

NAME Student  
 Adv Geo 1  
 10-7: Inscribed and Circumscribed Circles

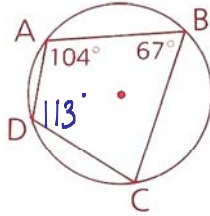
AMDG

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 T 30 Apr 2013

1 Given:  $\angle A = 104^\circ$ ,  $\angle B = 67^\circ$

Find:  $\angle D$  and  $\angle C$

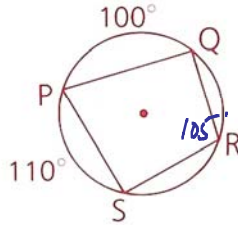
inscribed quad  $\Rightarrow$  opp  $\angle$ s supp  
 $\angle D = 180 - 67 = 113^\circ$   
 $\angle C = 180 - 104$



2 Given:  $\widehat{PS} = 110^\circ$ ,  $\widehat{PQ} = 100^\circ$

Find:  $m\angle R$  and  $m\angle P$

$105^\circ$        $180 - 105 = 75^\circ$



$$\angle R = \frac{\widehat{SPQ}}{2} = \frac{\widehat{SP} + \widehat{PQ}}{2} = \frac{210}{2} = 105^\circ$$

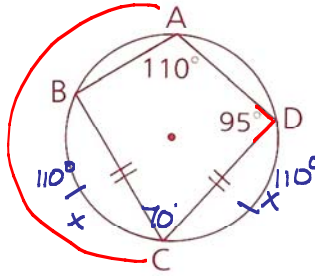
3 Given:  $\angle A = 110^\circ$ ,  $\overline{BC} \cong \overline{CD}$ ,  $\angle D = 95^\circ$

Find: a  $\angle C$

c  $\angle B = 180 - 95 = 85^\circ$

$\angle C$  supp  $\angle A$   
 $180 - 110 = 70^\circ$   
 b  $\widehat{BC}$   
 $\angle A = \frac{\widehat{BC} + \widehat{CD}}{2}$   
 $110 = \frac{2x}{2}$   
 $110 = x$

d  $\widehat{AB} = 80^\circ$



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

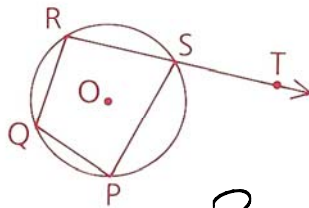
$$95^\circ = \frac{\widehat{AB} + 110}{2}$$

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

$$80 = \widehat{AB}$$

4 Given:  $\odot O$

Prove:  $\angle Q \cong \angle PST$



Statements

1.  $\odot O$
2.  $\angle Q$  supp  $\angle RSP$
3.  $\angle PST$  supp  $\angle RSP$
4.  $\angle Q \cong \angle PST$

Reasons

1. Given
2. inscribed quad  $\Rightarrow$  opp  $\angle$ s supp
3. st  $\angle \Rightarrow$  supp  $\angle$ s
4.  $\angle$ s supp to same  $\angle$  are  $\cong$

$\rightarrow \text{Rex} \Rightarrow m\angle = 90^\circ$

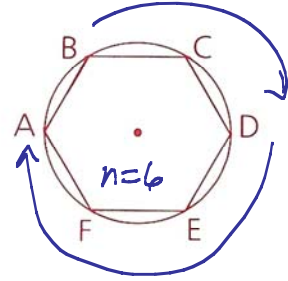
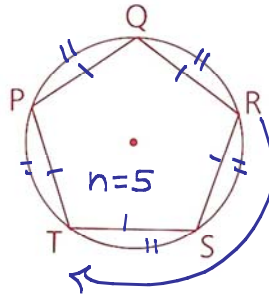
5 Can a parallelogram with a  $100^\circ$  angle be inscribed in a circle?

No

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

Find: a  $m\widehat{PQ} = \frac{360}{5} = 72^\circ$  d  $m\widehat{BD} = 2(60) = 120^\circ$   
b  $m\widehat{RT} = 2(72) = 144^\circ$  e  $m\widehat{DEA} = 3(60) = 180^\circ$   
c  $m\widehat{AB} = \frac{360}{6} = 60^\circ$

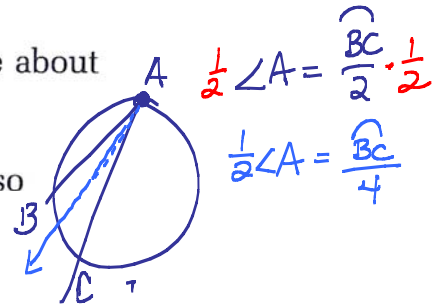
$\cong \text{chds} \Rightarrow \cong \text{arcs}$



7 a If a rhombus is inscribed in a circle, what must be true about the rhombus?  
*parallelogram rtLs*  
Square

b If a trapezoid is inscribed in a circle, what must be true about the trapezoid?  
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  $\angle ADC$  c  $\angle C \parallel \Rightarrow \text{Alt intLs} \cong : 85^\circ$   
b  $\angle CDF$  d  $\angle A$

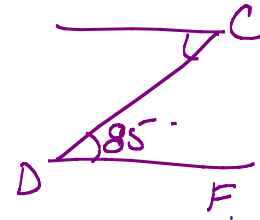
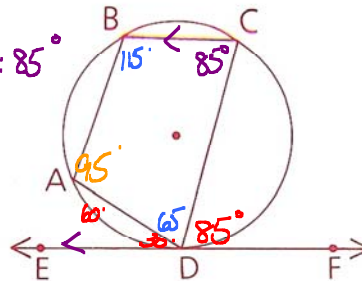
*inscribed quad  $\rightarrow$  oppLs sup p*

$\angle B + \angle D = 180$

$\angle D = 180 - 115 = 65$

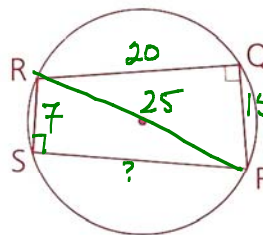
$\begin{matrix} 180 \\ - 65 \\ \hline 115 \end{matrix}$

$\begin{matrix} 180 \\ - 85 \\ \hline 95 \end{matrix}$



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

(24)

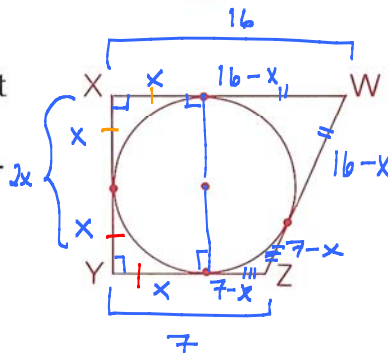


$(15, 20, 25)$   
 $5(3, 4, 5)$  }  $RP = 25$

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.

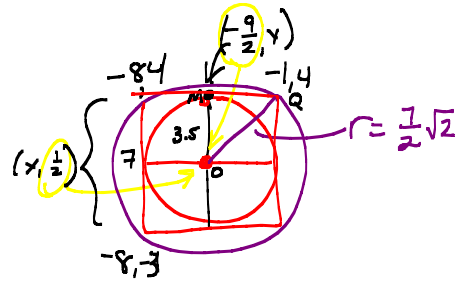
$$\begin{array}{ccccccc} XW & + & WZ & + & ZY & + & XY \\ \underline{16} & + & \underline{23-2x} & + & \underline{7} & + & \underline{2x} \end{array}$$

$46 + 0x = 46$



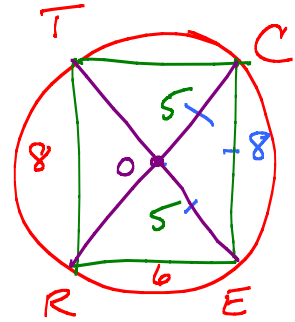
12 A circle is inscribed in a square with vertices  $(-8, -3)$ ,  $(-1, -3)$ ,  $(-8, 4)$ , and  $(-1, 4)$ .

- a Find the coordinates of the center of the circle.  $(-\frac{9}{2}, \frac{1}{2})$
- b Find the area of the circle.  $A_c = \pi r^2 = \pi (\frac{7}{2})^2 = \frac{49}{4} \pi$
- c Find the radius of a circle circumscribed about the square.  $r = \frac{7\sqrt{2}}{2}$



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  $\triangle ECO$ .  $8 + 5 + 5 = 18$



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

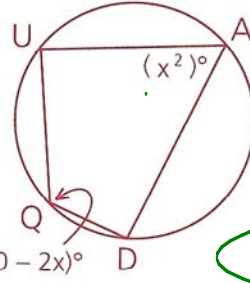
inscrib quad  $\Rightarrow$  opp  $\angle$  supp

$$x^2 - 2x + 100 = 180$$

$$x^2 - 2x - 80 = 0$$

$$(x - 10)(x + 8) = 0$$

$$x = 10 \text{ or } -8$$



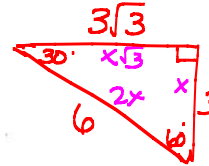
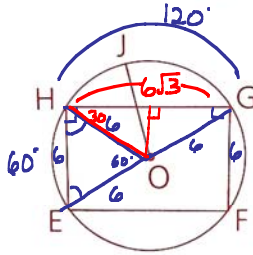
If  $x = 10$  then  $\angle Q = 100 - 20 = 80^\circ$   
 If  $x = -8$  then  $\angle Q = 100 + 16 = 116^\circ$

$\angle Q = 116^\circ$  or  $80^\circ$

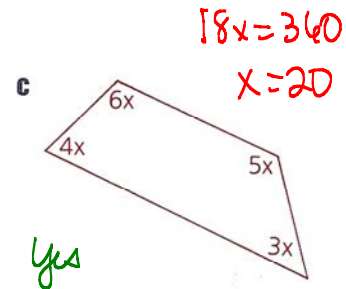
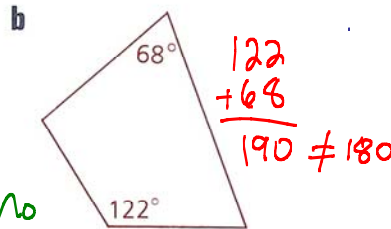
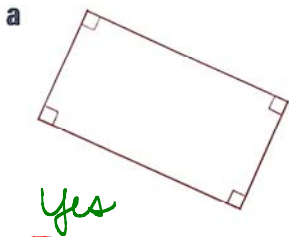
16 Given:  $\odot O$ ; EFGH is a  $\square$ .  
 $\widehat{HG} = 120^\circ$ ,  $OJ = 6$

Find: The perimeter of EFGH

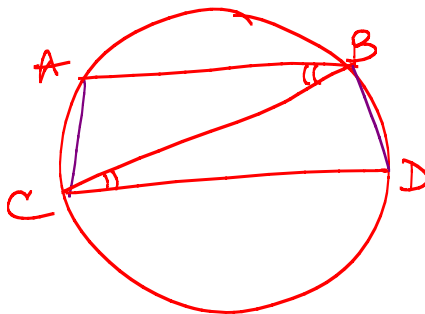
$$12 + 12\sqrt{3}$$



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.)



$$G: \overline{AB} \parallel \overline{CD}$$

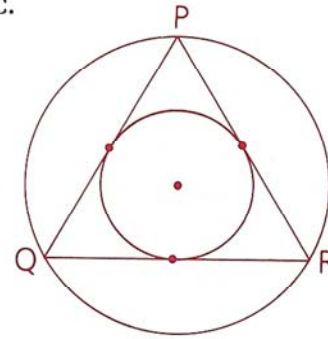
$$P: \overline{AC} \cong \overline{BD}$$

1.  $\overline{AB} \parallel \overline{CD}$  1. Given
2.  $\angle ABC \cong \angle BCD$  2.  $\parallel \Rightarrow$  A.I.  $\angle$ s  $\cong$
3.  $\overline{AC} \cong \overline{BD}$  3.  $\cong$  user  $\angle$ s  $\Rightarrow$   $\cong$   $\overline{c}$ s
4.  $\overline{AC} \cong \overline{BD}$  4.  $\cong$   $\overline{c}$ s  $\Rightarrow$   $\cong$   $\overline{chds}$
5. ABCD isos trap 5. 2  $\cong$   $\overline{c}$ s & other  $\overline{pr}$   $\Rightarrow$  isos trap

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. 20

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?  $\frac{1}{2}$



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.

$$6 + 6\sqrt{3}$$

