6.4 Radian Angle Measures

ACTIVITY:

1. You & your partner will need ONE narrow strip of paper, a paper plate, and a writing utensil.

2. Flatten your paper plate as best you can.

3. Find the center of your paper plate. Draw a point marking the center.

4. Mark one end of your strip with 0. Place this end at the plate's center. Measure the radius of the paper plate and draw a line on your strip showing this distance. Cut/tear your strip here so it measures one radius.

5. Make a tic mark on the edge of your paper plate and label it 0. This will be your starting point. Line up the 0 end of your strip at this point and wrap the strip around your plate.

6. On the plate, make a tic mark where the strip ends. Then move the 0 end of your strip to this point and repeat until you make it around the plate. Do NOT make any new tic marks past your initial starting point.

7. Each tic mark represents the distance of your paper plate's radius. About how many radii (to the nearest tenth or hundredth) go around *your* plate? 6-6.5

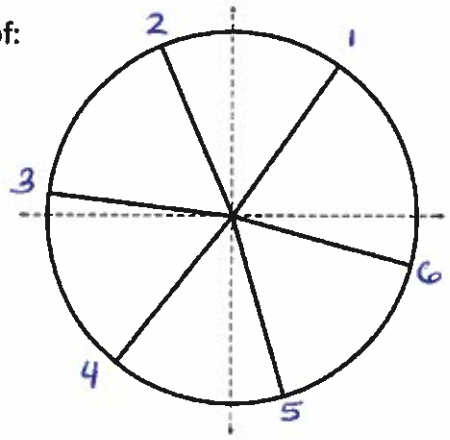
8. Let's compare... about how many radii wrapped around *our* plates? ≈ 6.28 or 6.25

WHY??? (circumference = $2\pi r$)

9. Draw lines from the center of your plate to your tic marks. Use your paper strip as a straight edge.

VOCABULARY

Radian: An angle measurement that is a ratio of: $\frac{\text{arc length}}{\text{radius}}$



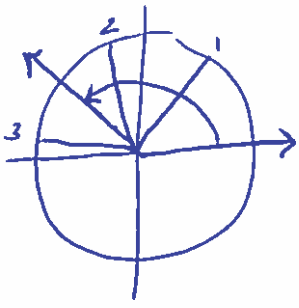
1 Radian creates an arc the length of 1 radius.

Radians in a FULL Rotation: 2π or 6.28

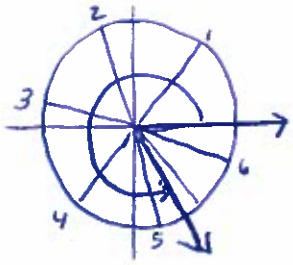
Radians in a HALF Rotation: π or 3.14

Draw the given angle. Be sure to always draw angles in *standard position.*

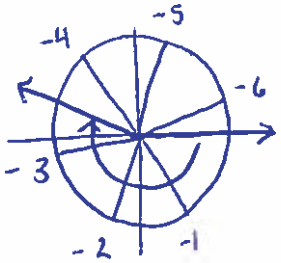
1. 2.5 radians



2. 5.25 radians



3. -3.5 radians



Let's get away from those decimals and use *radians in terms of pi.*

8 Wedges	12 Wedges	6 Wedges
1 Wedge = $\frac{\pi}{4}$ Radians	1 Wedge = $\frac{\pi}{6}$ Radians	1 Wedge = $\frac{\pi}{3}$ Radians
Examples:  $\frac{3\pi}{4}$  $\frac{7\pi}{4}$  $-\frac{5\pi}{4}$	Examples:  $\frac{5\pi}{6}$  $\frac{7\pi}{6}$  $-\frac{11\pi}{6}$	Examples:  $\frac{2\pi}{3}$  $\frac{5\pi}{3}$  $-\frac{4\pi}{3}$

KEY CONCEPT:

$\frac{a}{b}\pi$ or $\frac{a\pi}{b}$

a → # of pieces that make the angle

b → # of pieces that make a $\frac{1}{2}$ rotation (π)

Sketch the following angles, then find a) reference ∠ b) + coterminal ∠ c) − coterminal ∠

4. $-\frac{7}{2}\pi$

a. $\frac{\pi}{2}$

b. $\frac{\pi}{2}$

c. $-\frac{3\pi}{2}$

5. $\frac{8}{3}\pi$

a. $\frac{\pi}{3}$

b. $\frac{2\pi}{3}$

c. $-\frac{4\pi}{3}$

6. $\frac{3}{8}\pi$

a. $\frac{3\pi}{8}$

b. $\frac{19\pi}{8}$

c. $-\frac{13\pi}{8}$

7. $-\frac{9}{5}\pi$

a. $\frac{\pi}{5}$

b. $\frac{\pi}{5}$

c. $-\frac{19\pi}{5}$