Angles + Radian Measure

Degrees to Radians

radians are a "unitless" measure

$300^\circ \cdot \frac{\pi \text{ radians}}{180 \text{ degrees}} = \frac{300\pi}{180} = \div\frac{6}{6} = \frac{5\pi}{3}$ ← final answer

(divide by 10)

$\frac{5\pi}{3} \cdot \frac{180}{\pi} = \frac{900}{3} = 300^\circ$

Convert:

$\frac{4\pi}{3} \cdot \frac{180}{\pi} = \frac{720}{3} = 240^\circ$ (radians cancel)

$225^\circ \cdot \frac{\pi}{180}$ (degrees cancel) $\frac{225\pi}{180} \div \frac{9}{9} =$

$\frac{25\pi}{20} \div \frac{5}{5} = \frac{5\pi}{4}$

Radian measure can be used to find the length of a circular arc. A circular arc is a part of a circle.

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

s = arc length
θ = central angle ← must be in radians
r = radius

Example 1

$\frac{s}{\theta} = r$ $\quad \frac{\pi}{3}\cdot\frac{s}{\frac{\pi}{3}} = 7 \cdot \frac{\pi}{3}$

$\theta = \frac{5\pi}{4}$

$s = \frac{7\pi}{3} \approx$ 7.33 units

$\frac{5\pi}{4} \cdot \frac{s}{\frac{5\pi}{4}} = 7 \cdot \frac{5\pi}{4}$

$s = \frac{35\pi}{4} \approx 27.489$