Precalc 4.1 Intro

Obj: To create a unit circle with degree and radian measure and determine the measure of special angles

Hwk: Radian Measure worksheet
Read and take notes on Section 4.1
4.1 PA and Quarter 1 Test is coming …

Do Now:

1. Get supplies:
   1 red, brown, blue, green **COLORED PENCILS**
   1 piece of green yarn
   1 ruler
   1 protractor
   1 circle wksht w/ circle cut out
2. Pair up! BRAINSTORM! Name all the mathematical facts you know about circles
   - Circle – all points a fixed distance from center
   - Radius – distance from center
   - Diameter: distance through center across circle
   - Unit of measure: degrees
   - Number of degrees in circle = 360°
   - Circumference = perimeter = $2\pi r$
   - Area = πr^2
   - Equation of circle: $(x - h)^2 + (y - k)^2 = r^2$
   - Infinitely symmetrical
   - All circles are similar

Trigonometry: the study of triangles (3 sided figures) including angles and sides. First, we need to talk about how to MEASURE these angles and sides.

Unit circle-yarn activity:

1. Hold your circle so they form x-y axes. This represents a **UNIT CIRCLE** – a circle whose radius is ONE.

2. What is the perimeter (aka circumference) of this circle?
   - ***Since the radius is one, that means the circumference of the circle is $2\pi r = 2\pi(1) = 2\pi$.***

3. Fold circle into fourths (on thin lines) . How big is each angle? **90°**. Open. Use **brown** pencil & ruler to make these "x & y"axes.

4. Starting at the positive x-axis, mark it **0°**. Using the pipe cleaner as a guide, and starting at **0°**, measure the length of one radius on the outside of the circle. Mark this! Continue marking off radii until you go around the perimeter/circumference of the circle.
   How long is the circle (in terms of radii)? 6+ radii
   Does this make sense with what you already know?
   ***Since perim. = circumference, 6+ markings = 2π**

5. On circle, mark off **0°, 90°, 180°, 270°, 360°**

6. In **brown**, mark off and label **π** and **2π** **on your circle.**
   Where is π located? Does it make sense with what you know about π? ***$\pi \approx 3.14$ (a little more than 3 units/radii)***

7. What is the degree equivalent of π?
   180° = π. Mark this on your circle.

8. We already marked off **π** and 2**π**. What if we want to cut our circle into FOURTHS. How much would we have now? $\frac{\pi}{2}$ and $\frac{3\pi}{2}$. Label axes on circle in radians. What is the degree equivalent? $90° = \frac{\pi}{2}$; $270° = \frac{3\pi}{2}$

9. Fold circle into EIGHTHS (on thin line). How big is each angle? **45°** Open. Using your protractor, mark off each angle and its measure in **red**. Then label circle with $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4},$ etc.

10. Fold circle into SIXTHS (on thin line). How big is each angle? **60°** Open. Using your protractor, mark off each angle and its measure in **blue**. Label your new angles $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

11. Lastly, we want to divide the circle into TWELVES (remaining thin lines). How big is each angle? **30°** Using your protractor, mark off each angle and its measure in **green**. Label the angles $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

Show students Radian Measure ditto.

How does this relate to circles, degrees, pi, etc? What are the radian/degree equiv. of special ∠s?