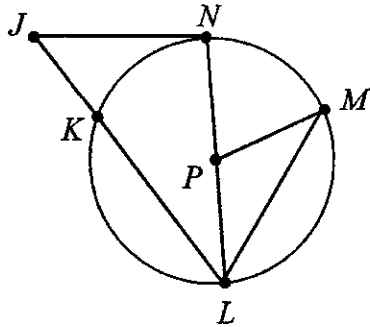


Unit 10 Test Study Guide (Circles)

Name: Key
Date: _____ Block: _____

Topic 1: Parts of Circles

1. Using the diagram below, give an example of each circle part.



- a. Center: P
 b. Radius: PM
 c. Diameter: NL
 d. Chord: ML
 e. Secant: JL
 f. Tangent: JN
 g. Central Angle: $\angle MPL$
 h. Inscribed Angle: $\angle NLM$
 i. Minor Arc: \widehat{NK}
 j. Major Arc: \widehat{MLN}
 k. Semicircle: \widehat{NKL}

Topic 2: Area & Circumference

2. Find the area and circumference of the circle to the right. $d = 16.6$

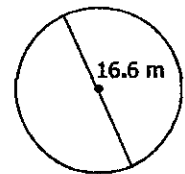
$$A = \pi (8.3)^2$$

$$A = 68.89\pi$$

$$\boxed{A \approx 216.42 \text{ m}^2}$$

$$C = 16.6\pi$$

$$\boxed{C \approx 52.15 \text{ m}}$$



3. Find the radius of a circle with a circumference of 106.81 centimeters. ($C = \pi d$)

$$\frac{106.81}{\pi} = \frac{\pi d}{\pi}$$

$$34 = d$$

$$\boxed{r = 17 \text{ cm}}$$

4. Find the diameter of a circle with an area of 95.03 square feet. ($A = \pi r^2$)

$$\frac{95.03}{\pi} = \frac{\pi r^2}{\pi}$$

$$\sqrt{30.25} = \sqrt{r^2}$$

$$5.5 = r$$

$$\boxed{d = 11 \text{ ft}}$$

5. Find the circumference of a circle with an area of 254.47 square inches.

$$\frac{254.47}{\pi} = \frac{\pi r^2}{\pi}$$

$$\sqrt{81} = \sqrt{r^2}$$

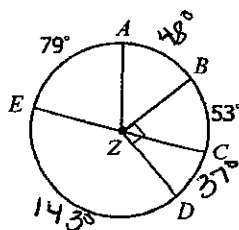
$$9 = r$$

$$C = \pi \cdot 18$$

$$\boxed{C \approx 56.55 \text{ in}}$$

Topic 3: Central Angles

6. Find each arc measure.



a) $m\widehat{CD} = \underline{37^\circ}$

d) $m\widehat{EB} = \underline{127^\circ}$

b) $m\widehat{AB} = \underline{48^\circ}$

e) $m\widehat{BDE} = \underline{233^\circ}$

c) $m\widehat{ED} = \underline{143^\circ}$

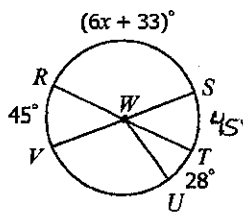
f) $m\widehat{DEC} = \underline{323^\circ}$

7. Solve for x.

$$6x + 33 = 135$$

$$6x = 102$$

$$x = 17$$



8. Find $m\widehat{EF}$.

$$15x - 7 = 13x + 3$$

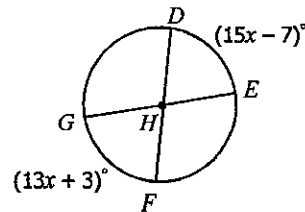
$$2x - 7 = 3$$

$$2x = 10$$

$$x = 5$$

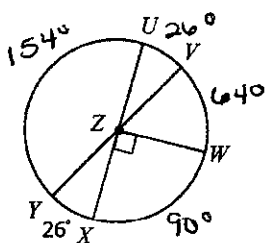
$$m\widehat{GF} = 13(5) + 3 = 68$$

$$m\widehat{EF} = 112^\circ$$



Topic 4: Arc Lengths

If the circle below has a radius of 15 cm, find each arc length.



9. \widehat{VW}

$$l = \frac{64 \cdot \pi \cdot 30}{360}$$

$$= \frac{1920\pi}{360}$$

$$\approx 16.76 \text{ cm}$$

10. \widehat{UXV}

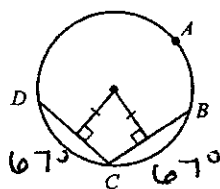
$$l = \frac{334 \cdot \pi \cdot 30}{360}$$

$$= \frac{10020\pi}{360}$$

$$\approx 87.44 \text{ cm}$$

Topic 5: Chords & Arcs

11. If $m\widehat{DC} = (12x + 7)^\circ$ and $m\widehat{CB} = (18x - 23)^\circ$, find $m\widehat{DAB}$.



$$18x - 23 = 12x + 7$$

$$6x - 23 = 7$$

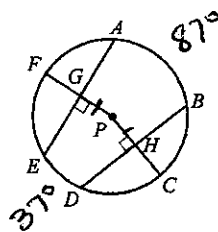
$$6x = 30$$

$$x = 5$$

$$m\widehat{DC} = 12(5) + 7 = 67$$

$$m\widehat{DAB} = 226^\circ$$

12. If $GP = PH$, $GA = 17$, $m\widehat{ED} = 37^\circ$, and $m\widehat{AB} = 87^\circ$, find each measure.



$$DB = \underline{34}$$

$$EG = \underline{17}$$

$$m\widehat{DB} = \underline{118^\circ}$$

$$m\widehat{FA} = \underline{59^\circ}$$

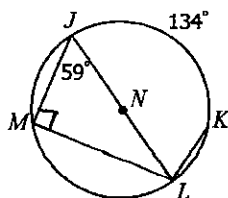
$$m\widehat{DC} = \underline{59^\circ}$$

$$360 - (37 + 87) = 236$$

$$236 \div 2 = 118$$

Topic 6: Inscribed Angles

13. Find each measure.



a) $m\widehat{ML} = \underline{118^\circ}$

b) $m\angle JLK = \underline{67^\circ}$

c) $m\angle JLM = \underline{31^\circ}$

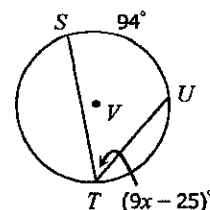
d) $m\widehat{MJ} = \underline{62^\circ}$

14. Solve for x.

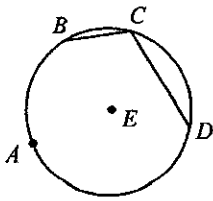
$$9x - 25 = 47$$

$$9x = 72$$

$$x = 8$$



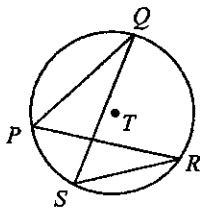
15. If $m\angle BCD = (7x + 10)^\circ$ and $m\widehat{BAD} = (19x - 50)^\circ$, find $m\widehat{BAD}$.



$$\begin{aligned} 19x - 50 &= 2(7x + 10) \\ 19x - 50 &= 14x + 20 \\ 5x - 50 &= 20 \\ 5x &= 70 \\ x &= 14 \end{aligned}$$

$$\begin{aligned} m\widehat{BAD} &= 19(14) - 50 \\ &= \boxed{216^\circ} \end{aligned}$$

16. If $m\angle PQS = (6x + 1)^\circ$ and $m\angle PRS = (34 - 5x)^\circ$, find $m\widehat{PS}$.

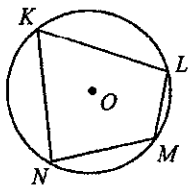


$$\begin{aligned} 6x + 1 &= 34 - 5x \\ 11x + 1 &= 34 \\ 11x &= 33 \\ x &= 3 \end{aligned}$$

$$\begin{aligned} m\angle PQS &= 6(3) + 1 \\ &= 19 \end{aligned}$$

$$m\widehat{PS} = 2(19) = \boxed{38^\circ}$$

17. If $m\angle K = (8x - 19)^\circ$ and $m\angle M = (5x + 43)^\circ$, find $m\angle M$.



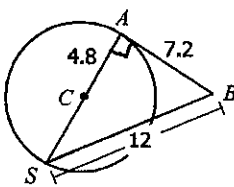
$$\begin{aligned} 8x - 19 + 5x + 43 &= 180 \\ 13x + 24 &= 180 \\ 13x &= 156 \\ x &= 12 \end{aligned}$$

$$\begin{aligned} m\angle M &= 5(12) + 43 \\ &= \boxed{103^\circ} \end{aligned}$$

Topic 7: Tangents

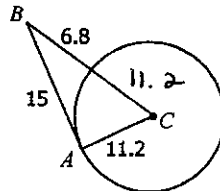
For questions 18-19, determine if \overline{AB} is tangent to circle C.

18.



$$\begin{aligned} 9.6^2 + 7.2^2 &= 12^2 \\ 92.16 + 51.84 &= 144 \\ 144 &= 144 \\ \text{Yes!} \end{aligned}$$

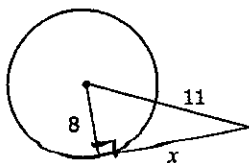
19.



$$\begin{aligned} 11.2^2 + 6.8^2 &= 15^2 \\ 125.44 + 46.24 &= 225 \\ 171.68 &\neq 225 \\ \text{NO} \end{aligned}$$

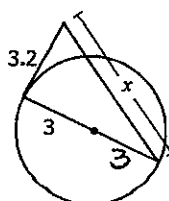
For questions 20-21, solve for x. Assume segments that appear to be tangent are tangent.

20.



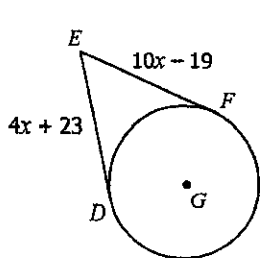
$$\begin{aligned} x^2 + 8^2 &= 11^2 \\ x^2 + 64 &= 121 \\ \sqrt{x^2} &= \sqrt{57} \\ x &= \boxed{7.55} \end{aligned}$$

21.



$$\begin{aligned} 3.2^2 + 6^2 &= x^2 \\ 10.24 + 36 &= x^2 \\ \sqrt{46.24} &= \sqrt{x^2} \\ x &= \boxed{6.8} \end{aligned}$$

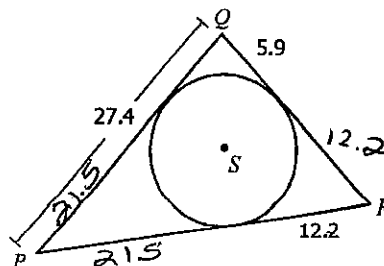
22. If \overline{DE} and \overline{EF} are tangent to circle G , find EF .



$$\begin{aligned} 10x - 19 &= 4x + 23 \\ 6x - 19 &= 23 \\ 6x &= 42 \\ x &= 7 \end{aligned}$$

$$EF = 10(7) - 19 = \boxed{51}$$

23. Find the perimeter of $\triangle PQR$.

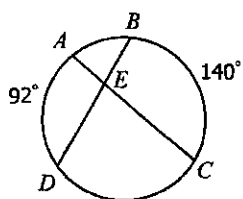


$$P = \boxed{79.2}$$

Topic 8: Angles formed by Intersecting Chords, Secants, & Tangents

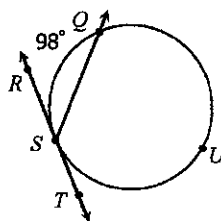
For questions 24-31, find each measure. Assume segments that appear to be tangent are tangent.

24.



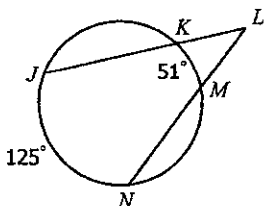
$$\begin{aligned} \frac{92 + 140}{2} &= 116^\circ \\ 180 - 116 &= 64^\circ \\ m\angle AED &= \underline{116^\circ} \\ m\angle DEC &= \underline{64^\circ} \end{aligned}$$

25.



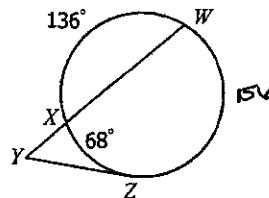
$$\begin{aligned} 360 - 98 &= 262 \\ 262 / 2 &= 131 \\ m\angle QST &= \underline{131^\circ} \end{aligned}$$

26.



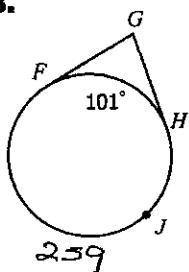
$$\begin{aligned} \frac{125 - 51}{2} &= 37 \\ m\angle KLM &= \underline{37^\circ} \end{aligned}$$

27.



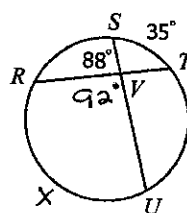
$$\begin{aligned} \frac{136 - 68}{2} &= 34 \\ m\angle XYZ &= \underline{44^\circ} \end{aligned}$$

28.



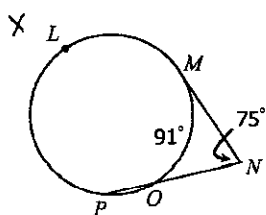
$$\begin{aligned} \frac{259 - 101}{2} &= 79 \\ m\angle FGH &= \underline{79^\circ} \end{aligned}$$

29.



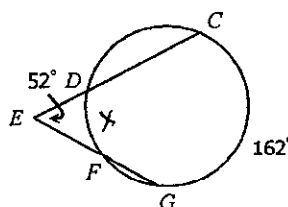
$$\begin{aligned} 92 &= \frac{x + 35}{2} \\ 184 &= x + 35 \\ x &= 149 \\ m\widehat{RU} &= \underline{149^\circ} \end{aligned}$$

30.



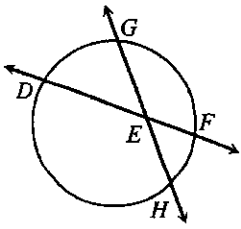
$$\begin{aligned} 75 &= \frac{x - 91}{2} \\ 150 &= x - 91 \\ x &= 241 \\ m\widehat{MLP} &= \underline{241^\circ} \end{aligned}$$

31.



$$\begin{aligned} 52 &= \frac{162 - x}{2} \\ 104 &= 162 - x \\ -58 &= -x \\ m\widehat{DF} &= \underline{58^\circ} \end{aligned}$$

32. If $m\widehat{DH} = (11x + 7)^\circ$, $m\widehat{GF} = (5x + 9)^\circ$, and $m\angle GEF = (10x - 22)^\circ$, find $m\widehat{DH}$.



$$2(10x - 22) = \frac{11x + 7 + 5x + 9}{2}$$

$$20x - 44 = 16x + 16$$

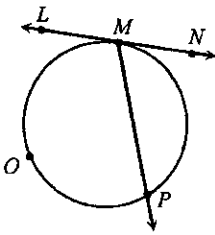
$$4x - 44 = 16$$

$$4x = 60$$

$$x = 15$$

$$m\widehat{DH} = 11(15) + 7 = \boxed{172^\circ}$$

33. If $m\widehat{MOP} = (11x - 38)^\circ$ and $m\angle LMP = (3x + 41)^\circ$, find $m\angle NMP$.



$$11x - 38 = 2(3x + 41)$$

$$11x - 38 = 6x + 82$$

$$5x - 38 = 82$$

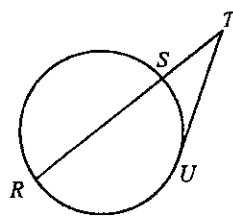
$$5x = 120$$

$$x = 24$$

$$m\angle LMP = 3(24) + 41 = 113^\circ$$

$$m\angle NMP = \boxed{67^\circ}$$

34. If $m\widehat{RU} = (16x - 13)^\circ$, $m\widehat{SU} = (11x - 24)^\circ$, and $m\angle STU = (3x + 1)^\circ$, find $m\widehat{SU}$.



$$2(3x + 1) = \frac{16x - 13 + (11x - 24)}{2}$$

$$6x + 2 = 5x + 11$$

$$x + 2 = 11$$

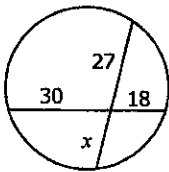
$$x = 9$$

$$m\widehat{SU} = 11(9) - 24 = \boxed{75^\circ}$$

Topic 9: Segment Lengths formed by Intersecting Chords, Secants, & Tangents

For questions 35-38, solve for x . Assume segments that appear to be tangent are tangent.

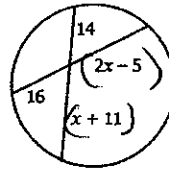
35.



$$\frac{27}{27} = \frac{540}{27}$$

$$x = 20$$

36.



$$16(2x - 5) = 14(x + 11)$$

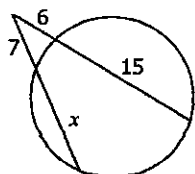
$$32x - 80 = 14x + 154$$

$$18x - 80 = 154$$

$$18x = 234$$

$$x = 13$$

37.



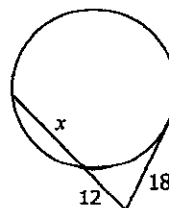
$$7(x + 7) = 6(21)$$

$$7x + 49 = 126$$

$$7x = 77$$

$$x = 11$$

38.



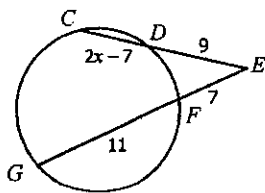
$$18^2 = 12(x + 12)$$

$$324 = 12x + 144$$

$$180 = 12x$$

$$x = 15$$

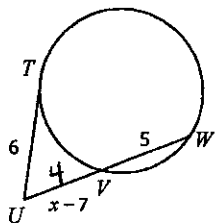
39. Find CD .



$$\begin{aligned} 9(2x+2) &= 7(18) \\ 18x+18 &= 126 \\ 18x &= 108 \\ x &= 6 \end{aligned}$$

$$\begin{aligned} CD &= 2(6) - 7 \\ &= \boxed{5} \end{aligned}$$

40. Find UW .



$$\begin{aligned} 6^2 &= (x-7)(x-2) \\ 36 &= x^2 - 2x - 7x + 14 \\ 36 &= x^2 - 9x + 14 \\ 0 &= x^2 - 9x - 22 \end{aligned}$$

$$\begin{aligned} (x-11)(x+2) &= 0 \\ x-11=0 \quad x+2=0 \\ x &= \boxed{11} - 2 \end{aligned}$$

$$\begin{aligned} UW &= 11 - 7 \\ &= 4 \end{aligned} \quad \boxed{UW=9}$$

Topic 10: Equations of Circles

Identify the center and radius/diameter for the following circles.

41. $(x+2)^2 + (y-7)^2 = 16$ Center: $(-2, 7)$; Radius: 4

42. $x^2 + y^2 = 121$ Center: $(0, 0)$; Diameter: 22

Using the given information, write the equation of the circle.

43. Center: $(-3, 4)$, Radius: 7

$$(x+3)^2 + (y-4)^2 = 49$$

44. Center: $(-9, 0)$, Diameter: 20

$$(x+9)^2 + y^2 = 100$$

45. Center: $(-7, -1)$, Diameter: 9

$$(x+7)^2 + (y+1)^2 = 20.25$$

46. Center: $(12, 5)$, Radius: $\sqrt{89}$

$$(x-12)^2 + (y-5)^2 = 89$$

47. Center: $(2, -2)$, Circumference: 12π
 $\hookrightarrow d=12$

$$(x-2)^2 + (y+2)^2 = 36$$

48. Center: $(0, 10)$, Area: 225π

$$x^2 + (y-10)^2 = 225$$

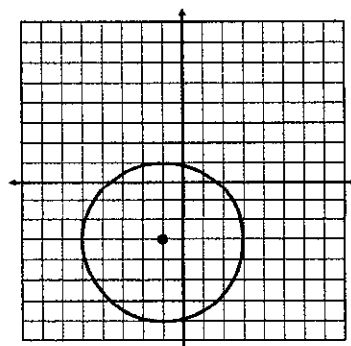
49. Center: $(-4, 7)$, Point on Circle: $(-1, 9)$

$$\begin{aligned} r &= \sqrt{(-1+4)^2 + (9-7)^2} \\ &= \sqrt{3^2 + 2^2} \\ &= \sqrt{9+4} = \sqrt{13} \end{aligned}$$

$$(x+4)^2 + (y-7)^2 = 13$$

50.

Center:
 $(-1, -3)$
 radius:
 4



$$(x+1)^2 + (y+3)^2 = 16$$