1. a. 225° to radians

$\Rightarrow 225^\circ \cdot \frac{\pi}{180^\circ} = \boxed{3.9269...}$

b. 3.37 to degrees

$\Rightarrow 3.37 \cdot \frac{180^\circ}{\pi} = \boxed{193.087}$

c. 638° to radians

$\Rightarrow 638^\circ \cdot \frac{\pi}{180^\circ} = \boxed{11.135}$

2. a.

$r = .2m \Rightarrow 20\ cm$

$\theta = ?$

$s = 19cm$

$\theta = \frac{s}{r} \Rightarrow \frac{19}{20} = \boxed{.95 \text{ or } 54.43^\circ}$

b.

$r = 400cm \Rightarrow 40m$

$\theta = 96^\circ \Rightarrow 1.675...$

$s = ?$

$s = \theta r \Rightarrow s = 1.675(40) = \boxed{67.02m}$

c.

$r = ?$

$\theta = \pi/2$

$s = 100m$

$r = \frac{s}{\theta} \Rightarrow \frac{100}{1.57...} = \boxed{63.66m}$

3

a. i First, convert the speed in to $\frac{in}{min}$

- radius is in inches, + we use minutes for our time

$$\Rightarrow \frac{14\,\cancel{mi}}{\cancel{hr}} \cdot \frac{5280\,\cancel{ft}}{1\,\cancel{mi}} \cdot \frac{12\,in}{1\,\cancel{ft}} \cdot \frac{1\,\cancel{hr}}{60\,min} = 20{,}064$$

then, use $v = r\omega$ to find angular speed

$$\Rightarrow v = r\omega \Rightarrow 20{,}064 = 12\omega \Rightarrow \omega = \boxed{1672\ \frac{rad}{min}}$$

ii. recall that 1 revolution is 2π radians...

$$\Rightarrow \omega = \frac{1672\,\cancel{rad}}{min} \cdot \frac{1\,rev}{2\pi\,\cancel{rad}} = \boxed{266.107\ \frac{rev}{min}}$$

b. The units are already in the correct format, so no conversions are necessary, just divide the diameter by 2.

$$\Rightarrow v = r\omega \Rightarrow 58{,}927\ \frac{mi}{yr} = 1516\,mi \cdot \omega$$

$$\Rightarrow \boxed{\omega = 38.87\ \frac{rad}{yr}}$$

Next, find revolutions per year

$$\Rightarrow \frac{58{,}927\,rad}{1516\ yrs} \cdot \frac{1\,rev}{2\pi\,rad} = \boxed{6.186\ \frac{rev}{yr}}$$