

9.2. Honors Geometry

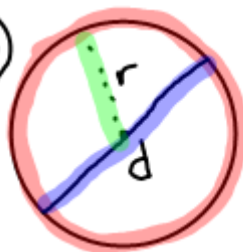
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NOTE: Circle has 360°

Circumference of a Circle and Length of an Arc

Circumference

$C = \frac{C}{d}$
"cross multiply"



r = radius
d = diameter
 $\frac{d}{2} = r \Rightarrow d = 2r$

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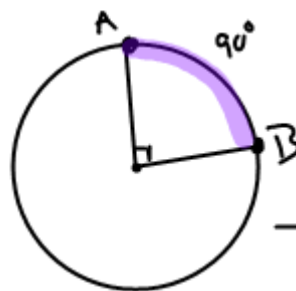
$$C = \pi d$$

$$C = 2\pi r$$

since $d = 2r$, we have

Units: cm, m, ft, etc.

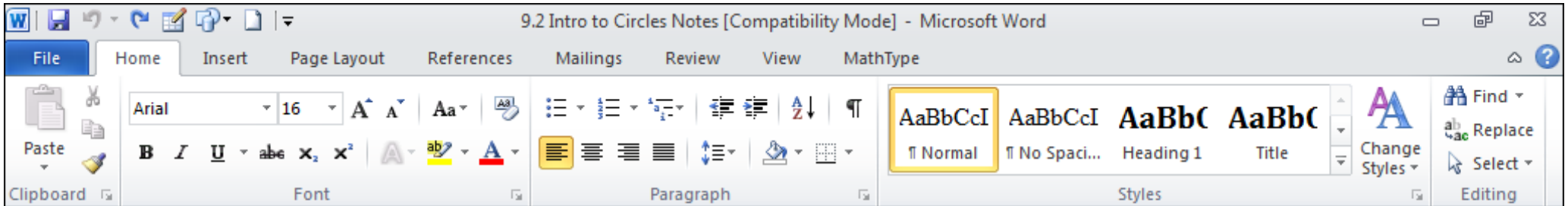
Length of an Arc (Fractional part of circumference)



Symbol: \widehat{AB}

$$\text{Length of } \widehat{AB} = \frac{\text{measure of arc or central } \angle \text{ (in degrees)}}{360^\circ} \cdot 2\pi r \text{ or } \pi d$$

Area of a Circle and Area of Sector



Area of a Circle and Area of Sector

Area of Circle

"the space inside"
(the sauce of the pizza pie)

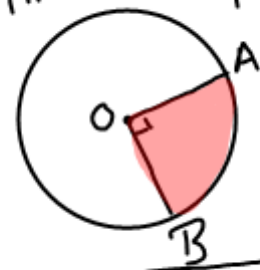


We derived
Formula
in class

$$A_{\odot} = \pi r^2 \text{ units}^2$$

Area of Sector

"the sauce on part of the pizza"



$$A_{\text{sector } AOB} = \frac{\text{measure of arc or central } \angle \text{ (in degrees)}}{360} \cdot \pi r^2$$

Examples

- 1) Find the area of a circle with a radius of 5 cm.

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Examples

will leave all answers in terms of π

- 1) Find the area of a circle with a radius of 5 cm.

$$r = 5$$

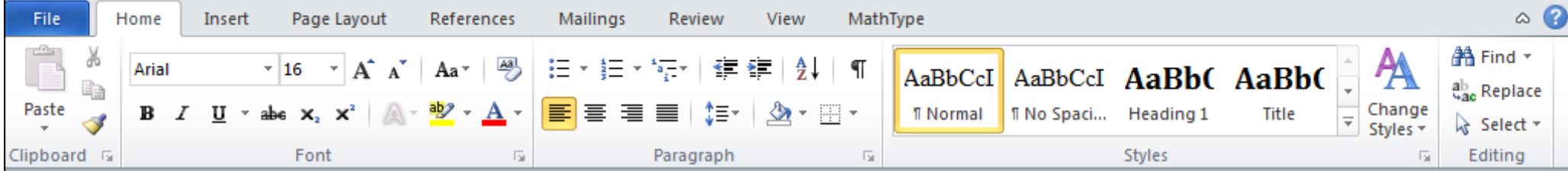
$$A = \pi r^2 = \pi (5)^2 = 25\pi \text{ units}^2$$

- 2) Find the circumference of a circle with a diameter of 14 cm.

$$C = \pi d = \pi \cdot 14 = 14\pi \text{ cm}$$

NOTE:

$$d = 14 \Rightarrow r = \frac{14}{2} = 7$$



3) The circumference of $\odot O$ is 36 π . Find the area of the circle.

$$C = 2\pi r$$

$$\frac{36\pi}{2\pi} = \frac{2\pi r}{\pi}$$

$$18 = r$$

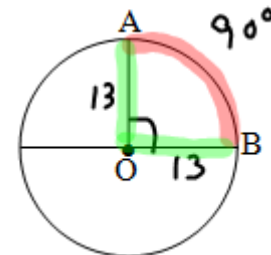
$$A_0 = \pi r^2 = \pi (r)^2 = 324\pi \text{ units}^2$$

4) Given: $\odot O$. $\overline{AO} \perp \overline{OB}$, $OA = 13$. Find the length of \widehat{AB} .

$\angle AOB = 90^\circ \rightarrow r = 13$

$$\text{Length } \widehat{AB} = \frac{90}{360} \cdot 2\pi(13) = \frac{90 \cdot 2\pi \cdot 13}{360}$$

$$= \frac{13}{2}\pi \text{ units}$$



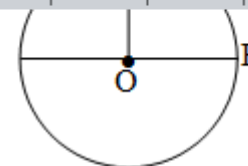
side work

$$\frac{90 \cdot 2(13)}{360} = \frac{13}{2}$$

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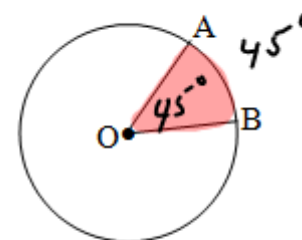
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5) The diameter of $\odot O$ is 16, $m\angle AOB$ is 45° . Find the area of sector AOB.

$$d = 16 \Rightarrow r = 8$$

$$\begin{aligned} A_{\text{sector AOB}} &= \frac{45}{360} \cdot \pi (8)^2 \\ &= \frac{45 \cdot \pi \cdot 64}{360} = 8\pi \text{ units}^2 \end{aligned}$$



$$\frac{45 \cdot 64}{360} = 8$$

