

Circumference & Arc Length Problems

$C = 42\pi$ feet

KREY

1. A Ferris wheel has diameter 42 ft. How far will a rider travel during a 4 minute ride if the wheel rotates once every 20 seconds? Use $\pi = \frac{22}{7}$.

1 min = 3 rotations
 4 min = 12 rotations \rightarrow $12C = 12(42 \cdot \frac{22}{7}) = 72 \cdot 22 = 1584$ feet

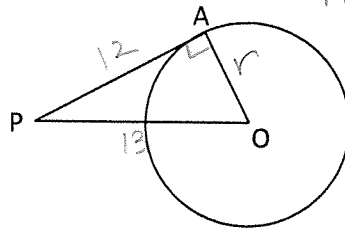
2. Find the circumference of a circle that is circumscribed about an equilateral triangle with side length 6.



$r = 2\sqrt{3}$ $C = 2\pi(2\sqrt{3}) = 4\pi\sqrt{3}$

3. $PA = 12$, $PO = 13$, \overline{PA} is tangent to circle O at A. Find the circumference of the circle.

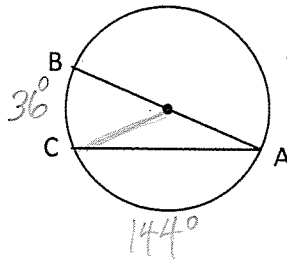
$5^2 + 12^2 = 13^2$
 $25 + 144 = 169$



$r = 5$ $C = 2\pi(5) = 10\pi$

4. Diameter $AB = 24$, $m\angle BAC = 18$. Find the length of \widehat{AC} .

$\frac{180}{-36}$
 $\frac{144}{144}$



$C = 24\pi$
 $\frac{144}{360} = \frac{2}{5} \rightarrow \frac{2}{5} \cdot \frac{24\pi}{1} = \frac{48\pi}{5}$

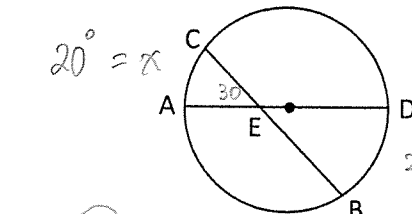
5. Diameter $AD = 16$, $m\widehat{AC} = x$, $m\widehat{BD} = 2x$ and $m\angle AEC = 30$. Find the lengths of \widehat{AC} and \widehat{BD} .

$30 = \frac{1}{2}(x + 2x)$

$60 = 3x$

$20 = x$

$C = 16\pi$



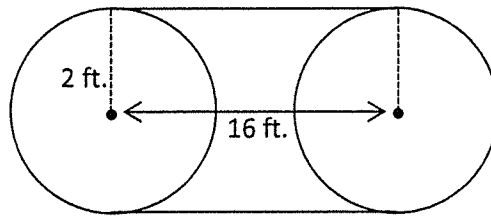
\widehat{AC}
 $\frac{20}{360} = \frac{1}{18}$
 $\frac{1}{18} \cdot 16\pi = \frac{8\pi}{9}$

\widehat{BD}
 $\frac{40}{360} = \frac{1}{9}$
 $\frac{1}{9} \cdot 16\pi = \frac{16\pi}{9}$

6. On a large machine, the centers of two pulleys are 16 ft. apart and the radius of each pulley is 2 ft. How long of a belt is needed to wrap around both pulleys?

$$C = 2\pi(2) = 4\pi$$

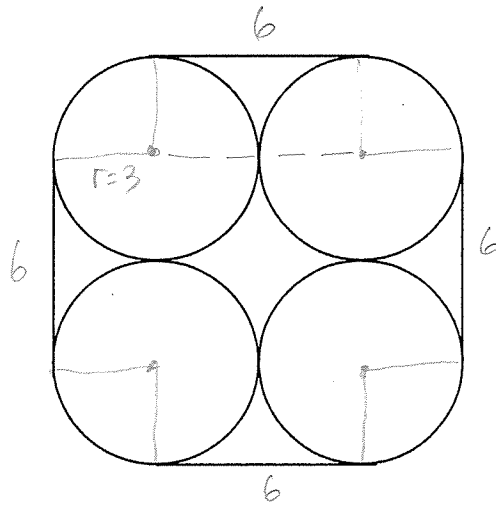
$$\text{belt} = 32 + 4\pi \text{ feet}$$



7. Four posts with 3 in. radii are bound together with a wire. Find the length of the shortest wire that will go around them.

$$C = 2\pi(3) = 6\pi$$

$$\text{Wire} = 24 + 6\pi$$



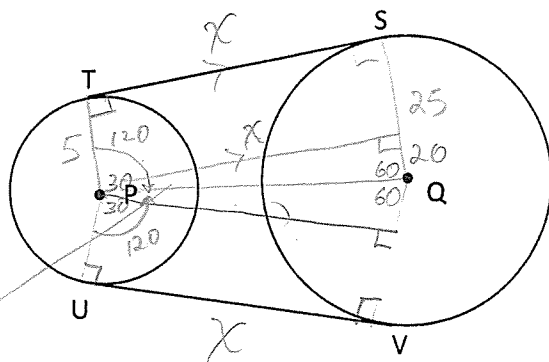
8. The diagram below shows a belt tightly stretch over two wheels with radii 5 and 25. The distance between the centers of the wheels is 40. Find the length of the belt.

$$C_{\text{small } \odot} = 10\pi$$

$$\widehat{TU} = \frac{1}{3} \cdot 10\pi = \frac{10\pi}{3}$$

$$C_{\text{large } \odot} = 50\pi$$

$$\widehat{SV} = \frac{2}{3} \cdot 50\pi = \frac{100\pi}{3}$$



$$20^2 + X^2 = 40^2$$

$$X^2 = 1600 - 400$$

$$X = \sqrt{1200}$$

$$X = 20\sqrt{3}$$

$$2X = 40\sqrt{3}$$

What is r'ship
bet 40 & 20?
30-60-90 Δ.

$$= 40\sqrt{3} + \frac{10\pi}{3} + \frac{100\pi}{3}$$

$$\text{belt} = 40\sqrt{3} + \frac{110\pi}{3}$$