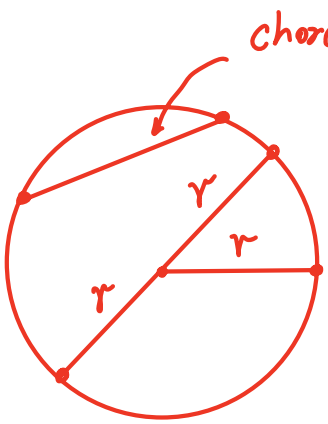
Circle:



→ $d = 2r$

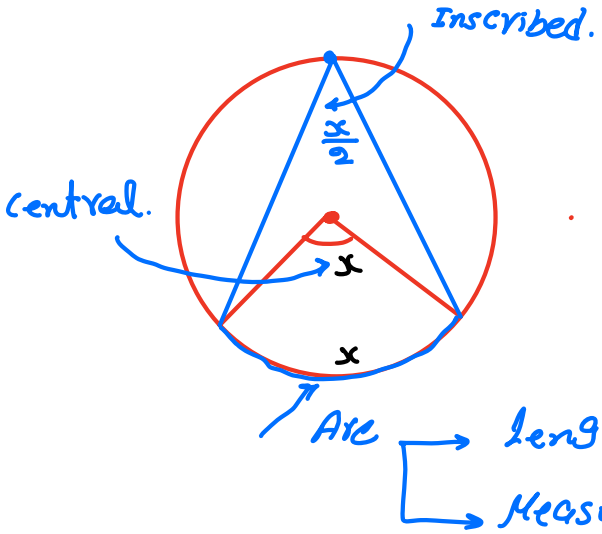
→ $r = \frac{1}{2} d$

→ $C = 2\pi r = d\pi$

→ $Area = \pi r^2$

→ $Measure = 360^\circ$

→ Angles:



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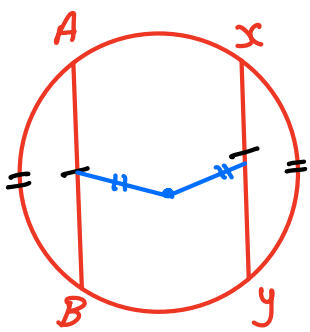
* Chord Relation:

①

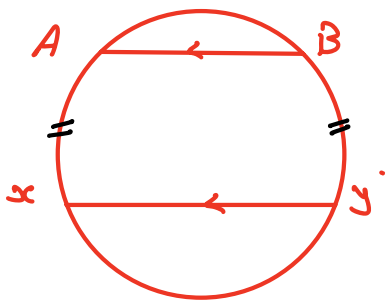


If $AB = xy$

Then: $m(\overset{\frown}{AB}) = m(\overset{\frown}{xy})$

: $length(\overset{\frown}{AB}) = length(\overset{\frown}{xy})$

②

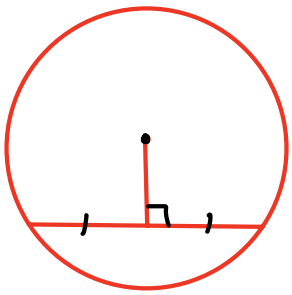


If $\overline{AB} \parallel \overline{xy}$

Then: $m(\overset{\frown}{Ax}) = m(\overset{\frown}{By})$

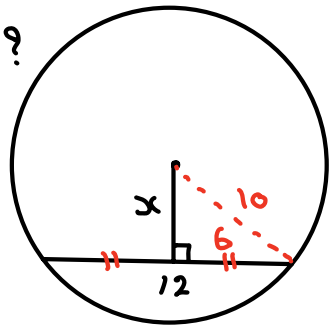
: $length(\overset{\frown}{Ax}) = length(\overset{\frown}{By})$

③



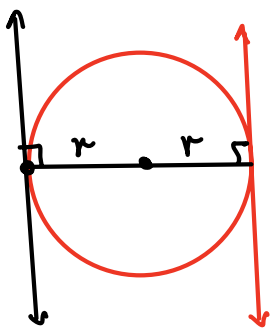
Ex: Find x If radius of circle = 10 Cm.?

$x = \sqrt{10^2 - 6^2} = 8$

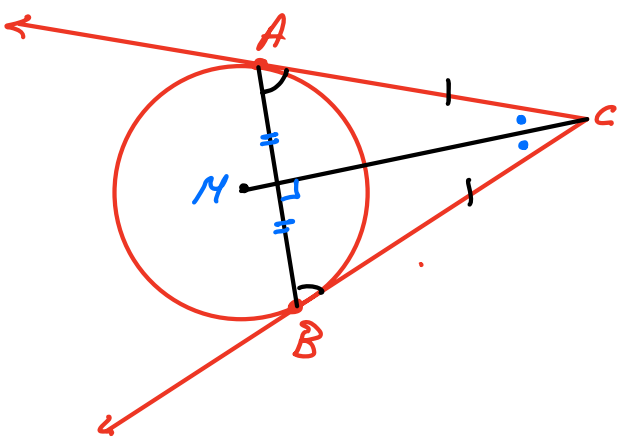


Note: **Tangents:**

① Tangent ⊥ radius.

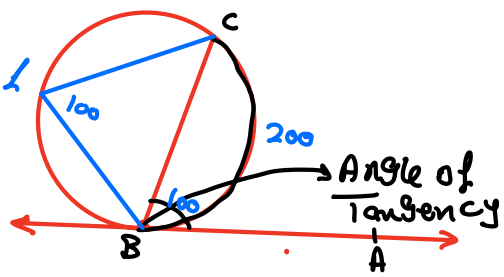


② $AC = BC$

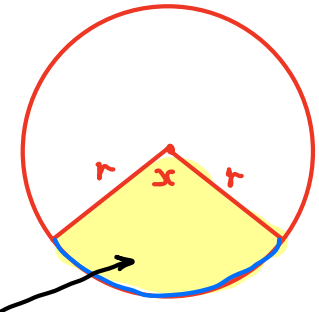


→ **Angle of tangency:**

* $m(\angle ABC) = \frac{1}{2} m(\overset{\frown}{BC})$
* $m(\angle ABC) = m(\angle BLC)$



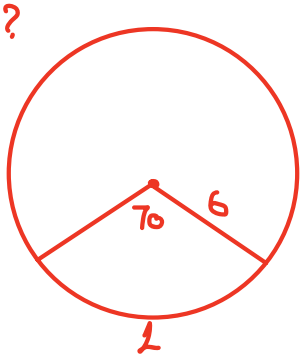
* Sector:



shaded (sector)
↳ (Area.)

Note: $\frac{\text{Area of sector}}{\pi r^2} = \frac{x}{360} = \frac{\text{Length of arc}}{2\pi r}$

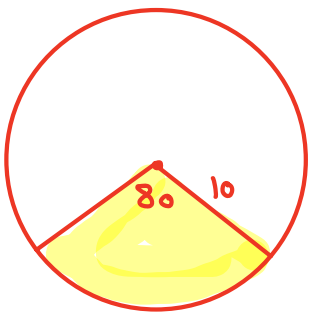
Ex: Find length of arc?



$$\frac{70}{360} = \frac{l}{2\pi(6)}$$

$$l = \frac{\overset{1}{\cancel{70}} \times \overset{1}{\cancel{12}}\pi}{\underset{3}{\cancel{360}}} = \frac{7\pi}{3}$$

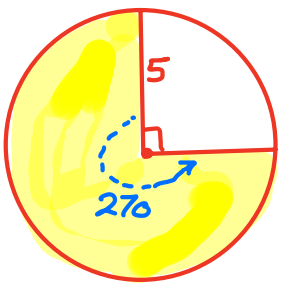
Ex: Find area of shaded?



$$\frac{80}{360} = \frac{A}{\pi(10)^2}$$

$$A = \frac{\overset{2}{\cancel{80}} \times 100\pi}{\underset{9}{\cancel{360}}} = \frac{200\pi}{9}$$

Ex: Find area of shaded?



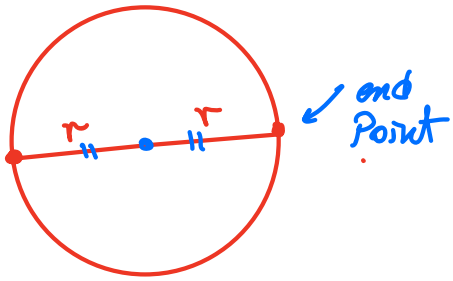
$$\frac{270}{360} = \frac{A}{\pi(5)^2}$$

$$A = \frac{\overset{3}{\cancel{270}} \times 25\pi}{\underset{4}{\cancel{360}}} = \frac{75\pi}{3}$$

* Equation of Circle:

* MidPoint = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

* Distance = $\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$



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* Standard Form:

$$(x-h)^2+(y-k)^2=r^2$$

* Center = (h,k)
* radius = $\sqrt{r^2}=r$

Ex: $(x-2)^2+(y+3)^2=25$

→ Center = $(2,-3)$

→ $r = \sqrt{25} = 5$

Ex: $(x+1)^2+y^2=36$

→ Center = $(-1,0)$

→ $r = \sqrt{36} = 6$

Ex: $x^2+y^2=100$

Center = $(0,0)$

$r = \sqrt{100} = 10$

Ex: write equation of Circle with center $(5,-2)$ And radius (3) ?

$$(x-5)^2+(y+2)^2=9$$

Ex: write equation of Circle with Center at (3, 1) And Passes through (2, 5) ?

$$(x-3)^2 + (y-1)^2 = r^2$$

radius → ① $r = \sqrt{(3-2)^2 + (1-5)^2} = \sqrt{1+16} = \sqrt{17}$

→ $(x-3)^2 + (y-1)^2 = 17$

② $(\cancel{x}^{2}-3)^2 + (\cancel{y}^{5}-1)^2 = r^2$

$1 + 16 = 17 = r^2$

$(x-3)^2 + (y-1)^2 = 17$

Ex: write equation of Circle with diameter Passes Through end Points (1, −3) , (5, −1) ?

→ Center = $\left(\frac{1+5}{2}, \frac{-3-1}{2}\right) = (3, -2)$

→ $(\cancel{x}^{5}-3)^2 + (\cancel{y}^{-1}+2)^2 = r^2$

$4 + 1 = 5 = r^2$

→ $(x-3)^2 + (y+2)^2 = 5$

Ex: write equation of Circle with Center at (−1, −4) And Tangent to:

① x-axis: $(x+1)^2 + (y+4)^2 = 16$

Note: $r = |-4| = 4$

② y-axis: $(x+1)^2 + (y+4)^2 = 1$

Note: $r = |-1| = 1$

→ General Form:

$$Ax^2 + By^2 + hx + ky = c$$

* $A = B = 1$
* Center $= \left(\frac{h}{-2}, \frac{k}{-2}\right)$
* radius $= \sqrt{\left(\frac{h}{-2}\right)^2 + \left(\frac{k}{-2}\right)^2 + c}$

Ex: $x^2 + y^2 + 6x - 8y = 7$

Find Center / radius?

* Center $= \left(\frac{6}{-2}, \frac{-8}{-2}\right) = (-3, 4)$
* $r = \sqrt{(-3)^2 + (4)^2 + 7} = \sqrt{32}$

Ex:

$$2x^2 + 2y^2 - 36x + 24y = 14 \quad \div 2$$

* $x^2 + y^2 - 18x + 12y = 7$
* Center $= (9, -6)$
* $r = \sqrt{81 + 36 + 7}$