

BE - Geometry | Monday 1-30-12

ACT
PRACTICE

- ① Football team spends 36 minutes of a 3 hour practice on punt returns. To show this in a circle graph, how many degrees should the central angle measure for the sector representing the punt return practice?
-

- ② $r \neq 0$, s is a real number, $r^3 = 2s$ and $r^5 = 18s$. What is one possible value of r ?

- Ⓐ 3 Ⓑ 5 Ⓒ 9 Ⓓ s^2 Ⓔ cannot be determined
-

Ans

①
$$\frac{36 \text{ min}}{180 \text{ min}} = \frac{x \text{ degrees}}{360 \text{ degrees}}$$

$\uparrow$
3 hours

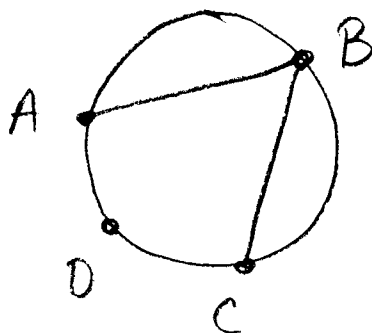
$$x = \frac{360 \cdot 36}{180} = 2 \cdot 36 = \boxed{72^\circ}$$

② $r^3 = 2s$ $r^5 = 18s = r^3 r^2$
 $\therefore r^3 = \frac{18s}{r^2}$
 $\frac{18s}{r^2} = 2s$ $\therefore \frac{18s}{2s} = r^2$ $\boxed{r=3}$

10-4 Inscribed Angles (in a $\odot$)

inscribed angle An angle in a circle that has its vertex on the circle and its sides are chords of the circle.

(Ex)



$\angle ABC$ is an inscribed angle

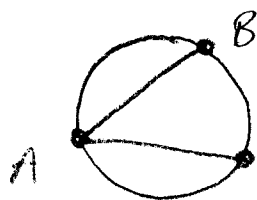
$\overline{AB}$, $\overline{BC}$ are chords

Arc $\widehat{ADC}$ is the arc intercepted by $\angle ABC$

Theorem 10.5

An inscribed angle's measure is $\frac{1}{2}$ its intercepted arc's measure.

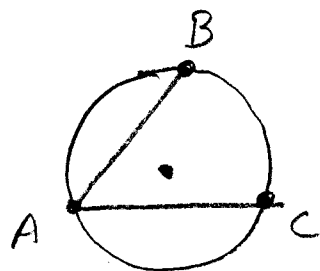
(Ex)



$$m\angle ABC = 25^\circ$$

$$m\widehat{BC} = 50^\circ$$

(EX)

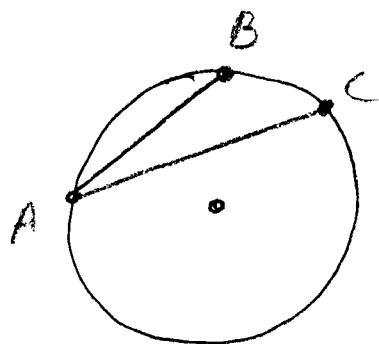


$$\angle BAC = 40^\circ$$

$$\widehat{BC} = 80^\circ$$

Center is "outside"

(EX)

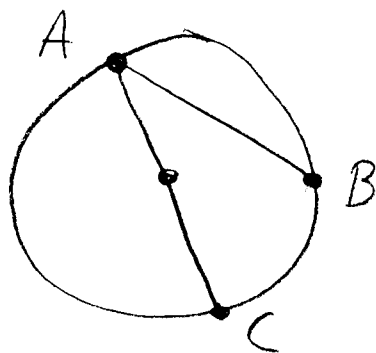


$$\angle BAC = 15^\circ$$

$$\widehat{BC} = 30^\circ$$

Center is "inside"

(EX)

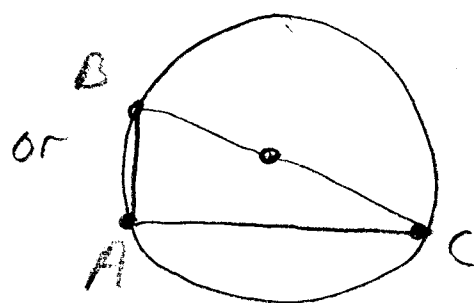
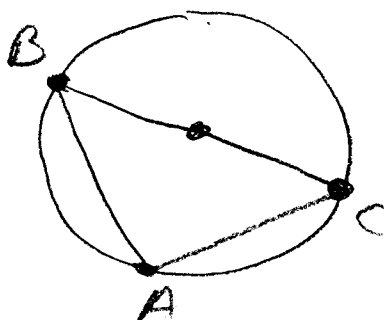
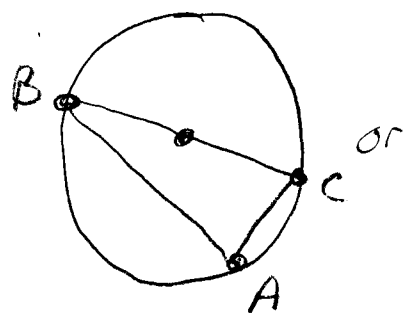


One side is a diameter

$$\angle BAC = 35^\circ$$

$$\widehat{BC} = 70^\circ$$

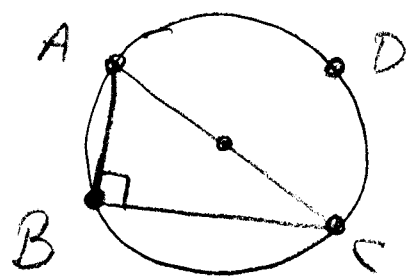
WHAT IS THE MEASURE OF AN angle that has sides that end on a diameter?



Since $\widehat{BC}$ is 180° , $m\angle BAC = 90^\circ !!!$

Theorem 10.7

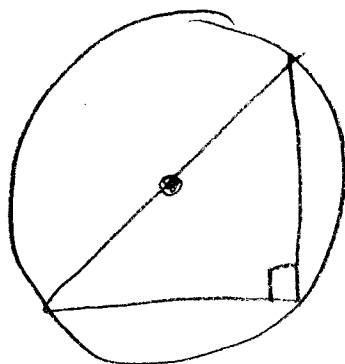
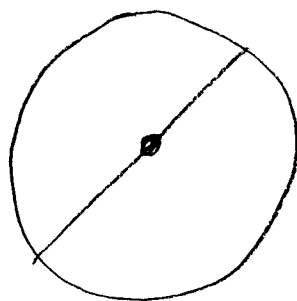
If an inscribed angle intercepts a semicircle, the angle is a right angle



$\widehat{ADC}$ is a semicircle

$$\therefore m\angle ABC = 90^\circ$$

To make a 90° angle, inscribe a triangle with a diameter as the hypotenuse:

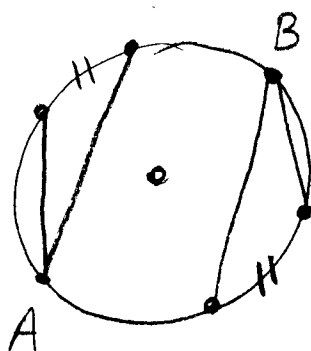


Finally, A "common sense" Theorem $\Rightarrow$

Theorem 10.6

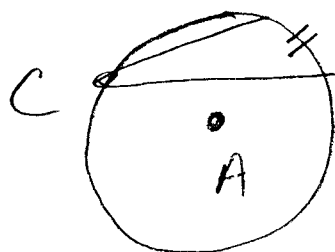
If 2 inscribed $\angle$ s of a circle intercept $\cong$ arcs, the $\angle$ s are $\cong$.

(EX)

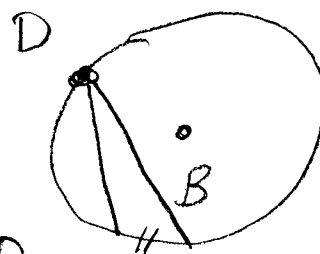


$$\angle A \cong \angle B$$

(EX) Circle A $\cong$ Circle B

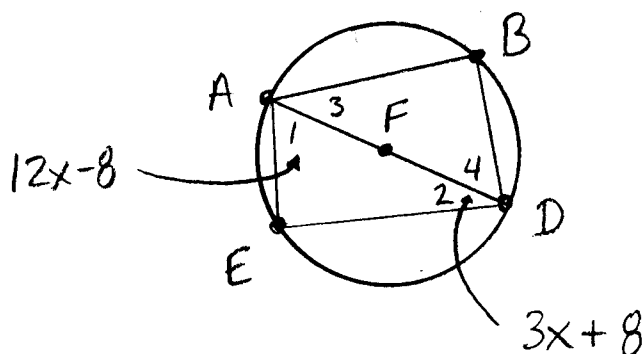


$$\angle C \cong \angle D$$



EX 4
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$\widehat{AB} \cong \widehat{BD}$ Find $m\angle 1, m\angle 2, m\angle 3, m\angle 4$
If $m\angle 1 = 12x - 8$ $m\angle 2 = 3x + 8$



Since $\angle AED$ is inscribed in a semicircle

$$m\angle AED = 90^\circ$$

$\therefore \triangle AED$ is a right $\triangle$

$$\therefore \angle 1 + \angle 2 = 90^\circ$$

$$12x - 8 + 3x + 8 = 90$$

$$15x = 90 \quad \therefore x = 6$$

$$\therefore \boxed{m\angle 1 = 64^\circ}, \boxed{m\angle 2 = 26^\circ}$$

Since $\widehat{AB} \cong \widehat{BD}$, $\overline{AB} \cong \overline{BD}$, $\angle 3 \cong \angle 4$

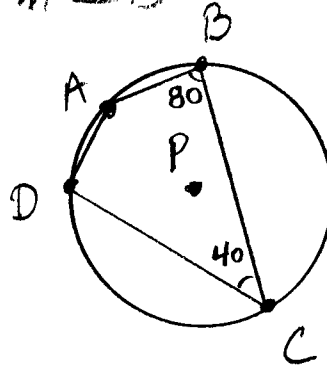
$$m\angle ABD = 90^\circ \quad \therefore \boxed{m\angle 3 = m\angle 4 = 45^\circ}$$

Ex 5
Pg 547

Quadrilateral ABCD inscribed in $\odot P$.

$$m\angle B = 80^\circ \quad m\angle C = 40^\circ$$

Find $m\angle A$, $m\angle D$



$$m\angle C = 40, \widehat{mDAB} = 80^\circ$$

$$\therefore \widehat{mDCB} = 360 - 80 = 280^\circ$$

$$\therefore m\angle BAD = m\angle A = \frac{280}{2} = \boxed{140^\circ} m\angle A$$

$$\widehat{mADC} = 2(80) = 160^\circ$$

$$\widehat{mABC} = 360 - 160 = 200^\circ$$

$$\therefore m\angle ADC = \frac{200}{2} = \boxed{100^\circ} = m\angle D$$

NOTE: Theorem 10.8 In an inscribed quadrilateral,
The opposite $\angle$ s are supplementary.
(Add to 180°)

Homework: Pg 549 # 8, 9, 13.