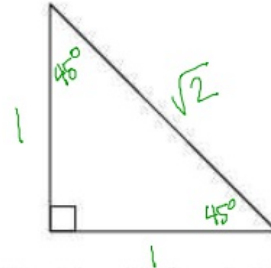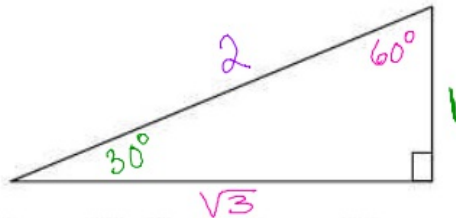**Warm-up:** *before* Section 17.3

Name: _____
Period: ____

SHOW YOUR WORK *as demonstrated in class notes*

*Label all of the **angles** and **sides** of each special triangle*

Reduce each fraction (try to complete as many as possible without the aid of a calculator)
Leave in fraction form

Example: $\dfrac{21}{18} = \dfrac{7}{6}$

1. $\dfrac{3}{18} = \dfrac{1}{6}$

2. $\dfrac{6}{18} = \dfrac{1}{3}$

3. $\dfrac{9}{36} = \dfrac{1}{4}$

4. $\dfrac{12}{18} = \dfrac{2}{3}$

5. $\dfrac{30}{18} = \dfrac{5}{3}$

6. $\dfrac{33}{18} = \dfrac{11}{6}$

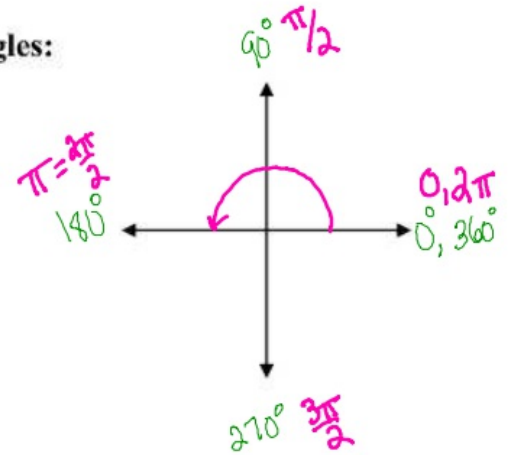7. $\dfrac{50}{60} = \dfrac{5}{6}$

8. $\dfrac{15}{35} = \dfrac{3}{7}$

9. $\dfrac{10}{15} = \dfrac{2}{3}$

There are two basic types of UNITS for measuring angles:

- **Degrees**
- **Radians**

Important conversion: π radians $= 180^0$

therefore, $\left(\dfrac{\pi \ radians}{180^0}\right) = 1 = \left(\dfrac{180^0}{\pi \ radians}\right)$

$90° \ \pi/2$

$\pi = \frac{2\pi}{2}$
$180°$

$0, 2\pi$
$0, 360°$

$270° \ \frac{3\pi}{2}$

---

1. How many radians is 60^0?

$\dfrac{60^0}{1} \cdot \left(\dfrac{\pi}{180^0}\right) = \dfrac{\pi}{3}$

2. What degree measure is equivalent to $\dfrac{5\pi}{3}$ radians?

$\dfrac{5\pi}{3} \cdot \left(\dfrac{180^0}{\pi}\right) = \dfrac{300°}{1} = \boxed{300°}$ $\dfrac{\pi}{\pi} = 1$

3a) $\overset{2}{\cancel{120^0}}\left(\dfrac{\pi}{\cancel{180^0}}\right) = \boxed{\dfrac{2\pi}{3}}$

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3. How many radians is 480^0?

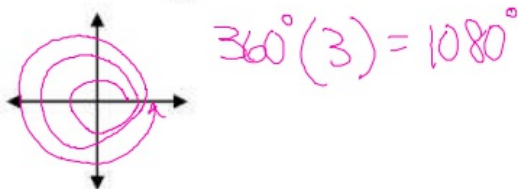$\overset{8}{\cancel{480^0}}\left(\dfrac{\pi}{\cancel{180^0}}\right) = \dfrac{8\pi}{3}$

4. What degree measure is equivalent to $\dfrac{\pi}{10}$ radians?

$\dfrac{\pi}{10}\left(\dfrac{180°}{\pi}\right) = 18°$

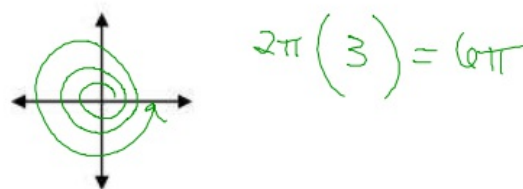5. Pretend you "wrap around" the coordinate plane 3 times in a circular path.

How many *degrees* is 3 rotations around the coordinate plane?
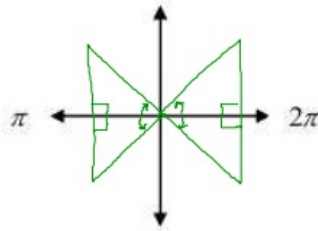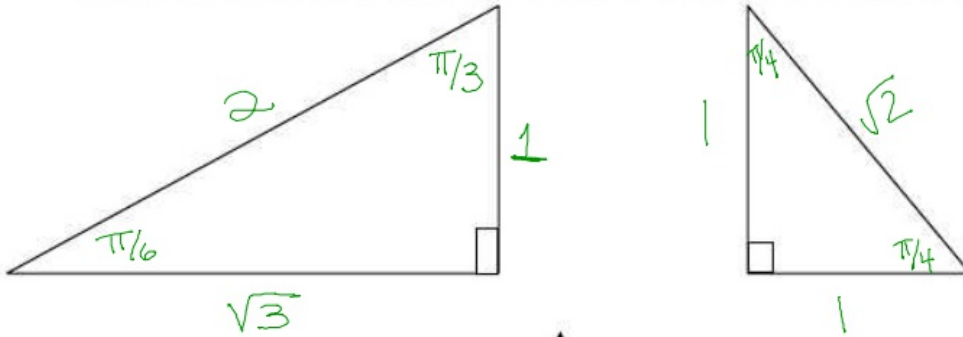
Degrees:

$360°(3) = 1080°$

How many *radians* is 3 rotations around the coordinate plane?

Radians:

$2\pi(3) = 6\pi$

Label all of the **sides** and **angles** of the special triangles using *radian* measure
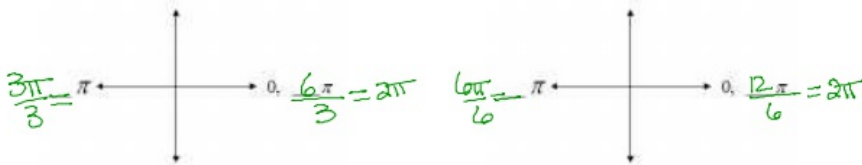
$45°\left(\dfrac{\pi}{180°}\right) = \dfrac{\pi}{4}$

$\pi/3$
2
1
$\pi/6$
$\sqrt{3}$

$\pi/4$
1
$\sqrt{2}$
$\pi/4$
1

$\pi \longleftrightarrow 2\pi$

$\dfrac{94\pi}{94} = \pi$

$\pi = \dfrac{3\pi}{3}$

$\theta' = \dfrac{\pi}{3}$ $\qquad$ $\theta' = \dfrac{\pi}{6}$ $\qquad$ $\theta' = \dfrac{\pi}{4}$

$\dfrac{3\pi}{3} = \pi \longleftrightarrow 0, \dfrac{6\pi}{3} = 2\pi$ $\qquad$ $\dfrac{6\pi}{6} = \pi \longleftrightarrow 0, \dfrac{12\pi}{6} = 2\pi$ $\qquad$ $\dfrac{4\pi}{4} \longleftrightarrow 0, \dfrac{8\pi}{4}$

Given an angle - determine the reference angle, then draw the reference triangle.
Label the sides of each triangle, then evaluate each trigonometric function.
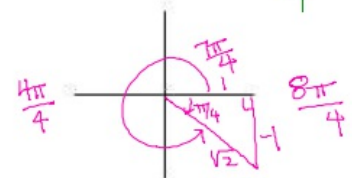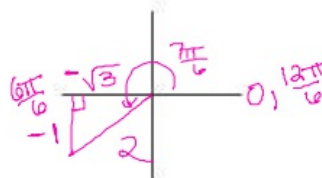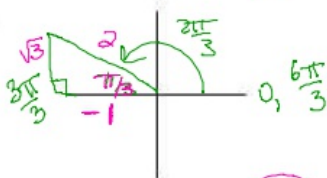
$\sin\theta = \dfrac{y}{r}$

$\cos\theta = \dfrac{x}{r}$

$\tan\theta = \dfrac{y}{x}$

6. $\theta = \dfrac{2\pi}{3}$ $\theta' = \dfrac{\pi}{3}$ $\qquad$ 7. $\theta = \dfrac{7\pi}{6}$ $\theta' = \dfrac{\pi}{6}$ $\qquad$ 8. $\theta = \dfrac{7\pi}{4}$ $\theta' = \dfrac{\pi}{4}$

$\dfrac{2\pi}{3}$ $\sqrt{3}$ 2 $\dfrac{\pi}{3}$ $\dfrac{3\pi}{3}$ -1 $0, \dfrac{6\pi}{3}$

$\dfrac{6\pi}{6}$ $-\sqrt{3}$ $\dfrac{7\pi}{6}$ -1 2 $0, \dfrac{12\pi}{6}$

$\dfrac{4\pi}{4}$ $\dfrac{\pi}{4}$ $\dfrac{\pi}{4}$ $\sqrt{2}$ -1 $\dfrac{8\pi}{4}$

6a. $\sin\left(\dfrac{2\pi}{3}\right) = \boxed{\dfrac{\sqrt{3}}{2}}$ $\qquad$ 7a. $\cos\left(\dfrac{7\pi}{6}\right) = -\dfrac{\sqrt{3}}{2}$ $\qquad$ 8a. $\tan\left(\dfrac{7\pi}{4}\right) = \dfrac{-1}{1} = -1$

$\sec\theta = \dfrac{r}{x}$

6b. $\sec\left(\dfrac{2\pi}{3}\right) = \dfrac{2}{-1} = -2$ $\qquad$ 7b. $\cot\left(\dfrac{7\pi}{6}\right) = \dfrac{-\sqrt{3}}{-1} = \sqrt{3}$ $\qquad$ 8b. $\csc\left(\dfrac{7\pi}{4}\right) = \dfrac{\sqrt{2}}{-1} = -\sqrt{2}$

Page 746: 2 – 12 even, 16, 18 and **Worksheet:** Reference Triangles with radian measures