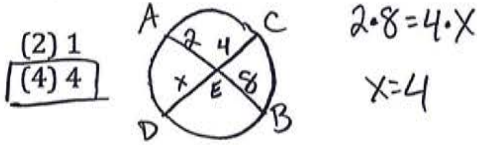


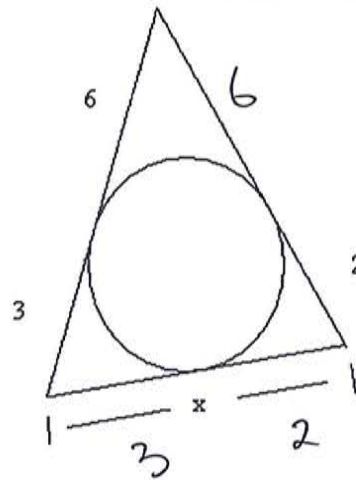
Answer each question below. Be sure to show all work where necessary:

\_\_\_ 1) Chords AB and CD intersect at E. If AE = 2, BE = 8, and CE = 4, what is the value of ED?

- (1) 16  
 (3) 2



\_\_\_ 5) In the diagram at the right, the segment shown are tangent to the circle. Find the value of x.

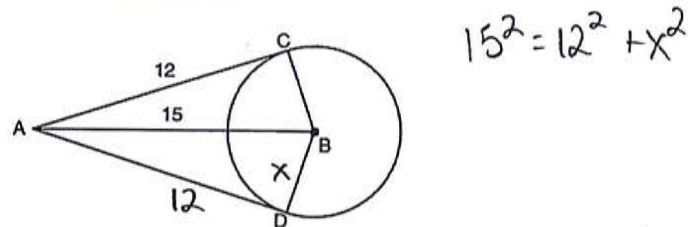


2) Two tangents meet at a common endpoint to form angle A. If the measure of the major arc is  $\frac{5\pi}{4}$ , what is the measure of angle A, in degrees?

$$\frac{5\pi}{4} \cdot \frac{180}{\pi} = 225 \text{ minor} = 135$$

$$\frac{225 - 135}{2} = \boxed{45}$$

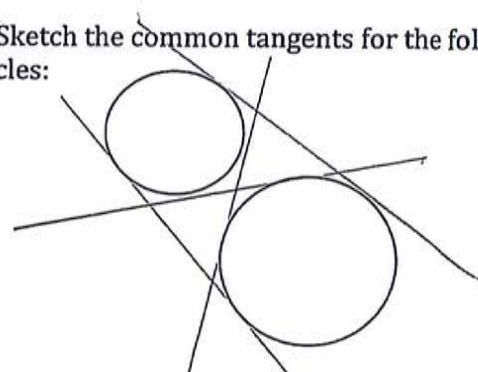
\_\_\_ 6) In the diagram below,  $\overline{AC}$  and  $\overline{AD}$  are tangent to circle B at points C and D, respectively, and  $\overline{BC}$ ,  $\overline{BD}$ , and  $\overline{BA}$  are drawn.



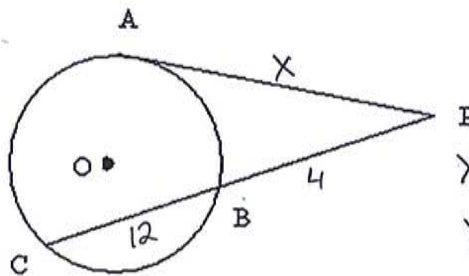
If  $AC = 12$  and  $AB = 15$ , what is the length of  $\overline{BD}$ ?

- 1) 5.5  
 (2) 9  
 3) 12  
 4) 18

7) Sketch the common tangents for the following circles:



3) In the accompanying diagram,  $\overline{PA}$  is tangent to circle O at A. If  $CB = 12$  and  $PB = 4$ , what is PA?

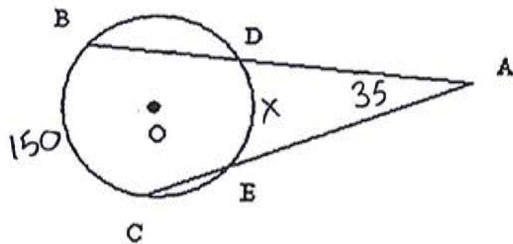


$$x^2 = 16 \cdot 4$$

$$x^2 = 64$$

$$\boxed{x = 8}$$

4) In the diagram at the right, secant  $\overline{AB}$  intersects circle O at D and secant  $\overline{AC}$  at E. If  $\widehat{BC} = 150$  and  $m\angle A = 35$ , what is the measure of arc DE?



$$\frac{150 - x}{2} = 35$$

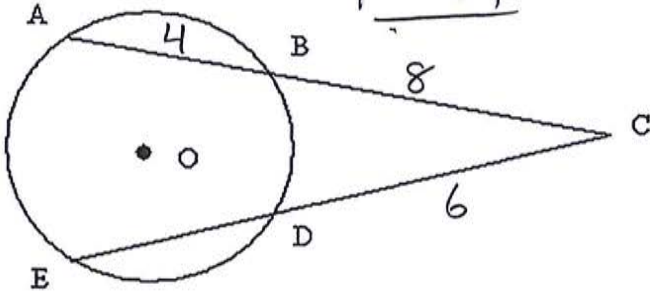
$$150 - x = 70$$

$$\boxed{x = 80}$$

8) In circle O below, if  $AB = 4$ ,  $BC = 8$ ,  $CD = 6$ , find the measure of CE.

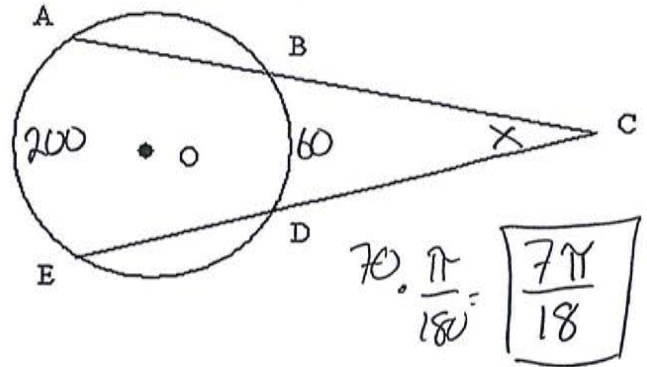
$$12 \cdot 8 = x \cdot 6$$

$$\boxed{x = 16}$$



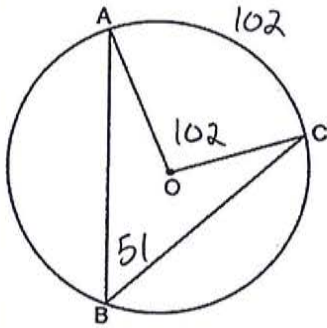
11) In circle O,  $m\widehat{AE} = 200$  and  $m\widehat{BD} = 60$ . Find  $m\angle C$ , in radians!!!!.

$$\frac{200 - 60}{2} = 70$$



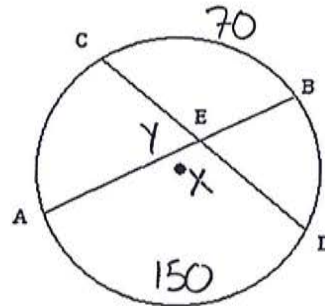
$$70 \cdot \frac{\pi}{180} = \boxed{\frac{7\pi}{18}}$$

9) In the accompanying diagram of circle O,  $\widehat{AB}$  and  $\widehat{BC}$  are chords and  $m\angle AOC = 102$ . What is  $m\angle ABC$ ?



$$\boxed{51}$$

12) In circle O, chords  $\widehat{AB}$  and  $\widehat{CD}$  intersect at E with  $\widehat{AD} = 150$ , and  $\widehat{CB} = 70$ . Determine  $m\angle AED$  and  $m\angle AEC$ .

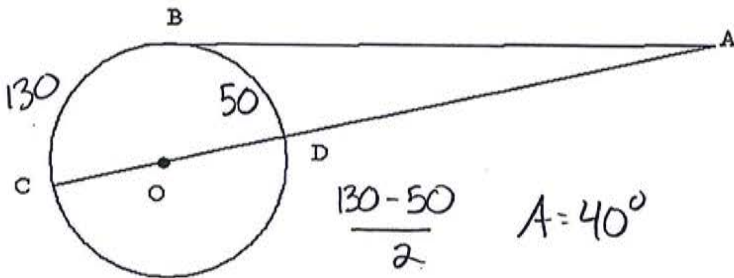


$$\frac{150 + 70}{2} = 110$$

$$\angle AED = 110$$

$$\angle AEC = 70$$

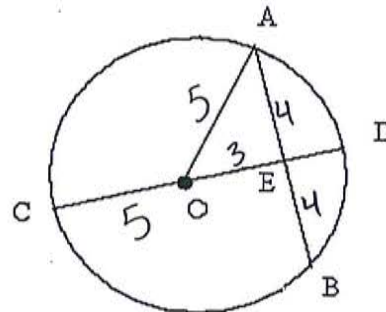
10) In circle O, with diameter  $\widehat{COD}$  and  $\widehat{BC} = 130$ , determine  $m\angle A$ , in radians!!!!



$$\frac{130 - 50}{2} \quad A = 40^\circ$$

$$40 \cdot \frac{\pi}{180} = \boxed{\frac{2\pi}{9}}$$

13) Given the circle below with chord AB measuring 8 inches,  $\widehat{AB} \perp \widehat{CD}$  at E, and diameter COD measuring 10 inches, find each of the following:

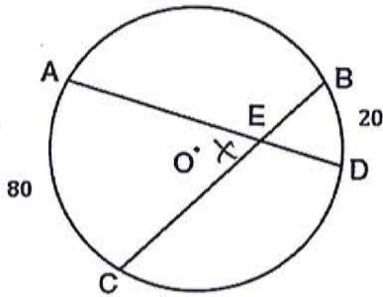


- a) AO 5  
b) OE 3

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Per: \_\_\_\_\_  
**Circles Review**

Answer each question below. Be sure to show all work and indicate any formulas used.

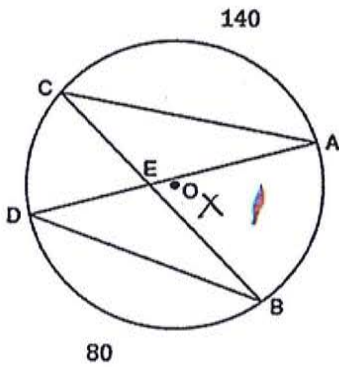
14. In the diagram below of circle  $O$ , chords  $\overline{AD}$  and  $\overline{BC}$  intersect at  $E$ . Determine the radian measure of  $\angle AEC$ .



$$\frac{80+20}{2} = 50$$

$$50 \cdot \frac{\pi}{180} = \boxed{\frac{5\pi}{18}}$$

15. In the diagram below of circle  $O$ , chords  $\overline{AD}$  and  $\overline{BC}$  intersect at  $E$ . Determine the radian measure of  $\angle AEB$ .



$$360 - (140 + 80)$$

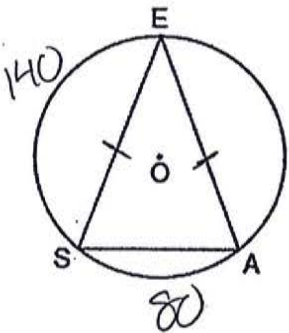
$$\frac{140}{2} = 70$$

$$\frac{140+80}{2} = 110 = \angle BED \cong \angle CEA$$

$$\therefore \angle AEB = 70$$

$$70 \cdot \frac{\pi}{180} = \boxed{\frac{7\pi}{18}}$$

16. A machine part consists of a circular wheel with an inscribed triangular plate, as shown in the accompanying diagram. If  $\overline{SE} \cong \overline{EA}$ , and  $m\widehat{SE} = 140$ , find  $m\angle SEA$ .



$$140 \quad \frac{80}{2} \quad \boxed{40}$$

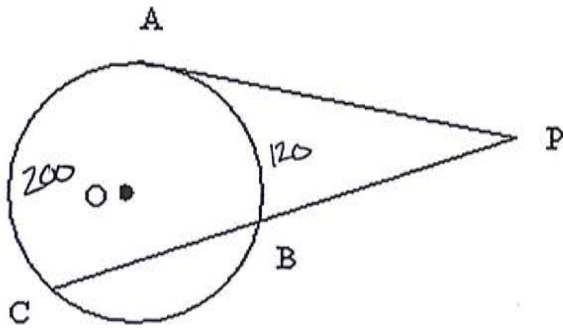
17. Two tangents meet at an external point  $P$ . If the measure of the major arc created is  $\frac{5\pi}{3}$ , determine the radian measure of  $P$ .

$$\frac{5\pi}{3} \cdot \frac{180}{\pi} = 300 \quad \text{minor} = 60$$

$$\frac{300-60}{2} = 120$$

$$120 \cdot \frac{\pi}{180} = \boxed{\frac{2\pi}{3}}$$

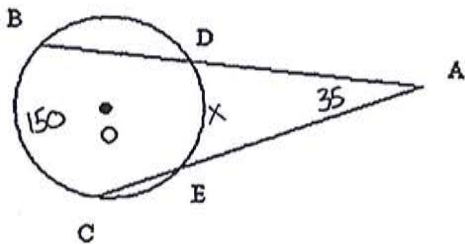
18. In the diagram below, secant  $\overline{PC}$  and tangent  $\overline{PA}$  meet at external point P. If  $m\widehat{AC} = 200$  and  $m\widehat{AB} = 120$ , determine the  $m\angle P$  in radians.



$$\frac{200 - 120}{2} = 40$$

$$40 \cdot \frac{\pi}{180} = \boxed{\frac{2\pi}{9}}$$

19. In the diagram at the right, secant  $\overline{AB}$  intersects circle O at D and secant  $\overline{AC}$  at E. If  $m\widehat{BC} = 150$  and  $m\angle A = 35$ , what is the radian measure of  $\widehat{DE}$ .



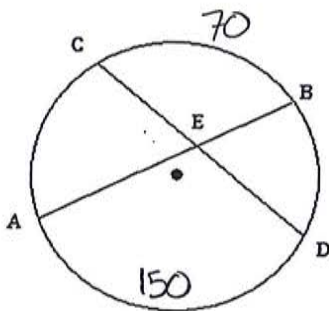
$$\frac{150 - X}{2} = 35$$

$$150 - X = 70$$

$$X = 80$$

$$80 \cdot \frac{\pi}{180} = \boxed{\frac{4\pi}{9}}$$

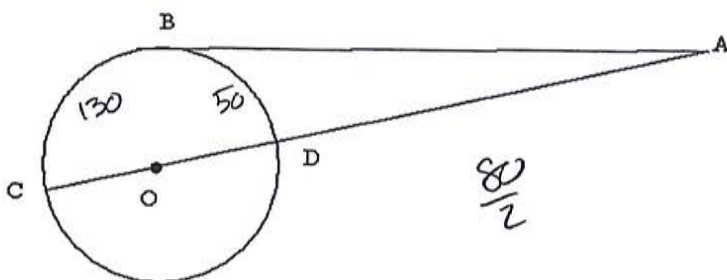
20. In circle O, chords  $\overline{AB}$  and  $\overline{CD}$  intersect at E with  $m\widehat{AD} = 150$ , and  $m\widehat{CB} = 70$ . Determine radian measure of  $\angle AED$  and  $\angle AEC$ .



$$\frac{150 + 70}{2} = 110 \cdot \frac{\pi}{180} = \frac{11\pi}{18} = \angle AED$$

$$70 \cdot \frac{\pi}{180} = \frac{7\pi}{18} = \angle AEC$$

21. In circle O, with diameter  $\overline{COD}$  and  $m\widehat{BC} = 130$ , determine the radian measure of angle A.



$$\frac{80}{2}$$

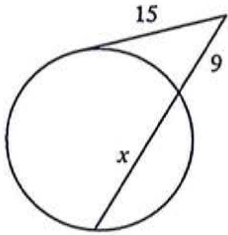
$$40$$

$$\rightarrow \boxed{\frac{2\pi}{9}}$$

## Segment Lengths in Circles

Solve for  $x$ . Assume that lines which appear tangent are tangent.

1)



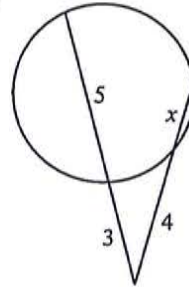
$$15^2 = (9+x) \cdot 9$$

$$225 = 81 + 9x$$

$$144 = 9x$$

$$x = 16$$

2)



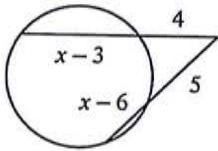
$$3(8) = 4(x+4)$$

$$24 = 4x + 16$$

$$8 = 4x$$

$$x = 2$$

3)

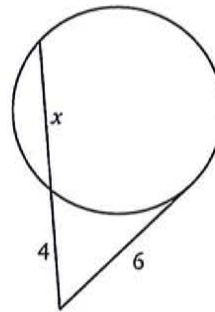


$$4(x+1) = 5(x-1)$$

$$4x+4 = 5x-5$$

$$9 = x$$

4)



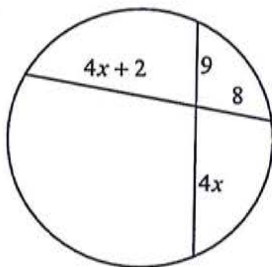
$$6^2 = 4(x+4)$$

$$36 = 4x + 16$$

$$20 = 4x$$

$$x = 5$$

5)



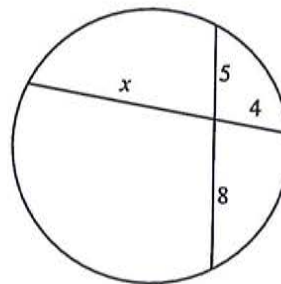
$$8(4x+2) = 9(4x)$$

$$32x+16 = 36x$$

$$16 = 4x$$

$$x = 4$$

6)

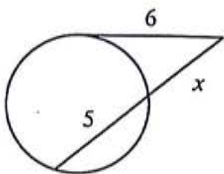


$$4 \cdot x = 5 \cdot 8$$

$$4x = 40$$

$$x = 10$$

7)



$$6^2 = x(x+5)$$

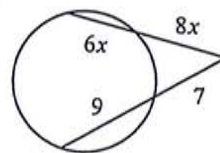
$$36 = x^2 + 5x$$

$$x^2 + 5x - 36 = 0$$

$$(x+9)(x-4) = 0$$

$$\begin{array}{r} -9 \quad | \quad 4 \quad | \end{array}$$

8)



$$8x(14x) = 7(16)$$

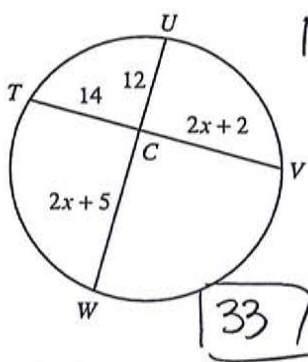
$$112x^2 = 112$$

$$x^2 = 1$$

$$x = 1$$

Find the measure of the line segment indicated. Assume that lines which appear tangent are tangent.

9) Find  $UW$



$$14(2x+2) = 12(2x+5)$$

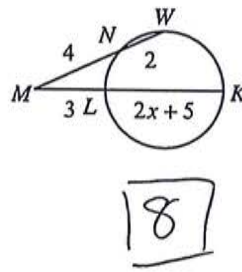
$$28x+28 = 24x+60$$

$$4x = 32$$

$$x = 8$$

**33**

10) Find  $KM$



$$4(6) = 3(2x+5)$$

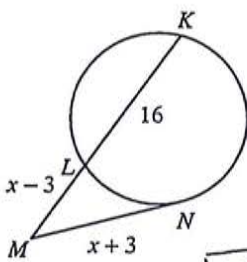
$$24 = 6x+15$$

$$9 = 6x$$

$$x = 1.5$$

**8**

11) Find  $NM$



$$(x-3)(x+3) = (16)^2$$

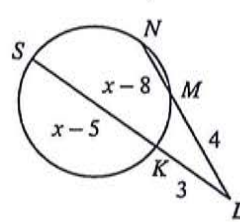
$$x^2+10x-39 = x^2+6x+9$$

$$4x = 48$$

$$x = 12$$

**15**

12) Find  $NL$



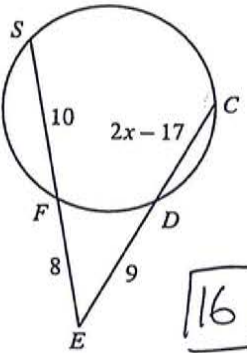
$$4(x-4) = 3(x-2)$$

$$4x-16 = 3x-6$$

$$x = 10$$

**16**

13) Find  $CE$



$$8(18) = 9(2x-17)$$

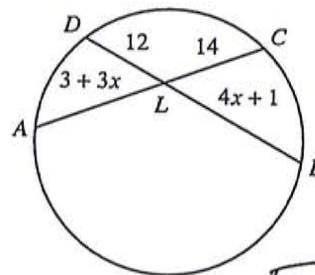
$$144 = 18x-153$$

$$297 = 18x$$

$$x = 16.5$$

**16**

14) Find  $CA$



$$14(3+3x) = 12(4x+1)$$

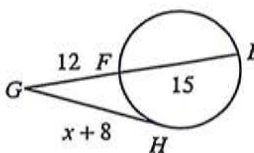
$$42+42x = 48x+12$$

$$30 = 6x$$

$$x = 5$$

**32**

15) Find  $HG$



$$(x+8)^2 = 12(27)$$

$$x^2+16x+64 = 324$$

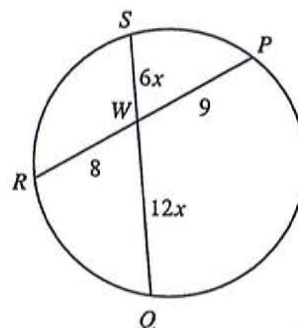
$$x^2+16x-260 = 0$$

$$(x+26)(x-10) = 0$$

$$\frac{-26 \quad | \quad 10}{\phantom{0}}$$

**18**

16) Find  $WS$



$$(8)(9) = (6x)(12x)$$

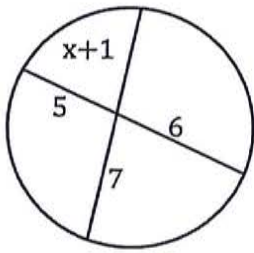
$$72 = 72x^2$$

$$x^2 = 1$$

$$x = 1$$

**6**

9.



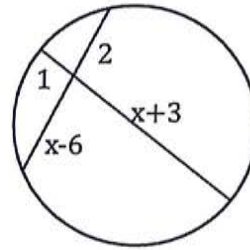
$$(5)(6) = 7(x+1)$$

$$30 = 7x + 7$$

$$23 = 7x$$

$$x = \frac{23}{7}$$

10.

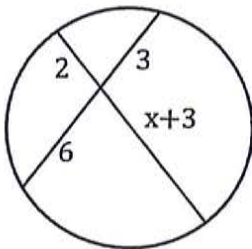


$$1(x+3) = 2(x-6)$$

$$x+3 = 2x-12$$

$$15 = x$$

11.



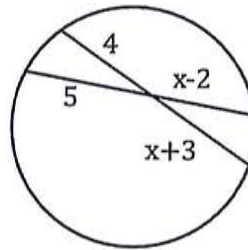
$$2(x+3) = (6)(3)$$

$$2x+6 = 18$$

$$2x = 12$$

$$x = 6$$

12.

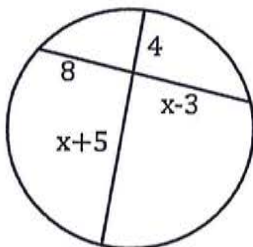


$$4(x+3) = 5(x-2)$$

$$4x+12 = 5x-10$$

$$22 = x$$

13.



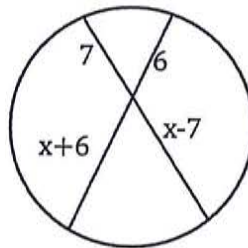
$$8(x-3) = 4(x+5)$$

$$8x-24 = 4x+20$$

$$4x = 44$$

$$x = 11$$

14.

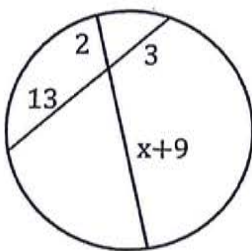


$$7(x-7) = 6(x+6)$$

$$7x-49 = 6x+36$$

$$x = 85$$

15.



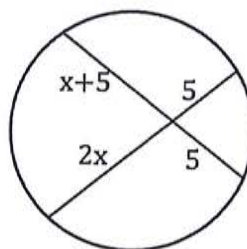
$$2(x+9) = 3(13)$$

$$2x+18 = 39$$

$$2x = 21$$

$$x = 10.5$$

16.



$$5(x+5) = 5(2x)$$

$$5x+25 = 10x$$

$$25 = 5x$$

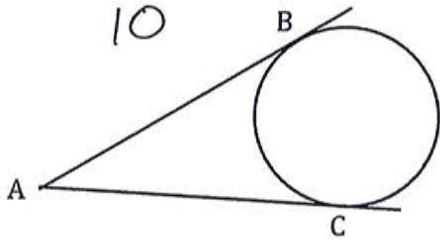
$$x = 5$$

Bubble all the correct answers from above. Don't bubble incorrect answers.

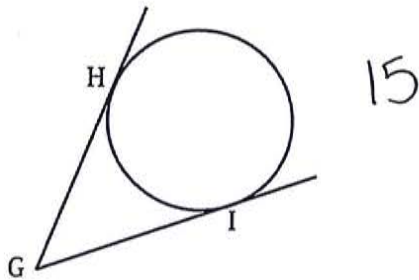
22  11  6  8  13.5  10.5  15  5  4.39  85  3.29  58  93  4.67

Answer each question...

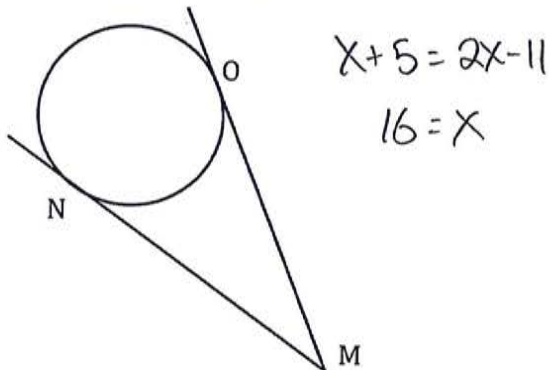
17.  $AB=10$ . Find AC.



19.  $GH=15$ . Find GI.



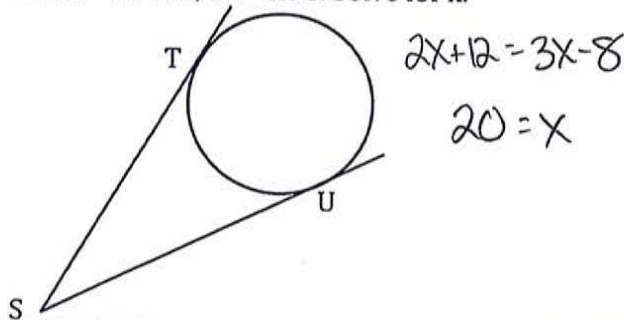
21.  $MN=x+5$ ,  $MO=2x-11$ . Solve for x.



$$x+5 = 2x-11$$

$$16 = x$$

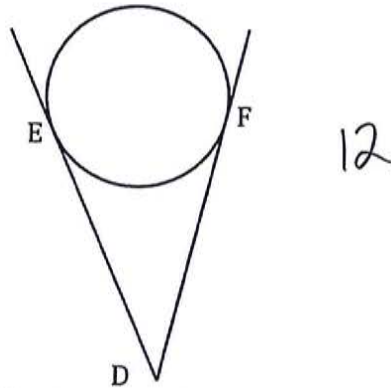
23.  $ST=2x+12$ ,  $SU=3x-8$ . Solve for x.



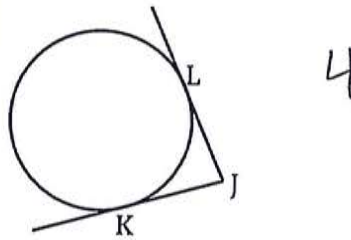
$$2x+12 = 3x-8$$

$$20 = x$$

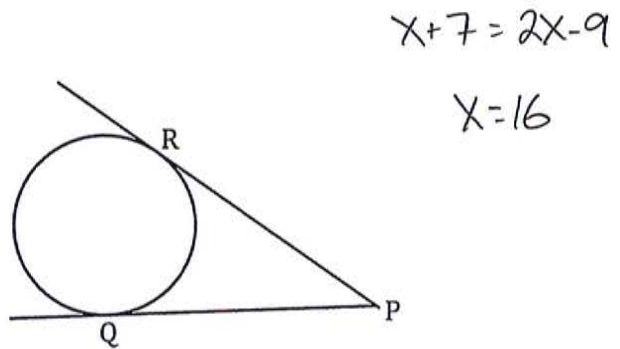
18.  $DE=12$ . Find DF.



20.  $JK=4$ . Find JL.



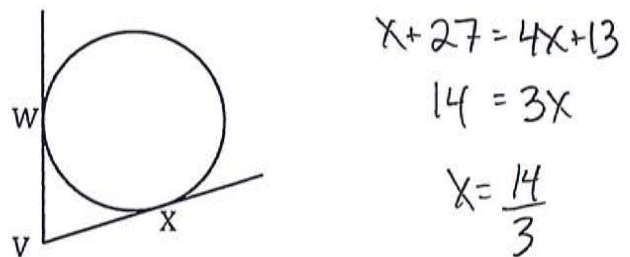
22.  $PQ=x+7$ ,  $PR=2x-9$ . Solve for x.



$$x+7 = 2x-9$$

$$x = 16$$

24.  $VW=x+27$ ,  $VX=4x+13$ . Solve for x.



$$x+27 = 4x+13$$

$$14 = 3x$$

$$x = \frac{14}{3}$$

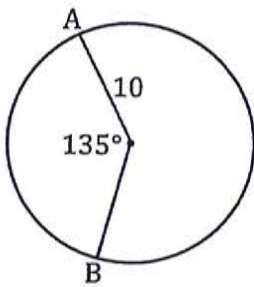
Bubble all the correct answers from above. Don't bubble incorrect answers.

15 16 11 17 4 3.67 12 10 5 19 4.67 20 16 12



Calculate the length of each arc...

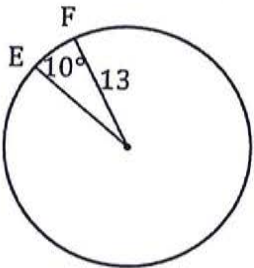
1.



$$S = 135 \cdot \frac{\pi}{180} \cdot 10$$

$$= 7.5\pi$$

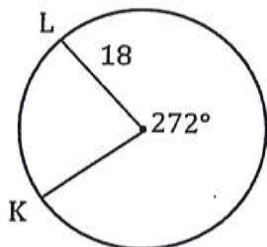
3.



$$S = 10 \cdot \frac{\pi}{180} \cdot 13$$

$$= \frac{13\pi}{18}$$

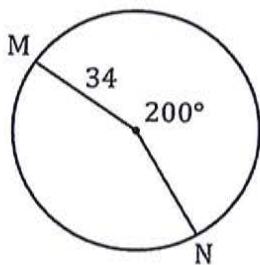
5.



$$272 \cdot \frac{\pi}{180} \cdot 18$$

$$\frac{272\pi}{10}$$

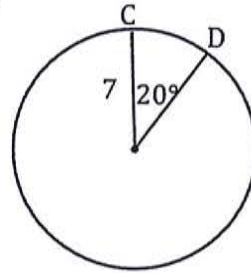
7.



$$200 \cdot \frac{\pi}{180} \cdot 34$$

$$\frac{340\pi}{9}$$

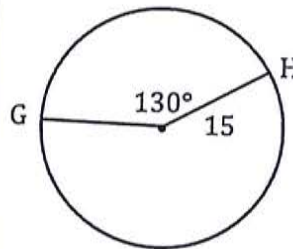
2.



$$20 \cdot \frac{\pi}{180} \cdot 7$$

$$\frac{7\pi}{9}$$

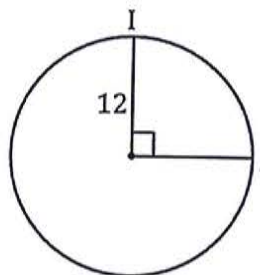
4.



$$130 \cdot \frac{\pi}{180} \cdot 15$$

$$\frac{65\pi}{6}$$

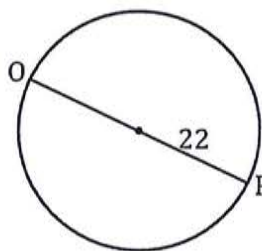
6.



$$90 \cdot \frac{\pi}{180} \cdot 12$$

$$6\pi$$

8.



$$180 \cdot \frac{\pi}{180} \cdot 22$$

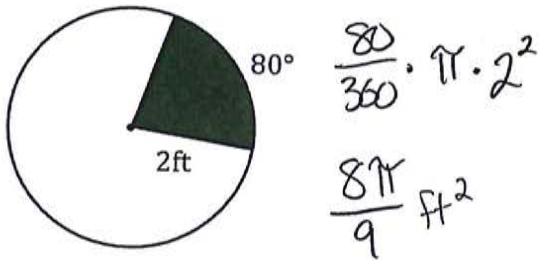
$$22\pi$$

Bubble all the correct answers from above. Don't bubble incorrect answers.

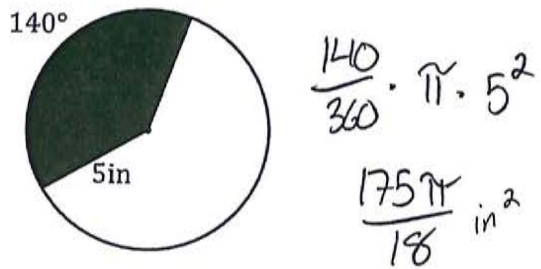
38.56  
  23.56  
  34.03  
  2.55  
  85.45  
  76.39  
  118.68  
  2.27  
  25.34  
  37.48  
  69.12  
  49.57  
  18.85  
  2.44

Find the area of each shaded sector...

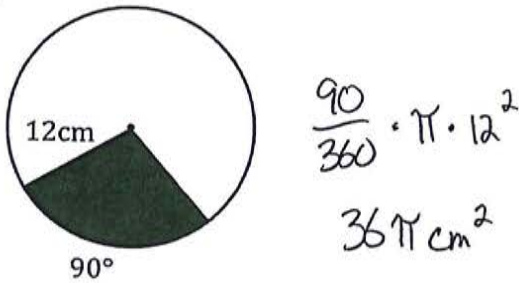
9.



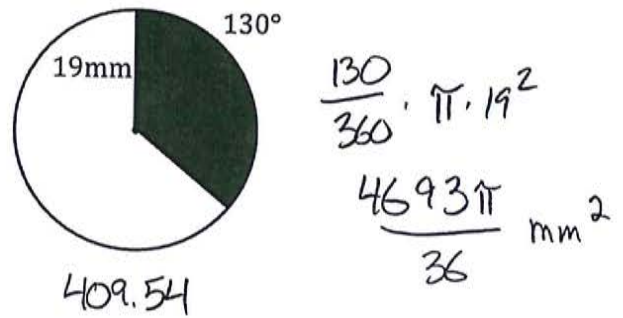
10.



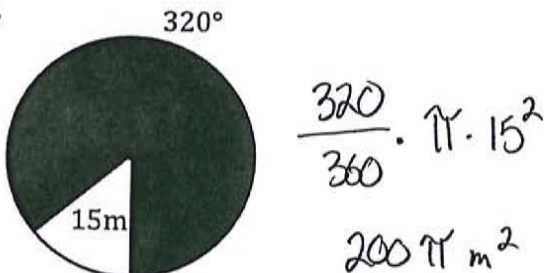
11.



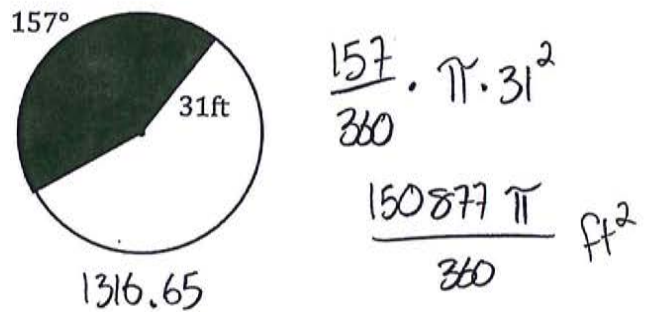
12.



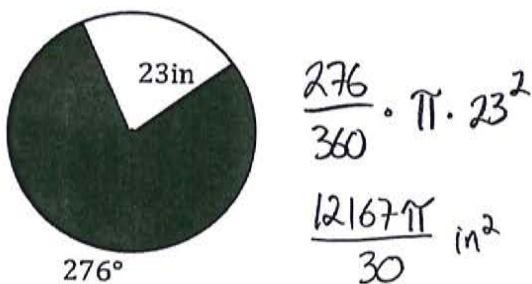
13.



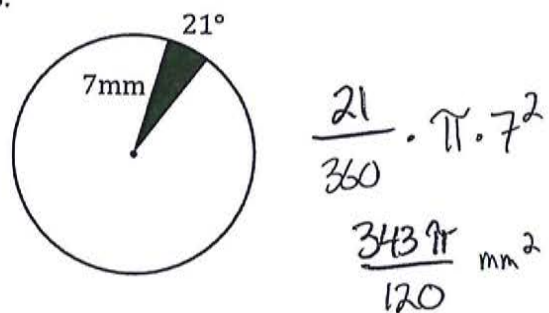
14.



15.



16.



Bubble all the correct answers from above. Don't bubble incorrect answers.

- 9   
  2.79   
  34.57   
  15   
  1274.13   
  146.91   
  13   
  628.32   
  579.34   
  67.09   
  45.78   
  698.87   
  31.50   
  11   
  10   
  20.54   
  1265.75