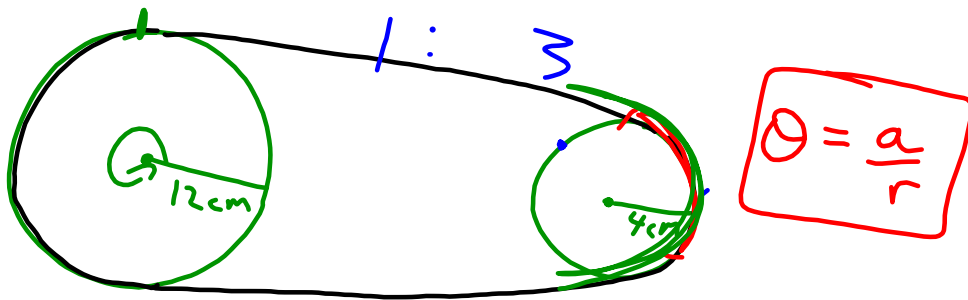


Check-Up



Ex. If larger wheel rotates 380° , how far has the belt travelled?
 ① $= 79.6 \text{ cm}$
 $= \frac{76\pi}{3} \text{ cm}$

② If the belt moves 4 m, through what angle has each of the pulleys rotated?

1/ $\theta = \frac{a}{r}$ MUST be in Radians

(12) ①

$$\frac{380\pi}{180} = \frac{a}{12 \text{ cm}}$$

$$\frac{12(380)\pi}{180} = a$$

$$a = \underline{79.6 \text{ cm}}$$

2/ Larger Pulley

$$\theta = \frac{a}{r}$$

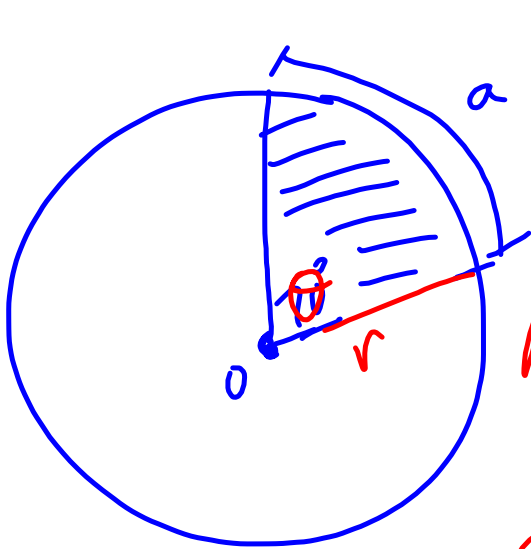
$$\theta = \frac{400 \text{ cm}}{12 \text{ cm}}$$

$$\theta = \frac{100}{3} \text{ Rad}$$

Small Pulley

$$\theta = \frac{100}{3} \times 3 = \underline{100 \text{ Rad}}$$

$$\theta = \frac{400 \text{ cm}}{4 \text{ cm}} = \underline{100 \text{ Rad}}$$



$$A = \pi r^2$$

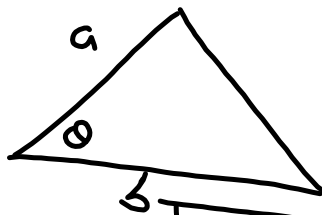
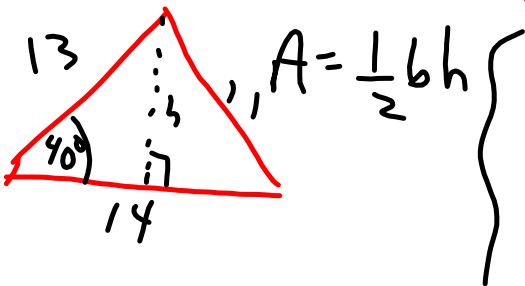
$$A = \left(\frac{70}{360}\right) \pi (10)^2$$

$$A_{\text{sector}} = \left(\frac{\theta}{360^\circ}\right) \pi r^2$$

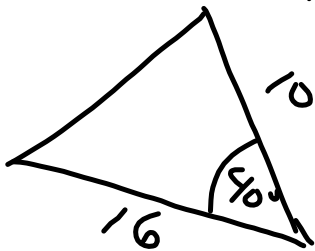
OR

$$A_{\text{sector}} = \left(\frac{\theta}{2\pi}\right) \pi r^2 = \frac{\theta r^2}{2}$$

Area of a Triangle

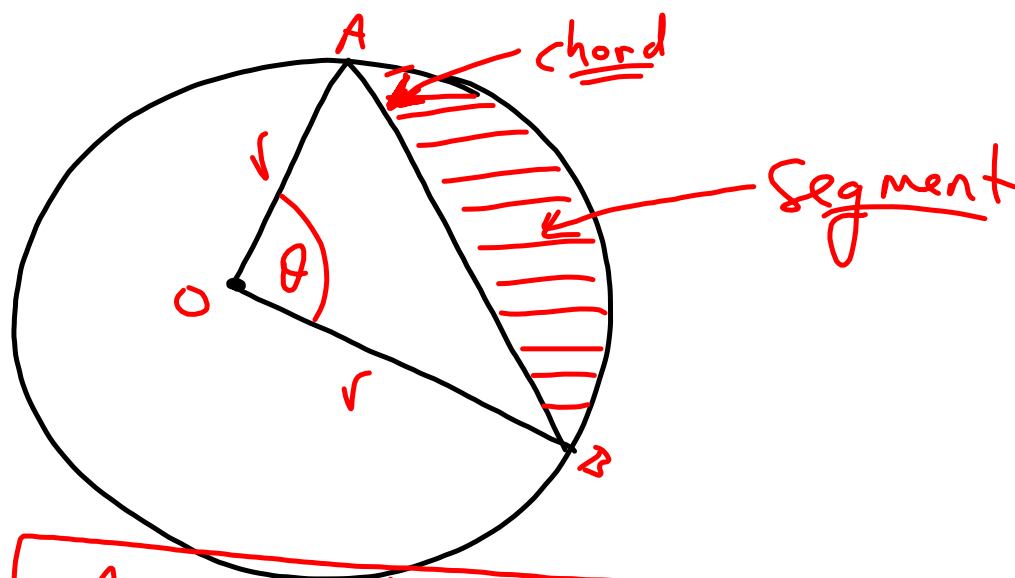


$$A = \frac{1}{2} ab \sin \theta$$



$$A = \frac{1}{2} (16)(10) \sin 40^\circ$$

$$A = \underline{\underline{51.4 \text{ u}^2}}$$

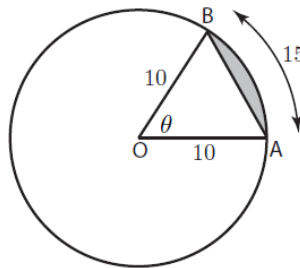


$$A_{\text{segment}} = A_{\text{sector}} - A_{\text{triangle}}$$

$$A_{\text{seg}} = \left(\frac{\theta}{360}\right)\pi r^2 - \frac{1}{2}r^2 \sin \theta$$

Example

Refer to Figure 8. Suppose we have a circle of radius 10cm and an arc of length 15cm. Suppose we want to find (a) the angle θ , (b) the area of the sector OAB , (c) the area of the minor segment (shaded).



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Figure 8. The shaded area is called the minor segment.

(a) $\theta = \frac{a}{r}$

$\theta = \frac{15}{10}$

$\theta = 1.5 \text{ Rad}$

(b) $A = \frac{\theta r^2}{2}$

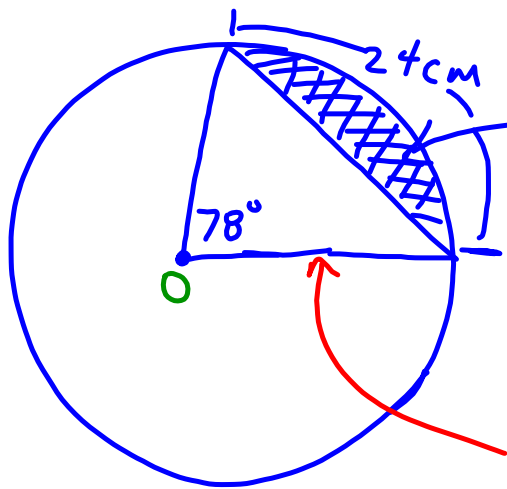
$A = \frac{1.5(10)^2}{2}$

$A = 75 \text{ u}^2$

(c) $A_{\text{seg}} = 75 - \frac{1}{2}(10)^2 \sin 1.5$

$A_{\text{seg}} = 75 - 49.87..$

$= 25.1 \text{ u}^2$



Find the area of this segment.

Ans. $\approx 59.6 \text{ cm}^2$

$$\theta = \frac{a}{r} \quad 180(24) / (78\pi)$$

$$\frac{78\pi}{180} = \frac{24 \text{ cm}}{r}$$

$$78\pi r = 180(24)$$

$$r = \frac{180(24)}{78\pi} = \underline{17.63 \text{ cm}}$$

$$A_{\text{seg}} = \overset{\text{Sector}}{\left(\frac{78}{360}\right) \pi (17.63)^2} - \overset{\text{Triangle}}{\frac{1}{2} (17.63)^2 \sin 78^\circ}$$

$$\approx \underline{59.55 \text{ cm}^2}$$

Practice Problems...

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#3, 4, 5, 6, 7, 9, 11, 12, 13, 14, 17