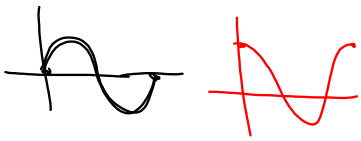
13.3 Degrees to Radians

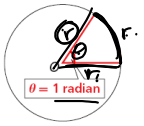
Goal: Covert degree to radians and radians to degrees.



Apr 11-11:05 AM

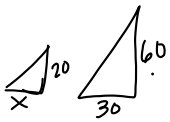
So far, you have measured angles in degrees.
You can also measure angles in *radians.*

A **radian** is a unit of angle measure based on arc length. Recall from geometry that an *arc* is an unbroken part of a circle. If a central angle θ in a circle of radius r, intercepts an arc of length r, then the measure of θ is defined as 1 radian.



360° 2πr

360° = 2π · 1



$\frac{x}{30} = \frac{20}{60}$

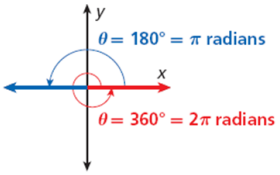
Apr 13-12:31 PM

360° 2π

180° π

Apr 18-1:29 PM

The circumference of a circle of radius r is $2\pi r$. Therefore, an angle representing one complete clockwise rotation measures 2π radians. You can use the fact that 2π radians is equivalent to 360° to convert between radians and degrees.



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To convert 60 degrees into radians:

Step 1: Set up the multiplication using the conversion factor.
Step 2: Reduce your fraction.
Step 3: Multiply.

$\frac{60^{\circ}}{1} \cdot \frac{\pi}{180^{\circ}} \cdot \frac{60\pi}{180} = \boxed{\frac{\pi}{3}}$

Apr 6-9:42 AM

To convert $\frac{3\pi}{4}$ radians into degrees:

Step 1: Set up the multiplication using the conversion factor.
Step 2: Reduce your fraction.
Step 3: Multiply.

$\frac{3\pi}{4} \cdot \frac{180}{\pi} = \frac{540\pi}{4\pi} = \boxed{135^{\circ}}$

Apr 6-9:47 AM

Convert the following:

1. $\frac{80°}{1} \cdot \frac{\pi}{180°} = \frac{80\pi}{180}$ → $\frac{4\pi}{9}$

2. $-225° \cdot \frac{\pi}{180} = \frac{-225\pi}{180}$ → $-\frac{5\pi}{4}$

Sin $\frac{1 \text{ ft}}{12 \text{ in}}$

3. 315° → $315 \cdot \frac{\pi}{180} = \frac{7\pi}{4}$

4. 1080° → 6π

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Convert the following:

5. $\frac{2\pi}{3}$ radians → $\frac{2\pi}{3} \cdot \frac{180}{\pi} = \frac{360}{3} = 120°$

6. 4π radians → $\frac{4\pi}{1} \cdot \frac{180}{\pi} = 720°$

10.2

7. $\frac{2\pi}{9}$ radians → $\frac{2\pi}{9} \cdot \frac{180}{\pi} = \frac{360}{9} = 40°$

8. 6π radians → 1080°

Apr 11-11:08 AM

Assignment:

Worksheet

$\frac{\pi}{3}$ $80°$

Apr 16-12:52 PM

Apr 11-11:06 AM