

1) Write the equation of a circle in standard form with center (0, 6) and  $r = 3\sqrt{7}$

$$x^2 + (y - 6)^2 = 63$$

2) Write the equation of a circle in general form with center (-2, 6) and  $r = 8$

$$(x + 2)^2 + (y - 6)^2 = 64$$

$$x^2 + 4x + 4 + y^2 - 12y + 36 = 64$$

$$x^2 + y^2 + 4x - 12y - 24 = 0$$

3) What is the center and radius of the following circle?

$$(x - 9)^2 + y^2 = 98$$

$$C: (9, 0)$$

$$r = 7\sqrt{2}$$

4) What is the center and radius of the following circle?

$$x^2 - 6x + y^2 + 9y = 1$$

$$x^2 - 6x + 9 + y^2 + 9y + \frac{81}{4} = 1 + 9 + \frac{81}{4}$$

$$(x - 3)^2 + (y + \frac{9}{2})^2 = \frac{121}{4}$$

$$C: (3, -\frac{9}{2}) \quad r = \frac{11}{2}$$

5) Find the center and radius of the following circle?

$$8y^2 - 64 = -8x^2 + 64y - 8$$

$$y^2 - 8 = -x^2 + 8y - 1$$

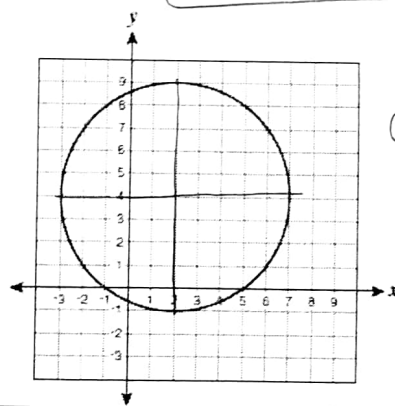
$$x^2 + y^2 - 8y + 16 = 7 + 16$$

$$x^2 + (y - 4)^2 = 23$$

$$C: (0, 4) \quad r = \sqrt{23}$$

6) Write the equation of the following circle in standard form:

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



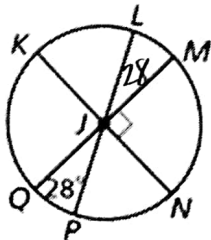
$$C: (2, 4)$$

$$r = 5$$

7) Find each measure.

$$m\widehat{MP} = 152^\circ$$

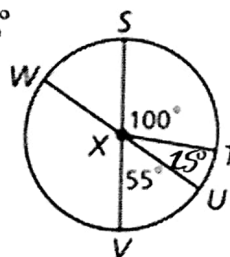
$$m\widehat{QNL} = 208^\circ$$



8) Find each measure.

$$m\widehat{WT} = 155^\circ$$

$$m\widehat{WTV} = 235^\circ$$



9) Does the point (-4, -4) lie in, on, or outside of the circle centered at (3, -5) and containing the point (5, 2)?

$$r = \sqrt{(5-3)^2 + (2-(-5))^2} = \sqrt{4 + 49} = \sqrt{53}$$

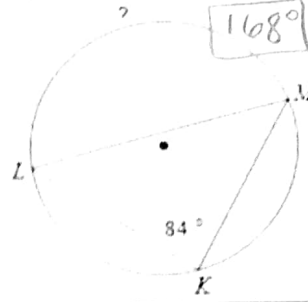
$$(x-3)^2 + (y+5)^2 = 53$$

$$(-4-3)^2 + (-4+5)^2 = 53$$

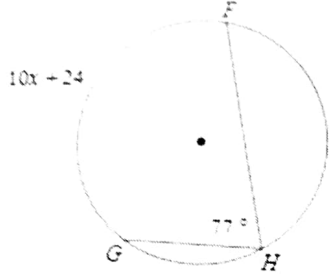
$$49 + 1 = 50 < 53$$

(inside)

10) Find the measure of the arc or angle indicated



11) Solve for x.



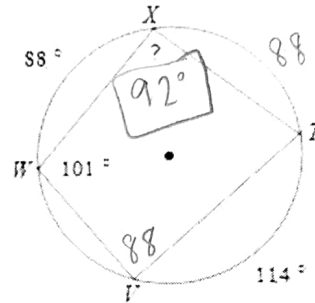
$$2(77) = 10x + 24$$

$$154 = 10x + 24$$

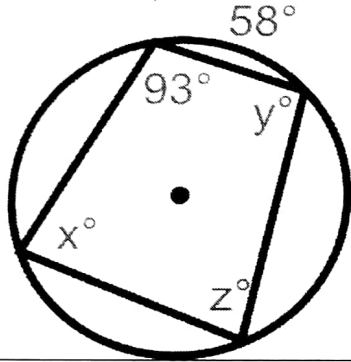
$$130 = 10x$$

$$x = 13$$

12) Find the measure of the arc or angle indicated



13) Find x, y, z

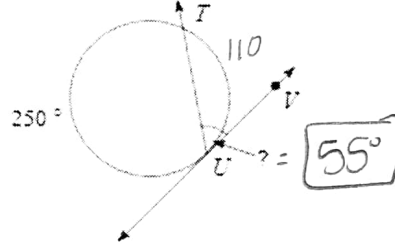


$$x = 82^\circ$$

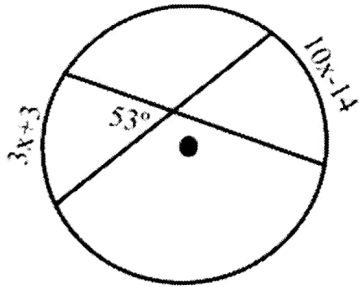
$$y = 98^\circ$$

$$z = 87^\circ$$

14) Find the measure of the arc or angle indicated.



15) Solve for x.



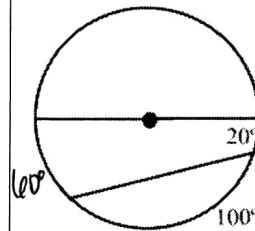
$$\frac{3x + 3 + 10x - 14}{2} = 53$$

$$13x - 11 = 106$$

$$13x = 117$$

$$x = 9$$

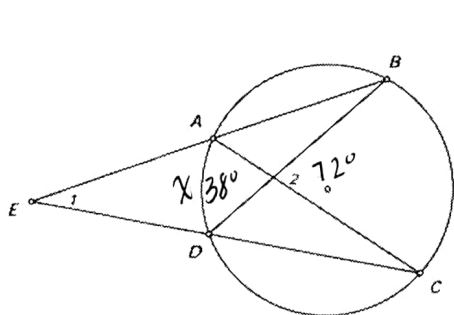
16) Solve for x.



$$x = \frac{60 - 20}{2}$$

$$x = \frac{40}{2} = 20^\circ$$

17) If  $m\angle 2 = 72$  and  $m\widehat{BC} = 106$ , find  $m\angle 1$



$$\frac{x + 106}{2} = 72$$

$$x + 106 = 144$$

$$x = 38$$

$$\frac{106 - 38}{2} = m\angle 1$$

$$\frac{68}{2} = m\angle 1$$

$$34^\circ = m\angle 1$$

18) Find the exact circumference given the area of the circle

$$\text{area} = 16\pi \text{ mi}^2$$

$$16\pi = \pi r^2$$

$$16 = r^2$$

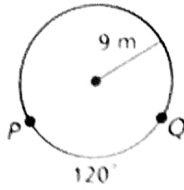
$$r = 4$$

$$C = 2\pi(4)$$

$$= 8\pi \text{ mi}$$

19) Find the length of the arc as an exact measurement.

$\widehat{PQ}$

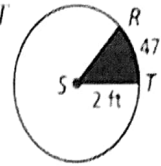


$$L = \frac{2\pi(9)(120)}{360}$$

$$= \boxed{60\pi \text{ m}}$$

20) Find the area of the sector as an exact measurement.

sector  $RST$



$$A = \frac{\pi(2)^2(47)}{360}$$

$$= \boxed{\frac{47\pi}{90} \text{ ft}^2}$$

21) Find the length of the radius as an exact measurement.

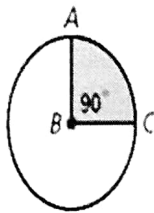
area of sector

$ABC = 9\pi$

$$9\pi = \frac{\pi r^2(90)}{360}$$

$$r^2 = 36$$

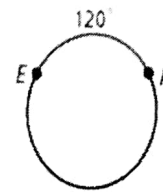
$$r = \boxed{6}$$



22) Find the length of the radius as an approximate measurement.

arc length of

$\widehat{EF} = 8\pi$



$$8\pi = \frac{2\pi r(120)}{360}$$

$$2880 = 240r$$

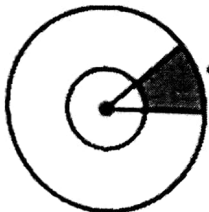
$$r = \boxed{12}$$

23)

In the diagram, the larger of the two concentric circles has radius 5, and the smaller circle has radius 2.

What is the area of the shaded region in terms of  $\pi$ ?

Answer in both exact and approximate.



Large sector

$$A = \frac{\pi(25)(40)}{360}$$

$$= \frac{25\pi}{9}$$

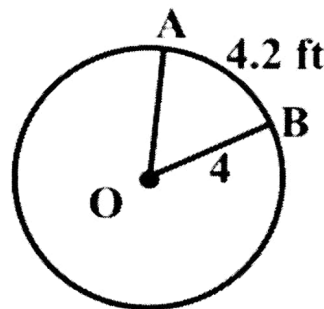
Small sector

$$A = \frac{\pi(4)(40)}{360}$$

$$= \frac{4\pi}{9}$$

$$\frac{25\pi}{9} - \frac{4\pi}{9} = \frac{21\pi}{9} = \boxed{\frac{7\pi}{3}} \approx \boxed{7.33}$$

24) Find the measure of the central angle. Round to the nearest tenth.



$$4.2 = \frac{2\pi(4)\theta}{360}$$

$$\frac{1512}{8\pi} = \frac{8\pi\theta}{8\pi}$$

$$\theta \approx \boxed{60.2^\circ}$$

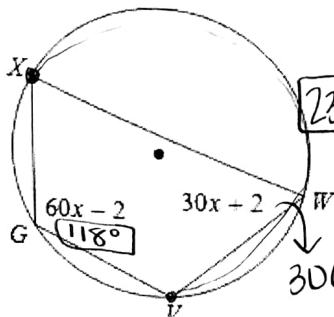
25)

Find  $m\widehat{XWV}$

$$60x - 2 + 30x + 2 = 180$$

$$90x = 180$$

$$x = 2$$



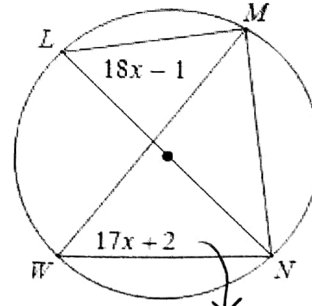
$$30(2) + 2 = 62^\circ$$

26)

Find  $m\angle MWN$

$$18x - 1 = 17x + 2$$

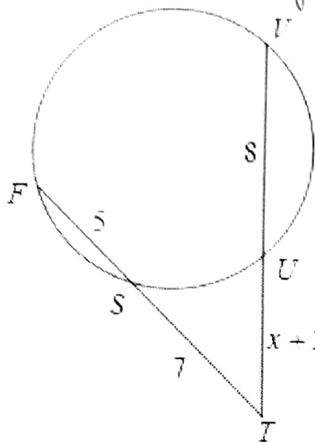
$$x = 3$$



$$17(3) + 2 = \boxed{53^\circ}$$

27)

Find  $UT$

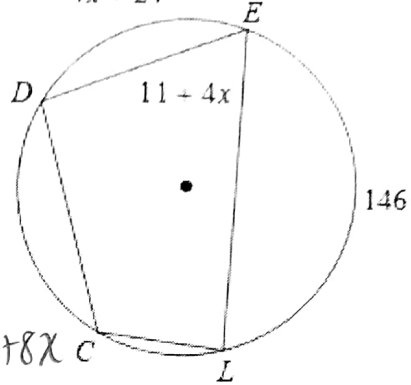


$$\begin{aligned} 7(12) &= (x+3)(x+11) \\ 84 &= x^2 + 14x + 33 \\ 0 &= x^2 + 14x - 51 \\ 0 &= (x+17)(x-3) \\ x &= -17, 3 \end{aligned}$$

$$x+3 = \boxed{6}$$

28)

Find  $m\widehat{DE}$

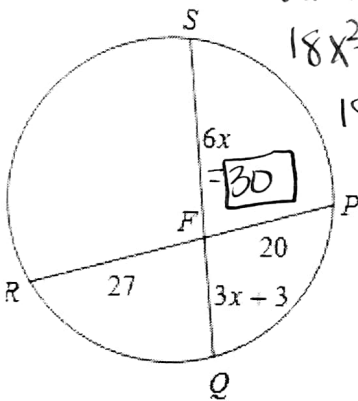


$$4x+24 = 4(114) + 24 = \boxed{80^\circ}$$

$$\begin{aligned} 22+8x + 4x+24 + 146 &= 360 \\ 12x + 192 &= 360 \\ 12x &= 168 \quad x=14 \end{aligned}$$

29)

Find  $FS$

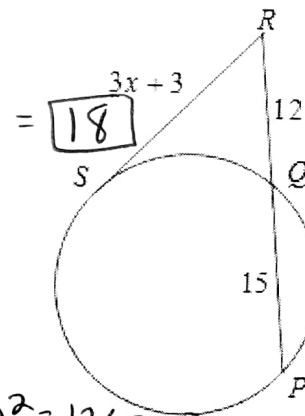


$$\begin{aligned} 6x(3x+3) &= 27(20) \\ 18x^2 + 18x &= 540 \\ 18x^2 + 18x - 540 &= 0 \\ 18(x^2 + x - 30) &= 0 \\ (x+6)(x-5) &= 0 \\ x &= -6, 5 \end{aligned}$$

$$6x = \boxed{30}$$

30)

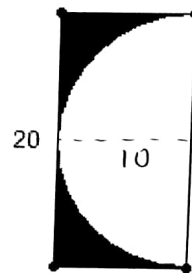
Find  $SR$



$$\begin{aligned} (3x+3)^2 &= 12(27) \\ 9x^2 + 18x + 9 &= 324 \\ 9x^2 + 18x - 315 &= 0 \\ 9(x^2 + 2x - 35) &= 0 \end{aligned}$$

$$9(x+7)(x-5) = 0 \quad x = -7, 5$$

Find the area of the shaded region



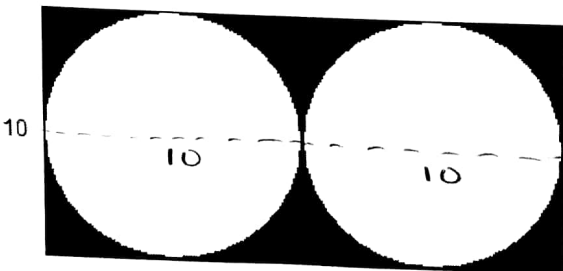
Circle:  
 $A = \pi(10)^2 = 100\pi$   
 Semi-Circle:  $50\pi$

Rectangle:  $A = 20 \cdot 10 = 200$

$$200 - 50\pi \approx \boxed{42.9}$$

30) Round to the nearest tenth.

3) Find the area of the shaded region:



Rectangle:  $A = lw = 10 \cdot 20 = 200$

Circle:  $A = \pi(5)^2 = 25\pi$

$$200 - 50\pi \approx \boxed{42.9}$$