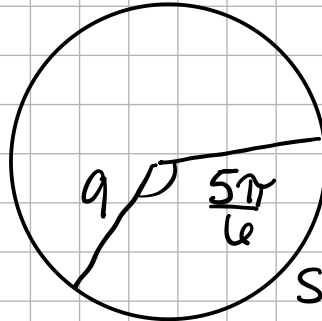


Name: _____ Date: 10/2/25

Session 7

1. Find the arc length

$$r\left(\frac{5\pi}{6}\right) \rightarrow \frac{r5\pi}{6} \rightarrow \boxed{\frac{15\pi}{2}}$$



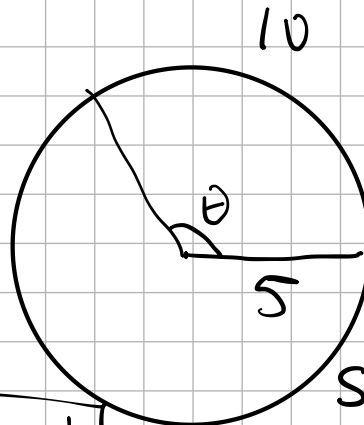
$$S = r\theta$$

2. Find θ

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

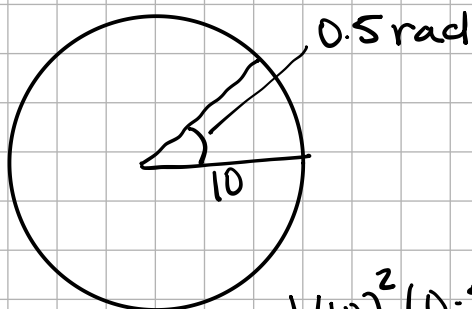
$$\frac{S}{r} = \theta$$

$$\frac{10}{5} = \theta = \boxed{2 \text{ rad}}$$



3. Find the area of the shaded region

a)

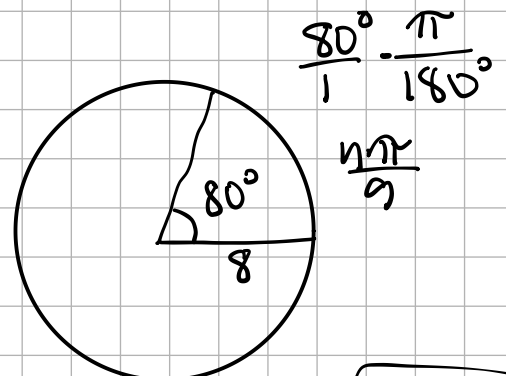


$$\frac{1}{2}(10)^2(0.5)$$

$$A = \frac{1}{2}r^2\theta$$

$$\boxed{25}$$

b)



$$\frac{80^\circ}{1} \cdot \frac{\pi}{180^\circ}$$

$$\frac{4\pi}{9}$$

$$\frac{1}{2}(8)^2\left(\frac{4\pi}{9}\right) \approx \boxed{11.68}$$

4. A ceiling fan with 16-inch blades rotates at 45 rpm.

angular speed $\omega = \frac{\theta}{t}$

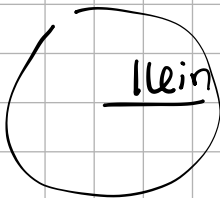
a) Find the angular speed of the fan in rad/min

$$\frac{45 \text{ revolutions}}{1 \text{ minute}} \cdot 2\pi$$

$$\boxed{\frac{90\pi \text{ rad}}{1 \text{ min}}}$$

b) Find the linear speed of the tips of the blades in inches/min.

$$v = \frac{s}{t} \text{ - distance}$$



$$16 \text{ in} \times 2\pi = 32\pi \text{ in}$$

$$\frac{45 \text{ revolutions}}{1 \text{ minute}} = \frac{32\pi \text{ in} \times 45 \text{ rev}}{1 \text{ min}}$$

$$\boxed{\frac{1440\pi \text{ in}}{1 \text{ min}}}$$

5. The top and bottom ends of a windshield wiper blade are 34 in. and 14 in., respectively from the pivot point. While in operation, the wipers sweep through 135° . Find the area swept by the blade.

$\frac{135^\circ}{1} \cdot \frac{\pi}{180^\circ}$

$\frac{3\pi}{4}$

$433.5\pi - 73.5\pi$

$\downarrow$

360π

$\approx 1130.4 \text{ in}^2$

$A = \frac{1}{2} r^2 \theta$

$\frac{1}{2} (14)^2 \left(\frac{3\pi}{4}\right)$

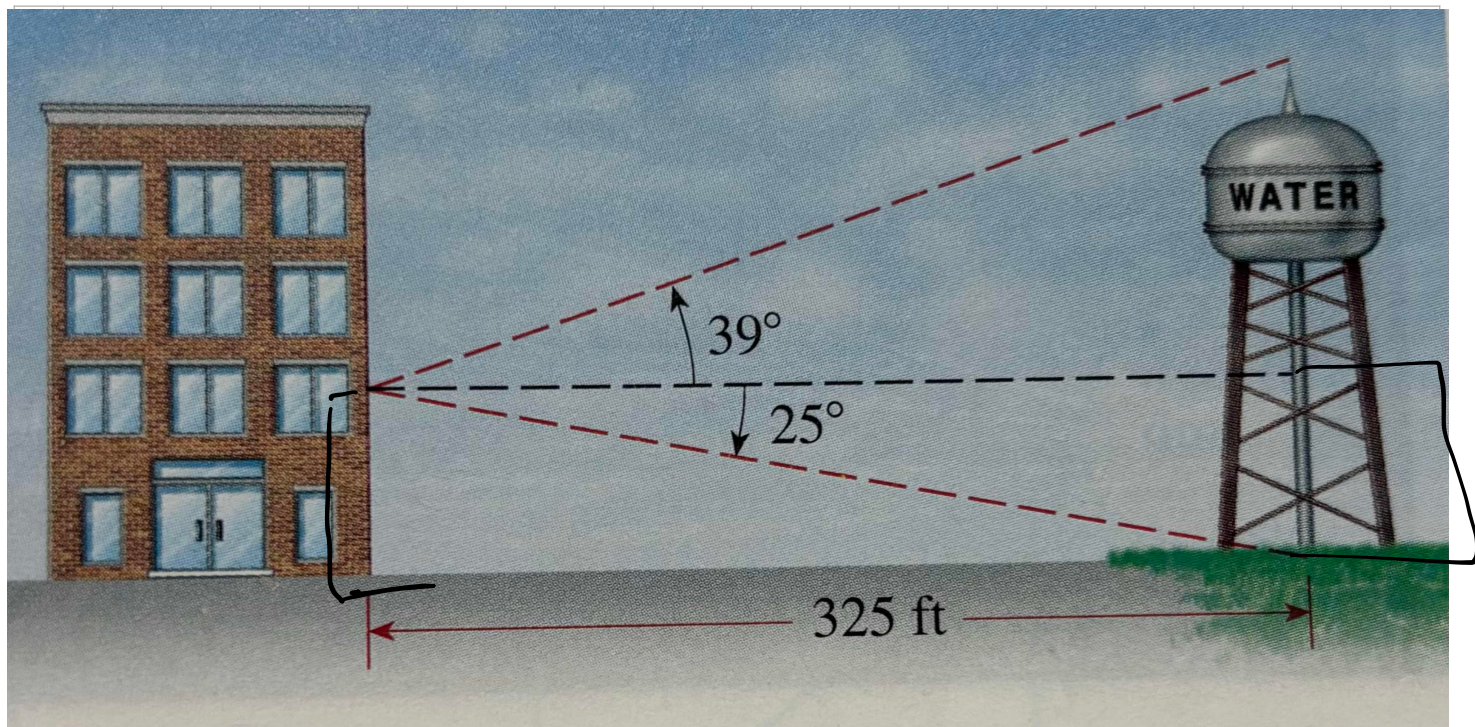
$\frac{294\pi}{4}$

$73.5\pi \text{ in}^2$

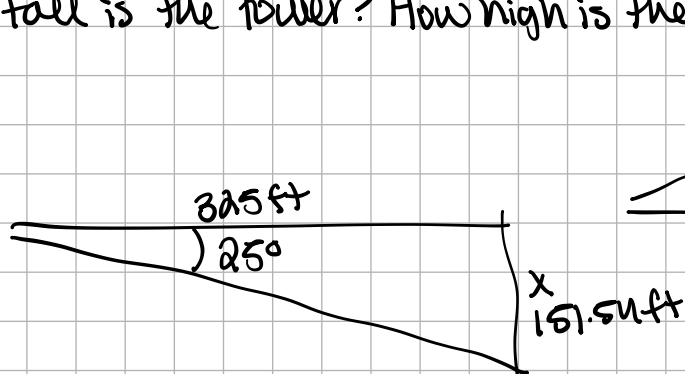
$34 \text{ in} \left(\frac{1}{2} (156) \left(\frac{3\pi}{4}\right)\right)$

578.3π

$433.5\pi \text{ in}^2$

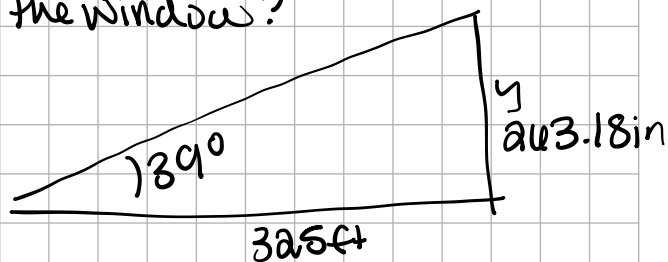


6. A water tower is located 325 ft from a building (see the figure). From a window in the building, an observer notes that the angle of depression to the bottom of the tower is 25° , and the angle of elevation to the top is 39° . How tall is the tower? How high is the window?



$$325 \cdot \tan 25^\circ = \frac{x}{325} \cdot 325$$

$$x = 151.55 \text{ ft}$$



$$325 \cdot \tan 39^\circ = \frac{y}{325} \cdot 325$$

$$y = 263.18 \text{ in}$$

height of the tower
114.73 in

height of window
151.55 in

$$\begin{array}{r} 151.55 \text{ in} \\ 263.18 \text{ in} \\ \hline 114.73 \text{ in} \end{array}$$