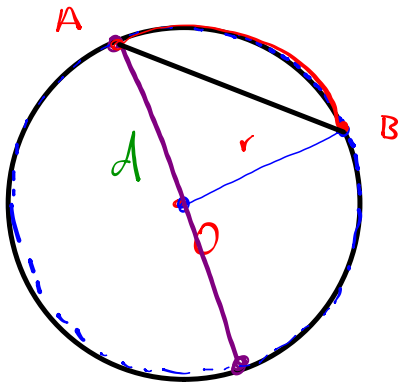
Unit 1: Identifying Various Elements in a Circle



Centre / Origin - O

r - radius

d - diameter - 2r

circumference (the perimeter of a circle)

$C = 2\pi r$ / $C = \pi d$

Area

$A = \pi r^2$

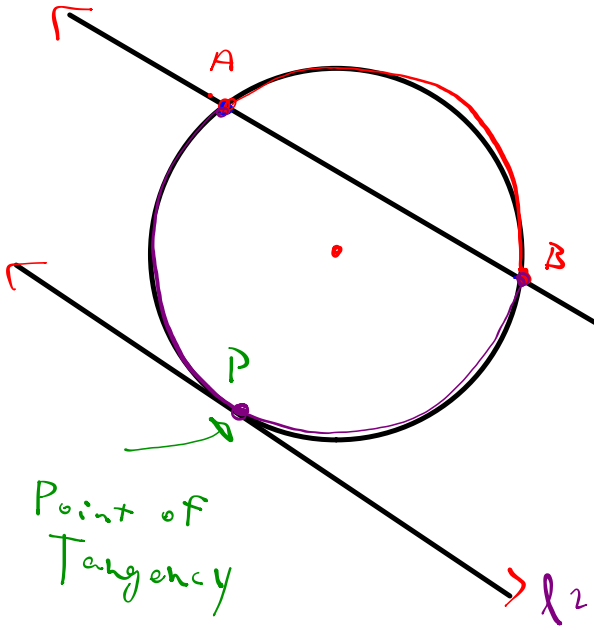
ray

line

line segment

$\overset{\frown}{AB}$ - arc

$\overline{AB}$ - chord - the line segment connecting two points on the circle.



Secant - ℓ_1 - a line that intercepts the circle at two points.

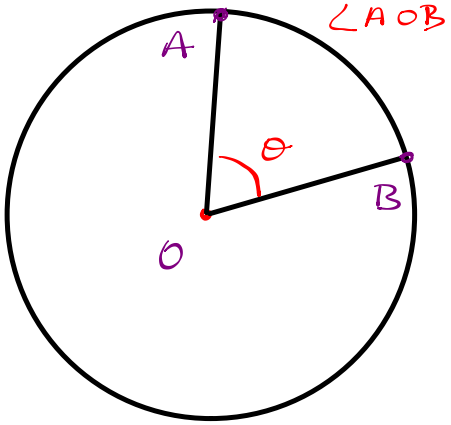
tangent - ℓ_2 - a line that intercepts the circle at one point. P

ℓ_1

$\overline{AB}$ subtends minor arc $\overset{\frown}{AB}$ and the major arc $\overset{\frown}{AB}$

Central Angle

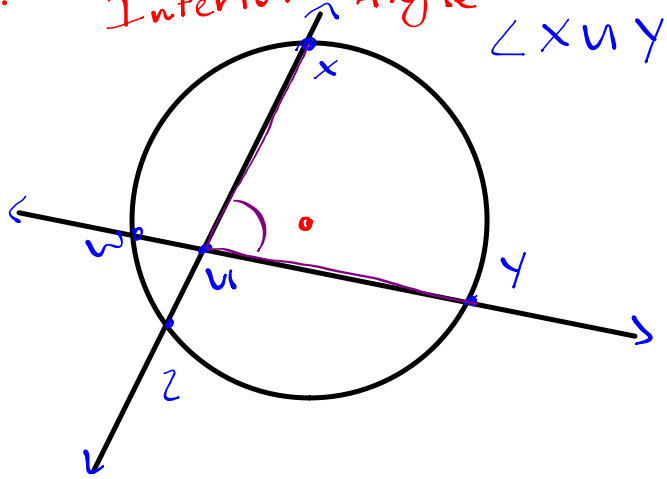
$\angle AOB$



$\angle AOB$ intercepts arc $\overset{\frown}{AB}$

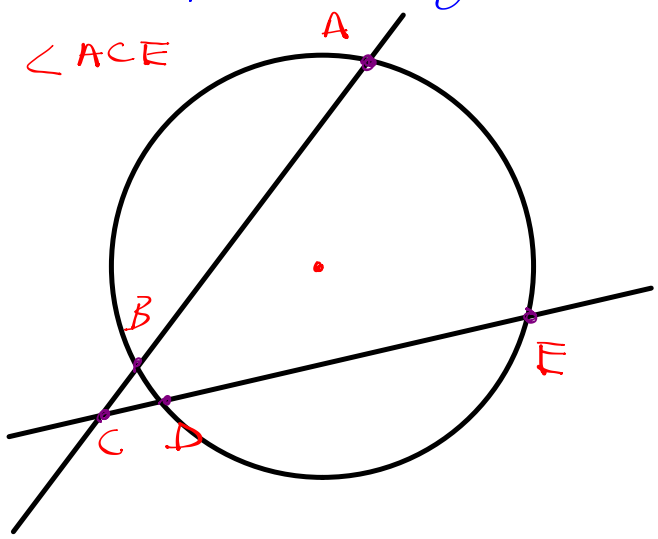
Interior Angle

$\angle XUY$



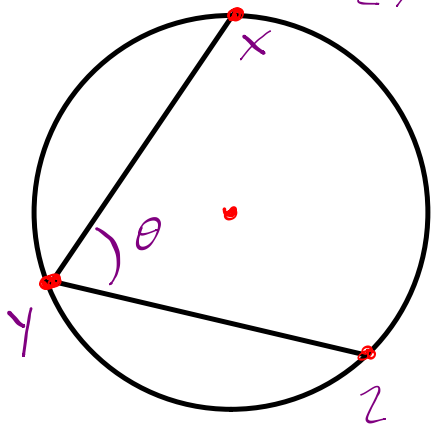
Exterior Angle

$\angle ACE$



Inscribed angle

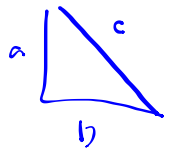
$\angle XYZ$



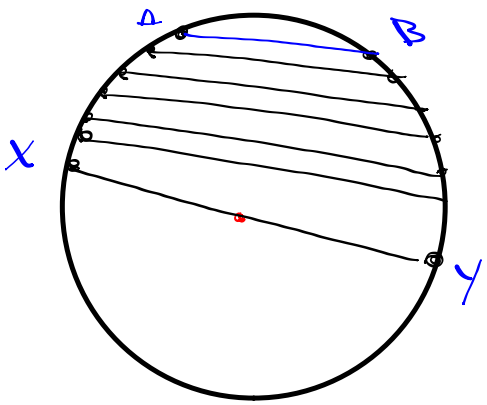
Unit 2 : Theorems

A theorem : a true, significant, interesting mathematical statement

× $2+2=4$ / $a^2+b^2=c^2$

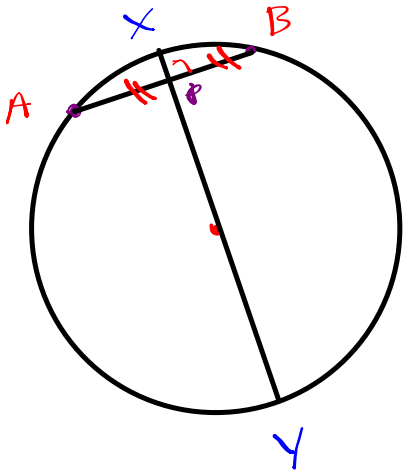


Theorem 1:



$\overline{XY}$ - diameter

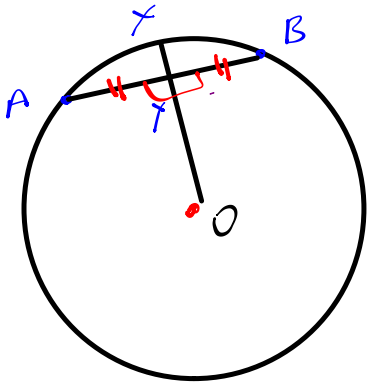
Theorem 2



$\overline{AB}$ - chord
$\overline{AP} \cong \overline{PB}$ → equivalent (same length)
$\overline{XY} \perp \overline{AB}$

then $\overline{XY}$ → diameter.

Theorem 3

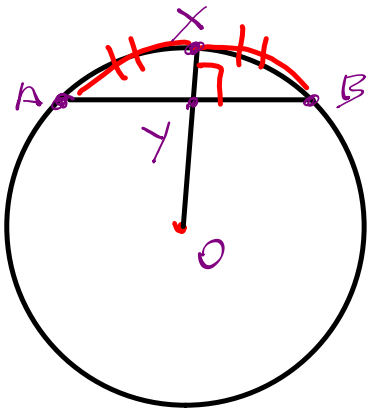


$\overline{AB}$ - chord

$\overline{XO}$ - radius

$\overline{AY} \cong \overline{BY}$

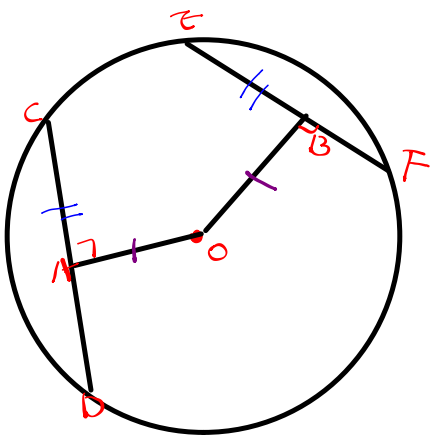
Theorem 4



$\overset{\frown}{AX} \cong \overset{\frown}{XB}$

since $\overline{XO} \perp \overline{AB}$

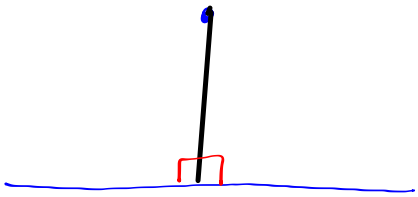
Theorem 5



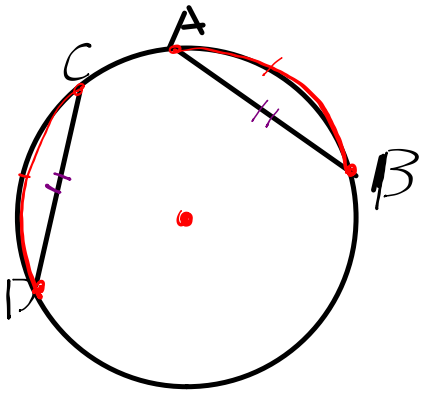
$\overline{OA} \cong \overline{OB}$

$\downarrow$

$\overline{CD} \cong \overline{EF}$

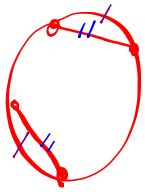


Theorem 6

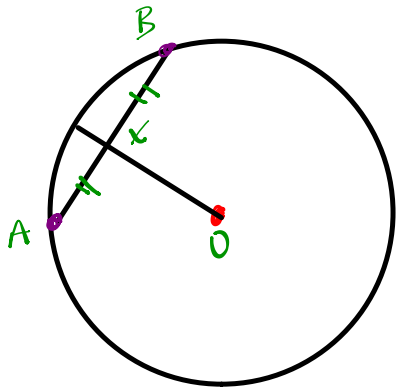


$\overline{AB} = \overline{CD}$

$\overset{\frown}{AB} = \overset{\frown}{CD}$



Question: Given the following circle, select from the list of theorems a theorem that proves angle $\angle OXA$ is a right angle.

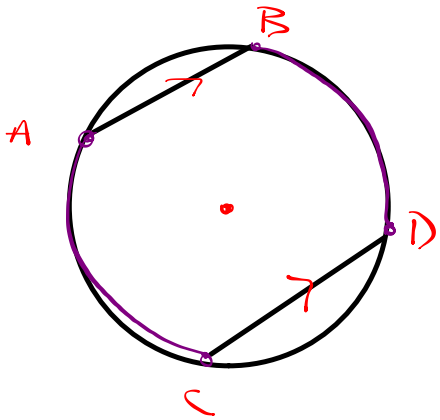


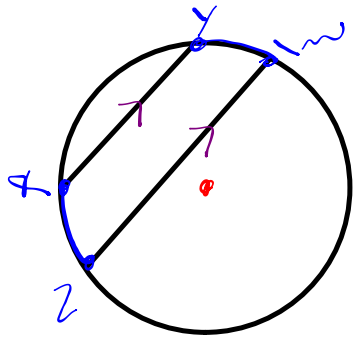
Th 3

Th 3

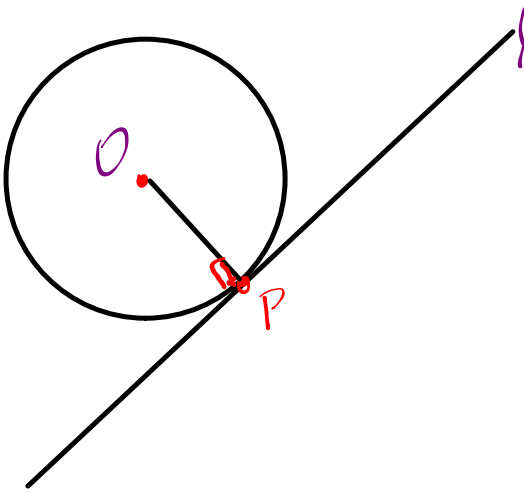
Theorem 7

$\overset{\frown}{BD} \cong \overset{\frown}{AC}$



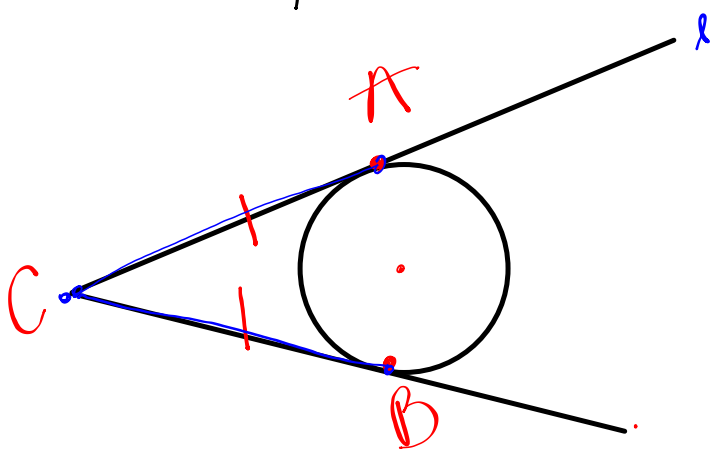


Theorem 8:



$\ell_1 \perp \overline{OP}$

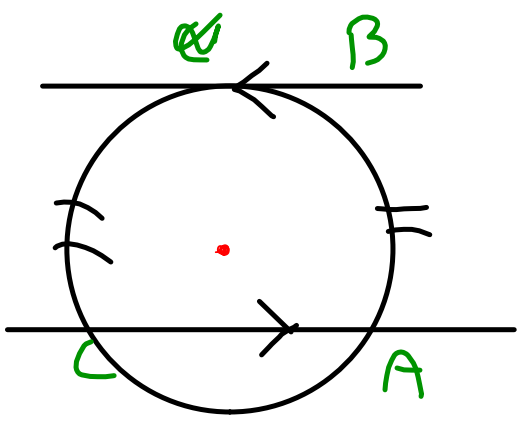
Theorem 9



$\overline{CA} \cong \overline{CB}$

l_{CA}

Theorem 10:



$\overset{\frown}{AB} \cong \overset{\frown}{BC}$

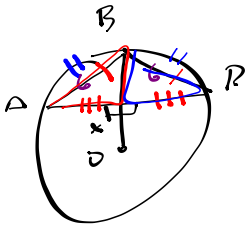
P 2.34

1, 2, 6

1.

Th 4 Use the theorem to label to diagram.

Th 6



$\overline{AB} = 6cm$

$\triangle ABX \cong \triangle BXC$ Th 3

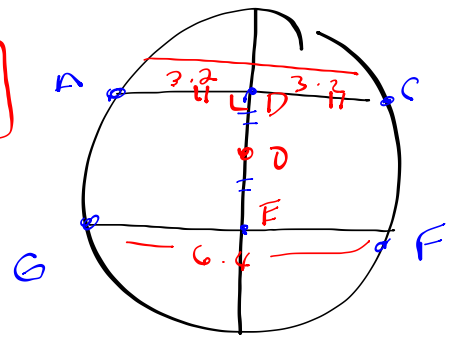
$AX \cong XC$ Th 3

$BX \cong BX$ shared side

$\angle BXA \cong \angle BXC = 90°$ ∴ each

2.

Th 3



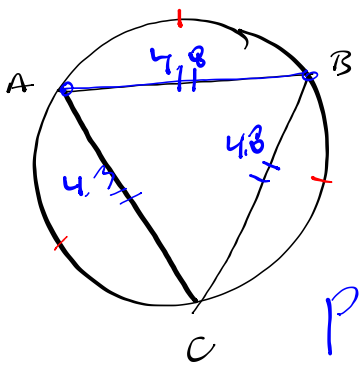
Th 5

$\bar{AC}$ is equidistant from the centre

$\bar{GF}$

$\bar{AC} \cong \bar{GF}$

Find the theorems that involve the elements of the circle in question.

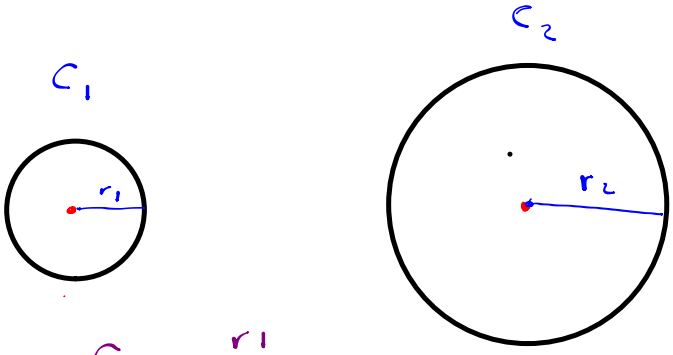


Th 6 arcs . chord

$P = 3 \cdot 4.8$ unit.

congruent = same length

Theorem 11



$$\frac{C_1}{C_2} = \frac{r_1}{r_2}$$

Ex Circle 1 has circum. 25.13 units. The ratio of the radii is $\frac{2}{3}$. What's the circum of circle 2.

Find C_2.

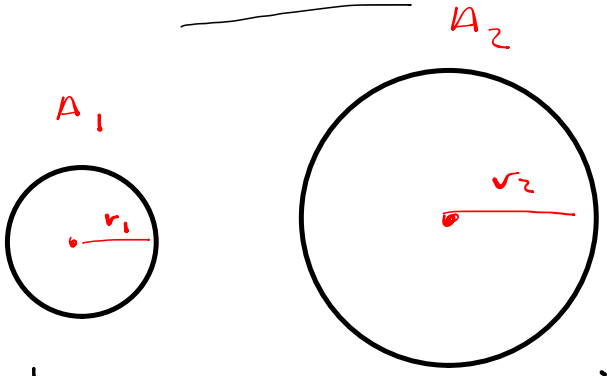
$$\frac{25.13}{C_2} = \frac{2}{3}$$

$C = 2\pi r$

∴

The ratio of width to length $w = 3$, $l = 4$ $\frac{3}{4}$

Theorem 12



$\frac{A_1}{A_2} = \frac{r_1^2}{r_2^2}$

Ex Circle one has an area of $50.26\ unit^2$. The ratio of the radii is $\frac{2}{3}$. Find A_2.

$A_1 = 50.26$

$\frac{r_1}{r_2} = \frac{2}{3}$

$\frac{50.26}{A_2} = \left(\frac{2}{3}\right)^2$

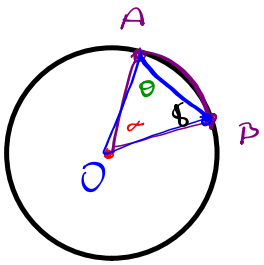
$\frac{50.26}{A_2} = \frac{4}{9}$

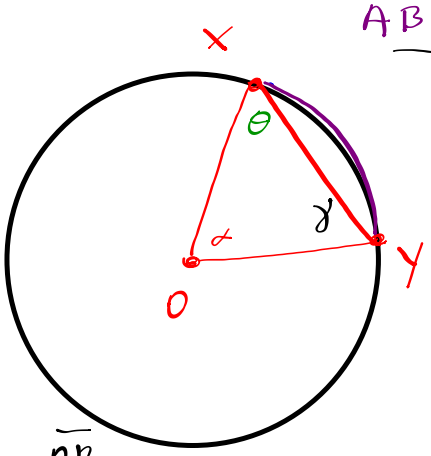
$A_2 = \frac{9 \cdot (50.26)}{4}$

$A_2 = 113.\overline{085}\ unit^2$

Theorem 13

$\overset{\frown}{AB} \sim \overset{\frown}{XY}$





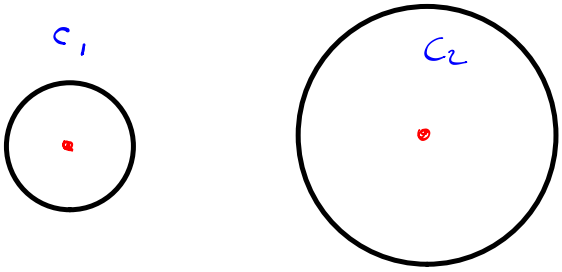
similar

$\triangle OAB \sim \triangle OXY$

$\frac{m\overset{\frown}{AB}}{m\overset{\frown}{XY}} = \frac{\overline{OB}}{\overline{OY}}$

right-o! roger that!

Question



The ratio of the areas of the circles is $\frac{4}{9} = \frac{A_1}{A_2}$

If the circumference of the 2nd circle is 37.699 units.

Find C_1.

$\frac{A_1}{A_2} = \frac{r_1^2}{r_2^2}$

$\sqrt{\frac{4}{9}} = \sqrt{\frac{r_1^2}{r_2^2}}$

$\frac{2}{3} = \frac{r_1}{r_2}$

$\frac{C_1}{C_2} = \frac{r_1}{r_2}$

$\frac{C_1}{37.699} = \frac{2}{3}$

$C_1 = \frac{2 \cdot 37.699}{3}$