(3)^2 + (12)^2 \stackrel{?}{=} 25$$

$$9 + 144 \stackrel{?}{=} 25$$

$$153 \neq 25$$

$(1, 8)$ does not
lie on the
circle

37. Jamie is designing a park and wants to include a carousel. On a blueprint, suppose that the center of the carousel is at the origin and that one of the railings on the circumference of the carousel has coordinates $(3, 4)$.

↖ center $(0, 0)$

a. Write an equation to represent the circular path the carousel follows as it spins.

$$\text{radius} = \sqrt{(3-0)^2 + (4-0)^2} = \sqrt{(3)^2 + (4)^2} = \sqrt{9+16} = \sqrt{25} = 5$$

center $(0, 0)$

$$\text{Eqn: } (x-0)^2 + (y-0)^2 = 5^2 \Rightarrow \boxed{x^2 + y^2 = 25}$$

b. If one unit on the coordinate plane is equivalent to 1 foot, find the diameter of the carousel.

$$\text{radius} = 5 \text{ ft}$$

$$\text{diameter} = 5 \times 2 = \boxed{10 \text{ ft}}$$

