Area of a sector 1.6

is the area of part of a circle, or a 'slice.'

I can find the area of a sector of a circle given the radius and the central angle.
Using the ... 
area formula 
\[ A = \pi r^2 \]

a. in degrees...
\[ \frac{\theta^\circ}{360^\circ} \pi r^2 \]

b. in radians...
\[ \frac{\theta_{\text{rad}}}{2\pi} \pi r^2 \]
Find the area of the sector.

a. in degrees...
\[
\frac{300}{360} \cdot \pi \cdot 5^2 = 65.45 \text{ in}^2
\]

b. in radians...
\[
\frac{300\pi}{180} = \frac{5\pi}{3} \text{ rad}
\]
\[
\frac{5\pi}{3} \cdot 5^2 = \frac{5\pi \cdot 25\pi}{6} = \frac{125\pi}{6}
\]
Using the ... book's formula

\[ K = \frac{1}{2} \theta \cdot r^2 \]

Sector Area = \( \frac{1}{2} \) Central angle in radians \( \times \) radius\(^2\) of circle

Find the area of the sector.

a. in degrees...

b. in radians...
Trig Ws 1.6 - Area of a Sector

1. Find the area of the sector of a circle of radius 30 in if the central angle of the sector is $\frac{1}{3}$ rad.

\[
K = \frac{1}{2} \cdot \frac{1}{3} \cdot 30^2 = \frac{1}{2} \cdot 900 = 450 \text{ in}^2
\]

2. A sector of a circle has a central angle of 50° and an area of 605 cm². Find the radius of the circle.

\[
605 = \frac{1}{2} \cdot \frac{5\pi}{18} \cdot r^2
\]

\[
36 \cdot 605 = \frac{36 \cdot 5\pi}{18} \cdot r^2
\]

\[
516 \cdot 55 = \frac{5\pi}{3} \cdot r^2
\]

\[
r = \sqrt{\frac{516 \cdot 55 \cdot 3}{5\pi}} \approx 37.24 \text{ cm}
\]
2. A water irrigation arm 500 m long rotates around a pivot $P$ once every day. How much area is irrigated every hour?
3. The windshield wiper at the back of a hatchback has an 18” blade mounted on a 10” arm. If the wiper turns through an angle of 124°, what area is swept clean?
The diagram below shows a cross section of Earth. $G$ represents Grand Rapids, MI (longitude 85° 40’ 12” W and latitude 42° 58’ N) and $L$ represents Louisville, KY (85° 46’ 12” W and 38° 15’N). Because their longitudes are close, assume that Grand Rapids is directly north of Louisville (so they are in the same cross section of Earth). If the radius of Earth is about 3,960 miles, estimate the air distance from Grand Rapids to Louisville.