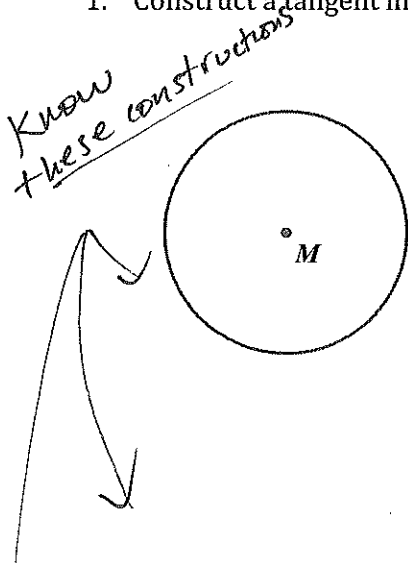


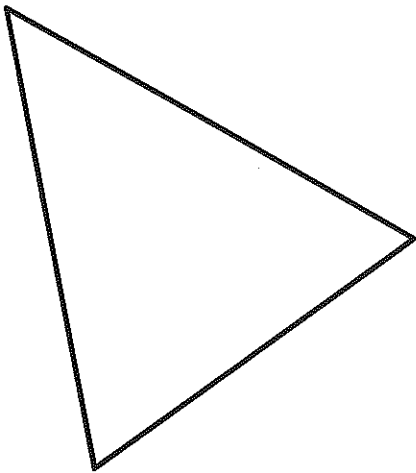
1. Construct a tangent line from T to circle M.



Write out the steps.

- ① Draw a line connecting pt. M to pt. T
- ② Construct  $\perp$  bisector of  $\overline{MT}$
- ③ Place the compass on the midpoint of  $\overline{MT}$ , adjust its width to reach either endpoint, and draw an arc across the  $\odot$
- ④ Where the arc crosses the  $\odot$  will be the tangent points.

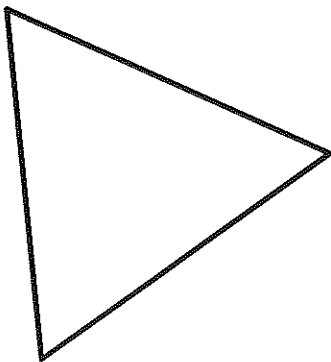
2. Construct an inscribed circle.



Write out the steps.

- ① Bisect any two  $\angle$ s. (Construct  $\angle$  bisectors of any two  $\angle$ s)
- ② Where they intersect is the center of the inscribed  $\odot$ .
- ③ Construct a  $\perp$  from the center pt. to one side of the  $\Delta$
- ④ Place the compass on the center point, adjust its length to where the  $\perp$  crosses the  $\Delta$ , and draw the inscribed  $\odot$ !

3. Construct a circumscribed circle.



Write out the steps.

- ① Construct the  $\perp$  bisector of any two sides of the  $\Delta$ .
- ② Where the  $\perp$  bisectors intersect is the center of the circumscribed  $\odot$
- ③ Place compass on center pt., adjust its width to reach any vertex of  $\Delta$ , and draw the circumscribed  $\odot$ !

4. Define the following terms and draw a diagram to represent them.

Word	Definition	Diagram
radius	Write your def. in your own words	
diameter		
chord		
secant		
tangent		

Word	Definition	Diagram
point of tangency		
center		
minor arc		
major arc		
semi-circle		

5. Given that Circle A has a diameter of 14...  $(r=7)$

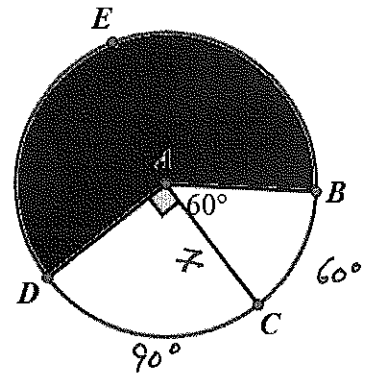
$$\widehat{BED} = 210^\circ$$

a. Find the length of arc BED (keep it in terms of  $\pi$ ).

$$\text{Arc length} = \frac{210}{360} \cdot 2\pi(7) = \boxed{\frac{49}{6}\pi \text{ units}}$$

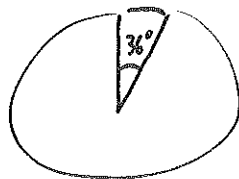
b. Find the area of the shaded sector (keep it in terms of  $\pi$ ).

$$\text{Area BED} = \frac{210}{360} \cdot \pi(7)^2 = \boxed{\frac{343}{12}\pi \text{ units}^2}$$



6. A pie with a 20" diameter is cut into 10 congruent slices. What is the area of one slice/sector (in terms of  $\pi$ )?

$$\frac{360}{10} = 36^\circ$$



$$d = 20 \Rightarrow r = 10$$

$$\text{Area} = \frac{36}{360} \cdot \pi(10)^2 = \boxed{10\pi \text{ in}^2}$$

① Convert from Degrees to Radian : multiply by  $\frac{\pi}{180}$

7. For the following diagram...

② Convert from Radian to Degrees: multiply by  $\frac{180}{\pi}$

a.  $\angle QPR = 96^\circ$ . Convert this to radians.

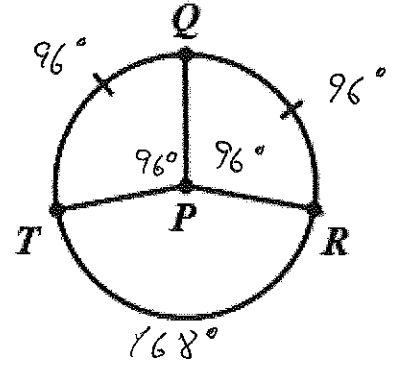
$$96 \cdot \frac{\pi}{180} = \boxed{\frac{8\pi}{15}}$$

b. What does  $\angle TPR$  equal in degrees?

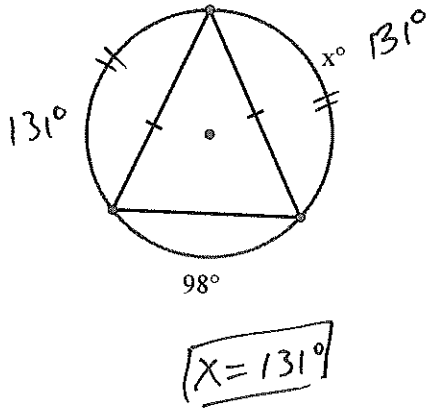
$$360 - 96 - 96 = 168^\circ$$

c. Convert your answer from b to radians.

$$168 \cdot \frac{\pi}{180} = \frac{168\pi}{180} = \boxed{\frac{14\pi}{15}}$$



8. Solve for the value of x.

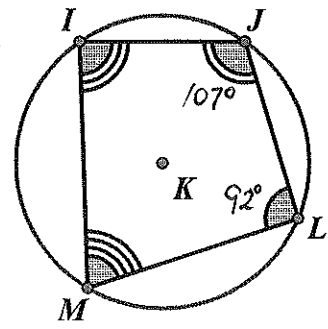


$$360 - 98 = 262$$

$$\frac{262}{2} = 131$$

$$\boxed{x = 131^\circ}$$

9. Solve for the value of the missing angles in the cyclic quadrilateral.



$\angle M, \angle J$  supp  
 $\angle I, \angle L$  supp

$m\angle IJL = 107^\circ$   
 $m\angle JLM = 92^\circ$

$$\angle M + 107 = 180$$

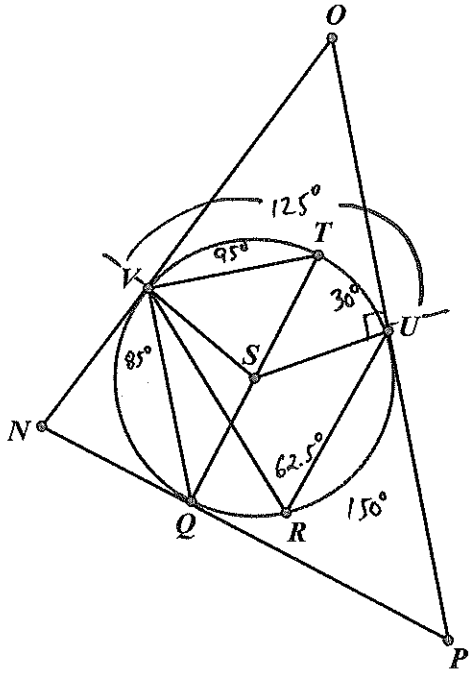
$$-107 \quad -107$$

$$\boxed{\angle M = 73^\circ}$$

$$\angle I + 92 = 180 \Rightarrow \boxed{\angle I = 88^\circ}$$

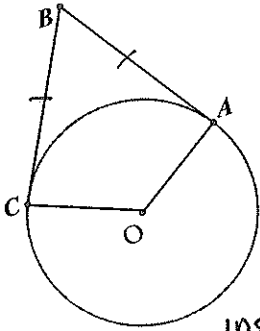
10. Use the diagram and the given information to solve for the missing values.

Given: Circle S is inscribed in  $\triangle OPN$ ,  $m\widehat{UV} = 125^\circ$ ,  $m\widehat{UT} = 30^\circ$



	$\angle O + m\widehat{UV} = 180$
a. $m\angle O$	$\frac{180 - 125 = 55^\circ}{\underline{\hspace{1cm}}}$
b. $m\angle QVT$	$\frac{\frac{1}{2}(180) = 90^\circ}{\underline{\hspace{1cm}}}$
c. $m\angle VRU$	$\frac{\frac{1}{2}(125) = 62.5^\circ}{\underline{\hspace{1cm}}}$
d. $m\angle USV$	$\frac{125^\circ}{\underline{\hspace{1cm}}}$
e. $m\widehat{UQ}$	$\frac{150^\circ}{\underline{\hspace{1cm}}}$
f. $m\angle SUO$	$\frac{90^\circ}{\underline{\hspace{1cm}}}$

11. BA and BC are tangent segments.  $BC = 3x - 4$ ,  $AB = x + 6$ ,  $OA = 4x - 1$ . What is the circumference of Circle O? (Remember what you learned about tangent segments!)



$$\overline{BC} \cong \overline{BA} \text{ Tangent - Tangent Thm}$$

$$\begin{array}{r} 3x - 4 = x + 6 \\ +4 \quad +4 \\ \hline 3x = x + 10 \\ -x \quad -x \\ \hline 2x = 10 \\ \frac{2x}{2} = \frac{10}{2} \end{array}$$

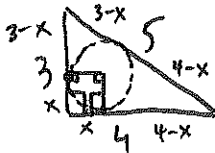
$$OA = r = 4x - 1 = 4(5) - 1 = 19$$

$$C = 2\pi r = 2\pi(19) = \boxed{38\pi \text{ units}}$$

$$x = 5$$

Inscribed in

12. A circle is circumscribed about a right triangle with side lengths of 3, 4, and 5. What is the radius of the circle?



$$3 - x + 4 - x = 5$$

$$7 - 2x = 5$$

$$\begin{array}{r} -2x = -2 \\ x = 1 \end{array}$$

$\therefore$  radius is 1

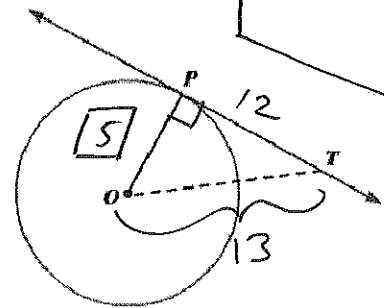
Original problem:



$$r = \frac{5}{2} = 2.5$$

13. TP is tangent to Circle O.  $TP = 12$  cm.  $OT = 13$  cm. What is the length of OP?

$$(5, 12, 13)$$



14. Explain why circle C with equation:  $(x + 3)^2 + (y - 10)^2 = 81$  is similar to circle D with equation:  $x^2 + (y + 5)^2 = 9$  by using transformations.

From C to D.

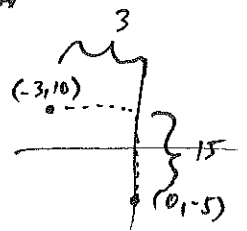
$$\begin{array}{l} | -3 - 0 | = | -3 | = 3 \\ | 10 - (-5) | = | 15 | = 15 \end{array}$$

$$\odot C \Rightarrow (-3, 10) \quad r = 9 \quad \odot D \Rightarrow (0, -5) \quad r = 3$$

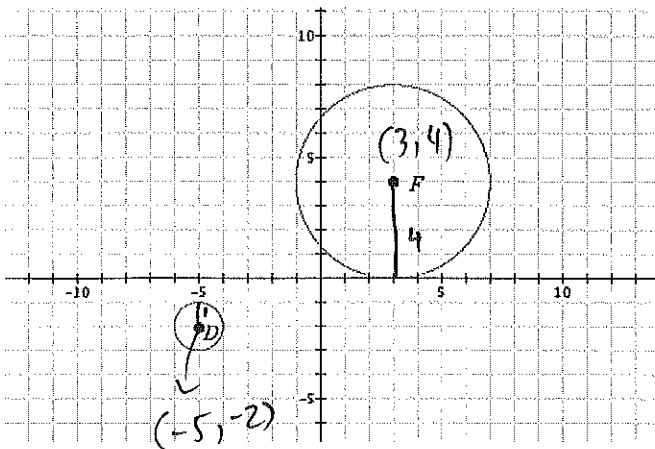
So translation 3 right, 15 down and dilation (reduction)  $\frac{3}{9} = \frac{1}{3}$  scale factor

Identify the center and radius of circle C:  $(-3, 10)$

Identify the center and radius of circle D:  $(0, -5)$



15. Given circle D & circle F...



- a. What is the equation for circle D?

$$(x + 5)^2 + (y + 2)^2 = 1$$

- b. What is the equation for circle F?

$$(x - 3)^2 + (y - 4)^2 = 16$$

- c. Explain why the two circles are similar using transformations.

D to F

Translation: 8 right, 6 up

Dilation: (Enlarge) scale factor 4.