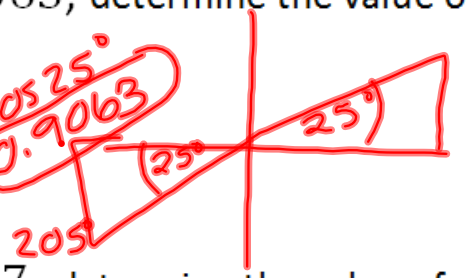
Review

1. Given that $\cos 25° \approx 0.9063$, determine the value of

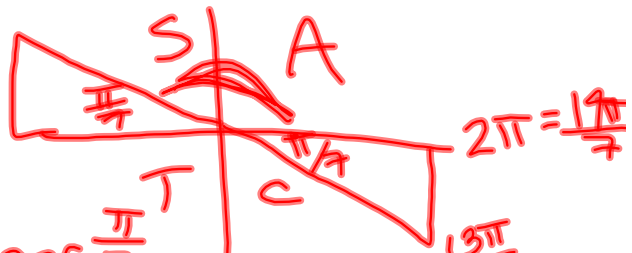
$\cos 205° \approx$ -0.9063

$\sin 65° = \sin(90° - 25°) = \cos 25° = 0.9063$



2. Given that $\csc \frac{6\pi}{7} \approx 2.3047$, determine the value of

$\csc \frac{13\pi}{7} \approx$ -2.3047

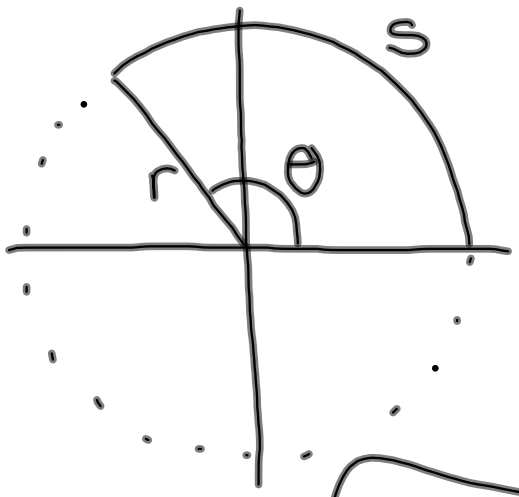


$\frac{7\pi}{7} - \frac{2\pi}{7} = \frac{5\pi}{7}$

$\sec \frac{5\pi}{14} = \sec\left(\frac{\pi}{2} - \frac{\pi}{7}\right) = \csc \frac{\pi}{7} = 2.3047$

complement of $\frac{\pi}{7}$

5.4 Arc Length & Angular Speed



r = radius in, cm, km

θ = angle

s = arc length in, cm, km, mi

(segment of circumference spanned by the angle)

$$s = r\theta$$

1. $r = 5\text{in}$; $\theta = 45^\circ$; $s = ?$ in

$s = r\theta$

$s = 5\text{in} \cdot 45^\circ \cdot \frac{\pi}{180^\circ} = \boxed{\frac{5\pi}{4}\text{ in}}$

4

2. $s = 16\text{yd}$; $\theta = 5$; $r = ?$ yd

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

$r = \frac{s}{\theta} = \boxed{\frac{16\text{yd}}{5}} = \boxed{\frac{16}{5}\text{yd}}$

3. Find the measure of a rotation in radians when a point 2 m from the center of rotation travels 4m.

$\theta = ?\ rad;\ r = 2m;\ s = 4m$

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

$\theta = \frac{s}{r} = \frac{4m}{2m} = \boxed{2}$

Linear Speed

$$V = \frac{s}{t}$$

V = linear speed
km/s, mi/h

s = linear distance
cm, mi

t = time
(s, min, h, years)

Arc Length

$$s = r\theta$$

r = radius or distance from the center of rotation

θ = angle or amount of rotation

Angular Speed

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

"omega"
ω = angular speed
rev/min, degrees/s

$$V = \frac{s}{t} = \frac{r\theta}{t} = r\omega$$

$$V = r\omega$$

4. A wheel with a 15-in diameter rotates at a rate of 6 radians per second. What is the linear speed of a point on its rim in feet per minute?

$r = \frac{15\text{in}}{2}$; $\omega = 6\ \text{rad/s}$; $V = ?\ \text{ft/min}$

$$V = r\omega = \frac{15\text{in}}{2} \cdot \frac{6\ \text{rad}}{1\ \text{s}} \cdot \frac{1\text{ft}}{12\text{in}} \cdot \frac{60\text{s}}{1\ \text{min}} = 225\ \text{ft/min}$$