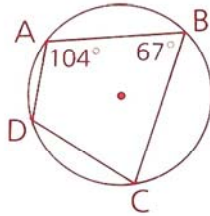


10-7: Inscribed and Circumscribed Circles

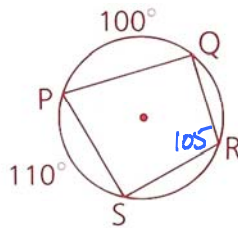
- 1 Given: $\angle A = 104^\circ$, $\angle B = 67^\circ$
Find: $\angle D$ and $\angle C$



$$\angle D = 180 - 67 = 113^\circ$$

$$\angle C = 180 - 104 = 76^\circ$$

- 2 Given: $\widehat{PS} = 110^\circ$, $\widehat{PQ} = 100^\circ$
Find: $m\angle R$ and $m\angle P$

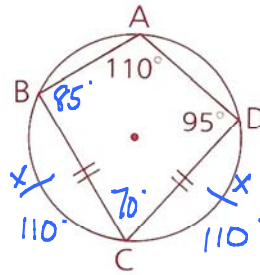


$$\angle R = \frac{\widehat{PS}}{2} = \frac{100 + 110}{2} = \frac{210}{2} = 105^\circ$$

$$\angle P = \frac{360 - 210}{2} = \frac{150}{2} = 75^\circ$$

$$\text{or } \angle P = 180 - 105 = 75^\circ$$

- 3 Given: $\angle A = 110^\circ$, $\overline{BC} \cong \overline{CD}$, $\angle D = 95^\circ$
Find: a $\angle C = 180 - 110$ c $\angle B = 180 - 95 = 85$
b $\widehat{BC} = 110^\circ$ d $\widehat{AB} = 80^\circ$



$$\angle A = \frac{x+x}{2}$$

$$110 = \frac{2x}{2}$$

$$110 = x$$

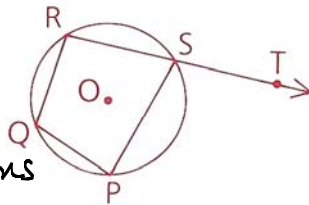
$$\angle D = \frac{\widehat{AB} + \widehat{BC}}{2}$$

$$95 = \frac{\widehat{AB} + 110}{2}$$

$$190 = \widehat{AB} + 110$$

$$80 = \widehat{AB}$$

- 4 Given: $\odot O$
Prove: $\angle Q \cong \angle PST$



Statements

Reasons

1. $\odot O$

1. Given

2. $\angle Q$ supp $\angle RSP$

2. inscrib quad \Rightarrow opp \angle s supp

3. $\angle PST$ supp $\angle RSP$

3. st $\angle \Rightarrow$ supp \angle s

4. $\angle Q \cong \angle PST$

4. \angle s supp same \angle are \cong

→ Rex

5 Can a parallelogram with a 100° angle be inscribed in a circle?

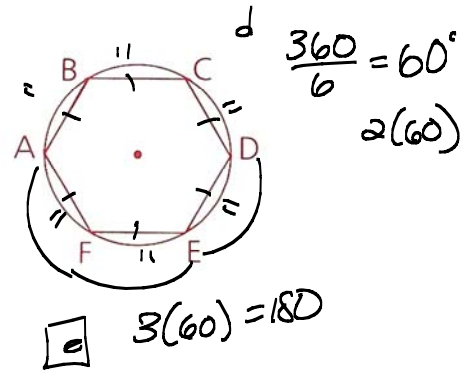
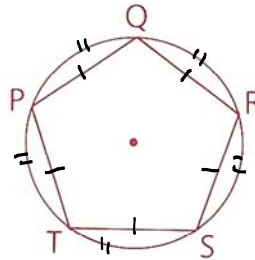
No \because not \angle

6 Given: PQIRST is a regular pentagon.
ABCDEF is a regular hexagon.

Find: a $m\widehat{PQ} = \frac{360}{5} = 72^\circ$ d $m\widehat{BD} = 120^\circ$

b $m\widehat{RT} = 2(72) = 144^\circ$ e $m\widehat{DEA} = 180^\circ$

c $m\widehat{AB} = \frac{360}{6} = 60^\circ$

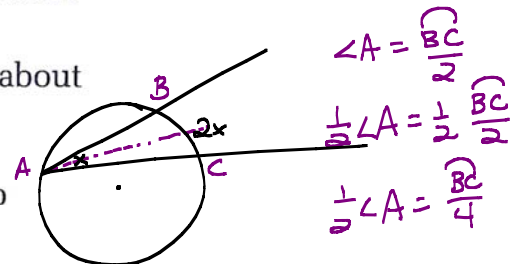


7 a If a rhombus is inscribed in a circle, what must be true about the rhombus? All $\angle s = 90^\circ \rightarrow$ it's a square

b If a trapezoid is inscribed in a circle, what must be true about the trapezoid? It's isos. trap.



8 Prove: The bisector of an angle of an inscribed triangle also bisects the arc cut off by the opposite side.



9 Given: $\angle B = 115^\circ$, $\widehat{AD} = 60^\circ$, $\overline{BC} \parallel \overline{EF}$

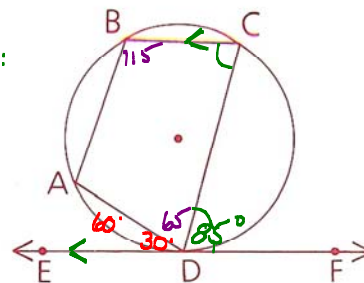
Find: a $\angle ADC = 65^\circ$ c $\angle C : \parallel \Rightarrow$ Alt int $\angle s$:

b $\angle CDF = 85^\circ$ d $\angle A$

supp $\angle C \therefore 180 - 85 = 95^\circ$

$$\begin{array}{r} 180 \\ - 115 \\ \hline 65 \end{array}$$

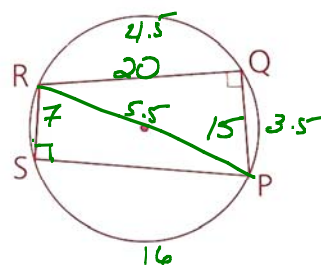
$$\begin{array}{r} 180 \\ - (65 + 30) \\ \hline 85 \end{array}$$



10 PQ = 15, QR = 20, RS = 7, and $\angle Q$ is a right angle. Find PS.

$$7 _ 25$$

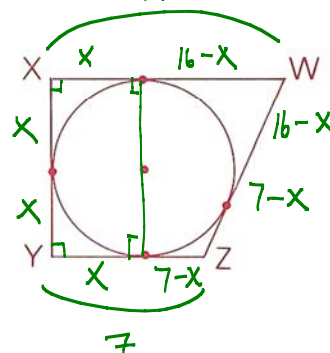
$$PS = 24$$



11 Trapezoid WXYZ is circumscribed about circle O. $\angle X$ and $\angle Y$ are right $\angle s$, $XW = 16$, and $YZ = 7$. Find the perimeter of WXYZ.

$$\begin{array}{l} XW + WZ + ZY + YX \\ 16 + 23 - 2x + 7 + 2x \end{array}$$

$$46$$

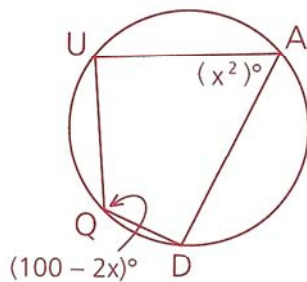


- 12** A circle is inscribed in a square with vertices $(-8, -3)$, $(-1, -3)$, $(-8, 4)$, and $(-1, 4)$.
- Find the coordinates of the center of the circle.
 - Find the area of the circle.
 - Find the radius of a circle circumscribed about the square.

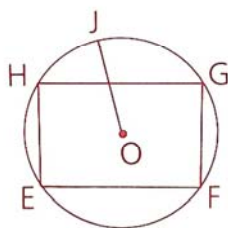
13 Prove: A trapezoid inscribed in a circle is isosceles.

- 14** Parallelogram RECT is inscribed in circle O. If $RE = 6$ and $EC = 8$, find the perimeter of $\triangle ECO$.

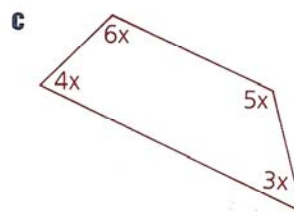
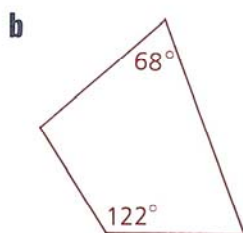
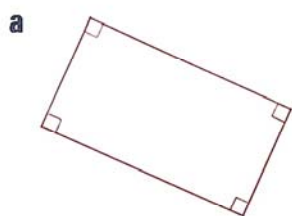
- 15** Given the figure shown, find $m\angle Q$.



- 16** Given: $\odot O$; EFGH is a \square .
 $\widehat{HG} = 120^\circ$, $OJ = 6$
 Find: The perimeter of EFGH



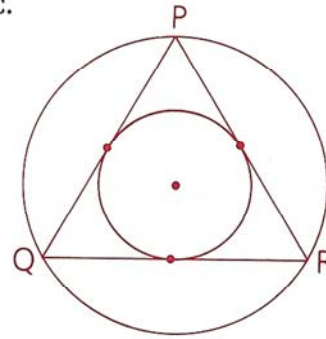
- 17** A quadrilateral can be inscribed in a circle only if a pair of opposite angles are supplementary. Which of the following quadrilaterals can be inscribed in a circle?



- 18** Prove: Any isosceles trapezoid can be inscribed in a circle.
 (Hint: See problem 17.)

- 19** Equilateral triangle PQR is inscribed in one circle and circumscribed about another circle. The circles are concentric.

- a** If the radius of the smaller circle is 10, find the radius of the larger circle.
- b** In general, for an equilateral triangle, what is the ratio of the radius of the inscribed circle to the radius of the circumscribed circle?



- 20** ABCD is a kite, with $\overline{AB} \cong \overline{BC}$, $\overline{AD} \cong \overline{CD}$, and $m\angle B = 120$. The radius of the circle is 3. Find the perimeter of ABCD.

