**Unit Circle Activity Directions:**

**Goal : To make an interactive unit circle with rotatable angles.**

1. Print out this document onto cardstock or glue these pages to a durable material .
2. Carefully cut out all of the circles and triangle figures on the following pages, while leaving the small circles attached to the triangles (see page 6).
3. Poke holes through the dots of the small circles (see Figure A below). You may wish to use the pointy part of your compass or protractor.

Figure A.

1. Gently widen the hole with a brass paper fastener or other instrument so the triangles can easily be moved around on a fastener of your choosing.
	1.
2. Line up the center holes to form concentric circles by gluing Circle 1 on top of Circle 2, glue Circle 2 on top of Circle 3 & glue Circle 3 on top of Circle 4, then glue circle 4 onto a thick/less flexible surface like cardstock.
3. Go to page 6 (the last page), and fill in the triangles and cut them out according the directions on page 6. Next, arrange the triangle sets so their circle’s overlap: Triangle Set A on the bottom, Triangle Set B on top of Set A & Triangle Set C on top of Set B. Now attach these triangles to the concentric circles with your fastener.
4. Draw onto circle 1 (page 2), the smallest and topmost circle, the lines forming the following angles (as found when rotating angles counter clockwise from 0$°$ which is the right horizontal black line):

30$°$, 45$°,$ 60$°,$ 90$°$, 120$°$, 135$°$, 150$°$, 180$°$, 210$°$, 225$°$, 240$°$, 270$°$, 300$°$, 315$°$, 330$°$, 360$°$.

1. On circle 2 (page 3), label each of the angle lines with their corresponding degree angle measurement.
2. On circle 3 (page 4), label each of the previously labeled degree angles with their corresponding radian angle measure.
3. Rotate the triangles until one of the triangles has one edge on the horizontal x-axis and its hypotenuse is lined up with the first angle line. Now on circle 4 (page 5), label the ordered pair $(x,y)$ resulting from the given horizontal ($x)$ and vertical $(y)$ sides of the triangle. Repeat this process for each of the labeled angles on the unit circle.
4. Feel free to decorate, add flare, and make changes/improvements that make this project more insightful and useful.

**After Assembly- Draw into this circle, the smallest and topmost circle, the lines forming the following angles:**

30$°$, 45$°,$ 60$°,$ 90$°$, 120$°$, 135$°$, 150$°$, 180$°$, 210$°$, 225$°$, 240$°$, 270$°$, 300$°$, 315$°$, 330$°$, 360$°$.

**The right side of the horizontal black line should correspond to** $0° and 360°. $**The angles should start from this line and rotate in a counterclockwise direction, so that the 30,45, &60 degree angles all lie in the first quadrant.**

Circle 1

 **After assembly, fill in this circle with the appropriate angles in degrees for each of the angles created on circle 1. The right side of the horizontal black line should correspond to** $0° and 360°. $**The angles should start from this line and rotate in a counterclockwise direction, so that the 30,45, &60 degree angles all lie in the first quadrant.**

Circle 2

**After Assembly- Fill in this circle with the radian measure of each of the corresponding degree angles.**

Circle 3

**After Assembly- Fill in this circle with the corresponding** $(x,y)$ **coordinates associated with each angle**

Circle 4

**Before Assembly- Fill in each special triangle with their appropriate side lengths remembering that each has a hypotenuse length of 1, and color each triangle set a different color. Note: the triangles have roman numerals in them, and these correspond to which quadrant that triangle should be used in to create the angles and ordered pairs in that quadrant.**

\*Print triangles on cardstock or glue each triangle onto its own index card/cardstock before you begin cutting. You could also choose to line them with cardstock after cutting or using packing tape on the back of the triangles to strengthen them for a longer lasting unit circle\*

60⁰

60⁰

II & IV

II & IV

II & IV

I & III

I & III

I & III

Triangle Set C

Triangle Set A

45⁰

45⁰

45⁰

45⁰

60⁰

30⁰

30⁰

30⁰

60⁰

30⁰

Triangle Set B