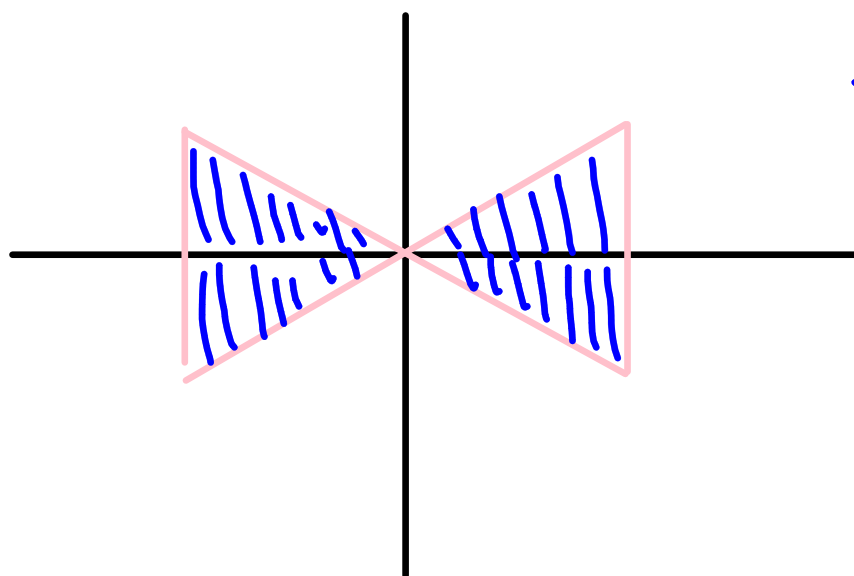# 1.6 Radians Day 2
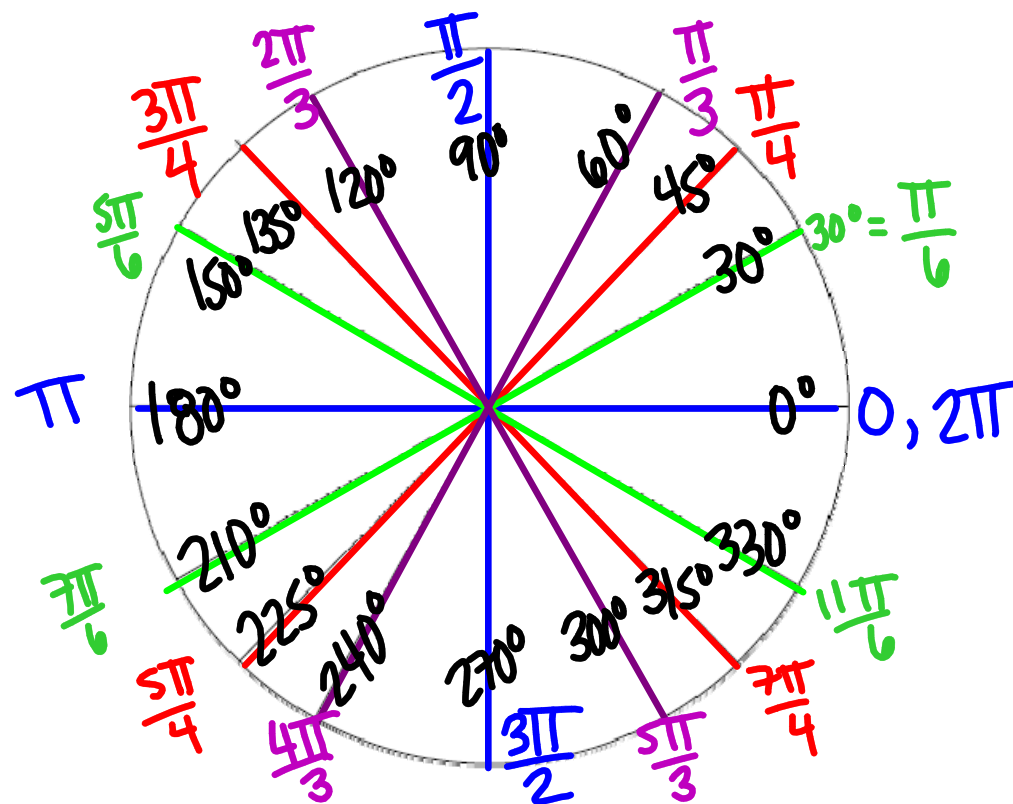
Essential Question:

How do I find reference angles of angles in radians?

+ "Bowtie"

1.6 Radians Day 2

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Essential Question: How do I find reference angles of angles in radians?

Draw the terminal side of each angle and find the corresponding reference angle
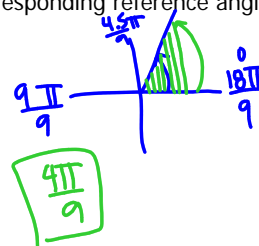
1. $\dfrac{4\pi}{9}$

Step 1. If not between 0 and 2π, find a coterminal angle ✔

Step 2. Write π and 2π with a common denominator

Step 3. Closer to π or 2π? Sketch terminal side.
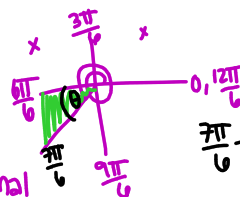
Step 4. How close (reference angle)?

$\dfrac{9\pi}{9} \quad \dfrac{18\pi}{9} \quad \dfrac{0}{9}$

$\boxed{\dfrac{4\pi}{9}}$

2. $-\dfrac{5\pi}{8}$

$-\dfrac{8\pi}{8} \qquad 0, \dfrac{16\pi}{8}$

$-\dfrac{4\pi}{8}$

$\dfrac{8\pi}{8} - \dfrac{5\pi}{8} = \boxed{\dfrac{3\pi}{8}}$

3. $\dfrac{19\pi}{6} > 2\pi$

$\dfrac{19\pi}{6} - \dfrac{12\pi}{6} = \dfrac{7\pi}{6}$

Coterminal

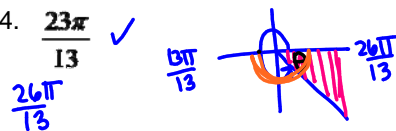$\dfrac{3\pi}{6} \quad x \qquad \dfrac{6\pi}{6} \quad (\theta) \quad 0, \dfrac{12\pi}{6}$

$\dfrac{3\pi}{6} \qquad \dfrac{9\pi}{6}$

$\dfrac{7\pi}{6} - \dfrac{6\pi}{6} = \boxed{\dfrac{\pi}{6}}$

4. $\dfrac{23\pi}{13}$ ✔

$\dfrac{26\pi}{13}$

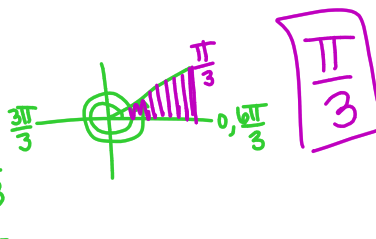$\dfrac{13\pi}{13} \qquad \theta \qquad \dfrac{26\pi}{13}$

$\dfrac{26\pi}{13} - \dfrac{23\pi}{13} = \boxed{\dfrac{3\pi}{13}}$

5. $-\dfrac{11\pi}{3} > 2\pi$

$\dfrac{6\pi}{3}$

$-\dfrac{11\pi}{3} + \dfrac{6\pi}{3} = -\dfrac{5\pi}{3} + \dfrac{6\pi}{3} = \dfrac{\pi}{3}$

$\dfrac{3\pi}{3} \qquad \qquad 0, \dfrac{6\pi}{3}$

$\dfrac{\pi}{3}$

$\boxed{\dfrac{\pi}{3}}$

1.6 Radians Day 2

Essential Question: How do I find reference angles of angles in radians?

Angular & Linear Velocity

↑ speed

Angular measurement which a particle rotates in a given unit of time.

$$W = \frac{\theta \leftarrow 2\pi \times rotations}{t \leftarrow time}$$

$$V = W \cdot r$$

angular velocity ↑   ↑ radius

6. A belt runs a pulley of radius 6 cm at 80 revolutions <u>per minute</u>.

   a. Find the angular velocity of the pulley in radians <u>per second</u>.

$$W = 2\pi \cdot 80 = 160\pi /min$$

$$\frac{160\pi \, rad}{1 \, min} \cdot \frac{1 \, min}{60 \, sec} \approx \boxed{8.378 \frac{rad}{sec}}$$

   b. Find the linear velocity of the belt in centimeters per <u>second</u>.

$$V = 8.378 \,(6) = \boxed{50.37 \frac{cm}{sec}}$$