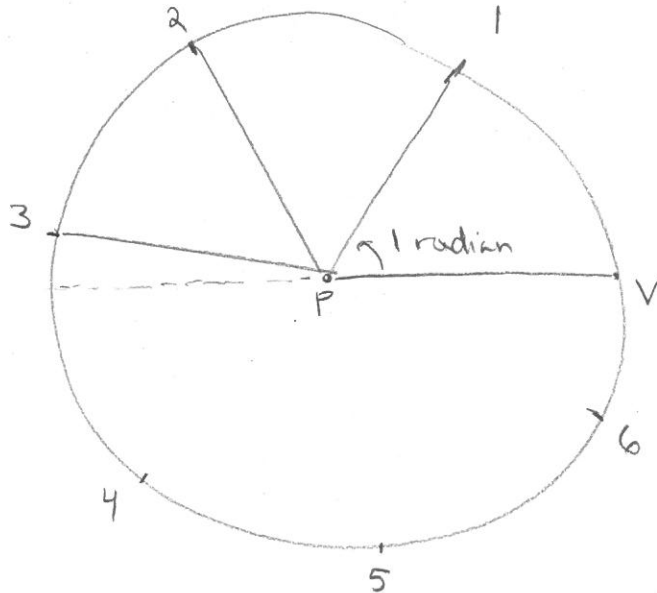


Activity

1. Draw a dot for the center of a circle (label it P)
2. Draw a circle of any size.
3. Draw a horizontal diameter through point P.
4. Where the diameter meets the circle on the right, label that point V.
5. On your string, mark off the length of PV with your marker/pen.
6. Starting at point V, mark off one radius length on the circle (mark it with the number 1)
7. Draw in the radius from the center to number 1 – **this angle you've created is 1 radian.**
8. Use your string to mark off another radius length on the circle starting at number 1, continuing along the circle. Call this new point 2.
9. Draw in the radius from the center to number 2 – this angle is how many radians? 2 because it is created by marking off how many radii? 2
10. Use your string to mark off another radius length on the circle starting at number 2, continuing along the circle. Call this new point 3.
11. Draw in the radius from the center to the number 3 – this angle is how many radians? 3 because it is created by marking off how many radii? 3
12. How many radii do you think it takes to get half way around the circle? 3.14 or π
13. How many radii do you think it will take to get all the way around the circle? 6.28 or 2π



Your turn: Since $360^\circ = 2\pi$, what do you think the following would equal?

* use unit circle

$$180^\circ = \underline{\pi}$$

$$90^\circ = \underline{\pi/2}$$

$$45^\circ = \underline{\pi/4}$$

$$30^\circ = \underline{\pi/6}$$

$$60^\circ = \underline{\pi/3}$$

$$225^\circ = \underline{5\pi/4}$$

$$270^\circ = \underline{3\pi/2}$$

$$135^\circ = \underline{3\pi/4}$$

$$210^\circ = \underline{7\pi/6}$$

$$240^\circ = \underline{4\pi/3}$$

$$300^\circ = \underline{5\pi/3}$$

$$330^\circ = \underline{11\pi/6}$$

$$120^\circ = \underline{2\pi/3}$$

$$150^\circ = \underline{5\pi/6}$$

$$315^\circ = \underline{7\pi/4}$$

Key Concept:

To convert degrees to radians or radians to degrees use one of the following ratios to set up a proportion:

$$\frac{\pi \text{ radians}}{180^\circ} \text{ or } \frac{180^\circ}{\pi \text{ radians}}$$

Example: a.) Convert $\frac{11\pi}{12}$ to degrees

$$\frac{11\pi \text{ radians}}{12} \cdot \frac{180^\circ}{\pi}$$

$$\frac{180 \cdot 11}{12} = 165^\circ$$

b.) Convert 22.5° to radians

$$22.5^\circ \cdot \frac{\pi}{180^\circ}$$

$$\frac{22.5\pi}{180} = \frac{\pi}{8}$$

\div , then
math \rightarrow
fraction

You Try: Convert degree measures to radians and radian measures to degrees.

$$1. \quad 140^\circ \cdot \frac{\pi}{180^\circ}$$

$$\frac{140\pi}{180} = \frac{7\pi}{9}$$

$$2. \quad -\frac{3\pi}{5} \cdot \frac{180^\circ}{\pi}$$

$$-\frac{3 \cdot 180}{5} = -108^\circ$$

$$3. \quad -860^\circ \cdot \frac{\pi}{180^\circ}$$

$$-\frac{860\pi}{180} = -\frac{43\pi}{9}$$

$$4. \quad \frac{11\pi}{3} \cdot \frac{180}{\pi}$$

$$\frac{11 \cdot 180}{3} = 660^\circ$$

$$5. \quad -370^\circ \cdot \frac{\pi}{180^\circ}$$

$$-\frac{370\pi}{180} = -\frac{37\pi}{18}$$

$$6. \quad \frac{5\pi}{2} \cdot \frac{180}{\pi}$$

$$\frac{5 \cdot 180}{2} = 450^\circ$$