

1. Which quadrant is the terminal side of each angle in?

a) 120° II

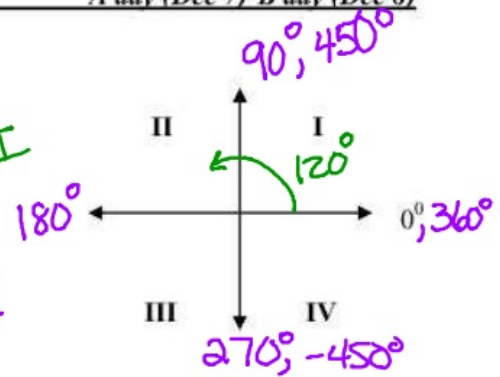
b) 275° IV

c) -140° III

d) 60° I

e) 460° II

f) -400° IV



2. Find the following ratios for the angle θ

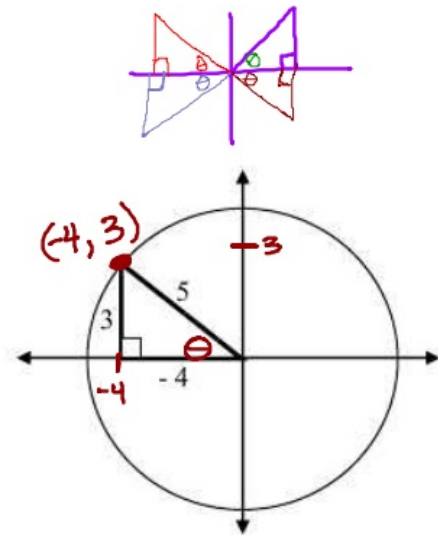
The bolded triangle is called the Reference Triangle

a)

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{\mathbf{y}}{\mathbf{r}} = \frac{\mathbf{3}}{\mathbf{5}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{\mathbf{x}}{\mathbf{r}} = \frac{\mathbf{-4}}{\mathbf{5}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{\mathbf{y}}{\mathbf{x}} = \frac{\mathbf{3}}{\mathbf{-4}}$$

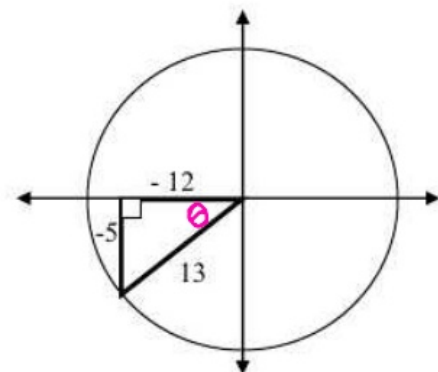


b)

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{\mathbf{y}}{\mathbf{r}} = \frac{\mathbf{-5}}{\mathbf{13}}$$

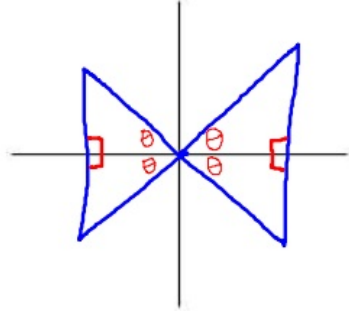
$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{\mathbf{x}}{\mathbf{r}} = \frac{\mathbf{-12}}{\mathbf{13}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{\mathbf{y}}{\mathbf{x}} = \frac{\mathbf{-5}}{\mathbf{-12}} = \frac{\mathbf{5}}{\mathbf{12}}$$



Angles, reference angles and reference triangles using Special Angles

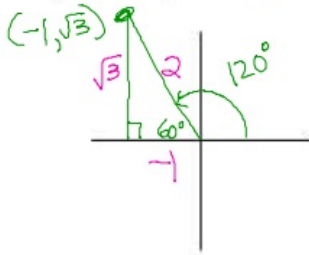
Reference Triangles in the "Bow Tie" position



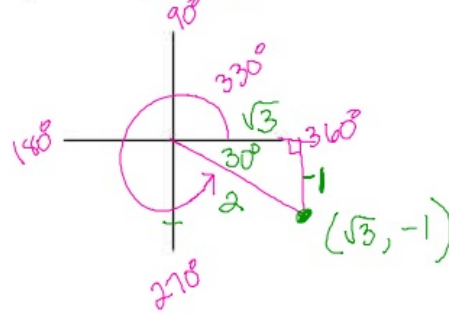
3. Find the reference angle θ' , sketch and label the reference triangle for the following angles of rotation.

NOTE: For today's assignment θ' will be 30° , 45° , or 60°

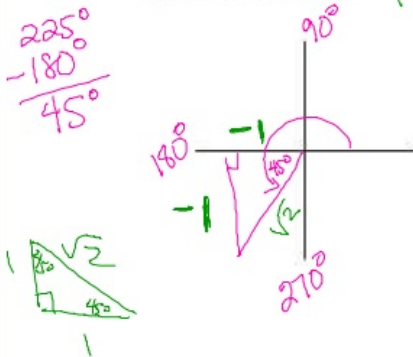
a) $\theta = 120^\circ$, $\theta' = 60^\circ$



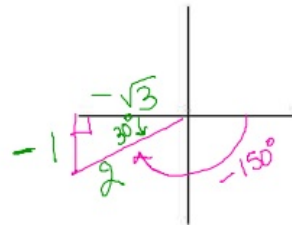
b) $\theta = 330^\circ$, $\theta' = 30^\circ$



c) $\theta = 225^\circ$, $\theta' = 45^\circ$



d) $\theta = -150^\circ$, $\theta' = 30^\circ$



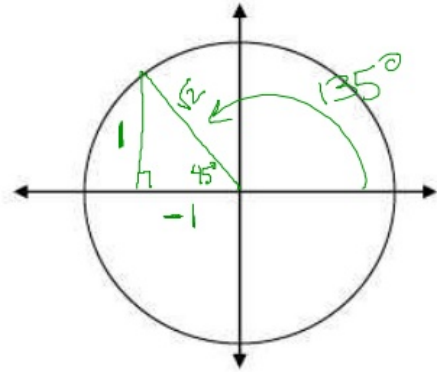
4. Draw the reference triangle, label the reference angle and sides of the triangle.

a) Find the following ratios for a 135° angle

$$\sin 135^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos 135^\circ = \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

$$\tan 135^\circ = \frac{1}{-1} = -1$$

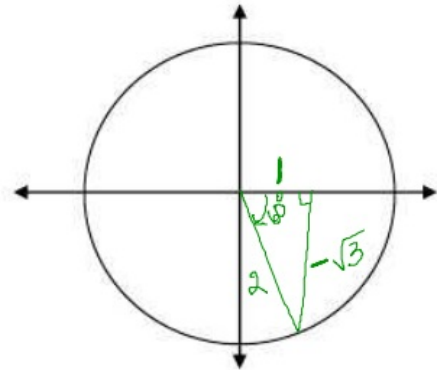


b) Find the following ratios if $\theta = -60^\circ$

$$\sin(-60^\circ) = -\frac{\sqrt{3}}{2}$$

$$\cos(-60^\circ) = \frac{1}{2}$$

$$\tan(-60^\circ) = \frac{-\sqrt{3}}{1} = -\sqrt{3}$$

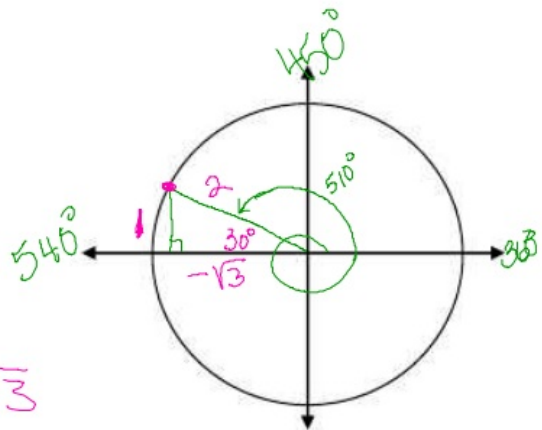


c) Find the following ratios if $\theta = \cancel{570^\circ} 510^\circ$

$$\sin(\cancel{570^\circ}) = \frac{1}{2} \quad \csc(\cancel{570^\circ}) = \frac{2}{1}$$

$$\cos(\cancel{570^\circ}) = \frac{-\sqrt{3}}{2} \quad \sec(\cancel{570^\circ}) = \frac{2}{-\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

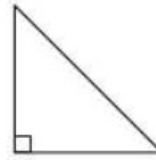
$$\tan(\cancel{570^\circ}) = \frac{1}{-\sqrt{3}} = -\frac{\sqrt{3}}{3} \quad \cot(\cancel{570^\circ}) = \frac{-\sqrt{3}}{1} = -\sqrt{3}$$



Assignment: Worksheet on Reference angles and their triangles

Reference angles and their triangles – Degree measure only

Label all of the *sides* and *angles* of the special triangles



Given an angle - determine the reference angle, then draw the reference triangle.

Label the sides of each triangle, then evaluate each trigonometric function.

1. $\theta = 150^\circ$ $\theta' =$



1a. $\sin(150^\circ) =$

1b. $\sec(150^\circ) =$

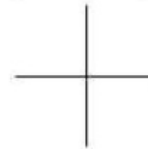
2. $\theta = 300^\circ$ $\theta' =$



2a. $\cos(300^\circ) =$

2b. $\cot(300^\circ) =$

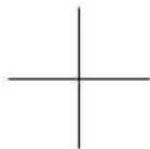
3. $\theta = 225^\circ$ $\theta' =$



3a. $\tan(225^\circ) =$

3b. $\csc(225^\circ) =$

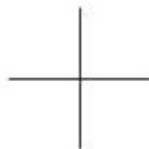
4. $\theta = 30^\circ$ $\theta' =$



4a. $\sin(30^\circ) =$

4b. $\cot(30^\circ) =$

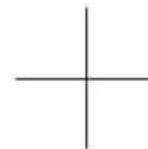
5. $\theta = 120^\circ$ $\theta' =$



5a. $\cos(120^\circ) =$

5b. $\csc(120^\circ) =$

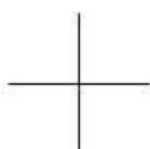
6. $\theta = 210^\circ$ $\theta' =$



6a. $\tan(210^\circ) =$

6b. $\sec(210^\circ) =$

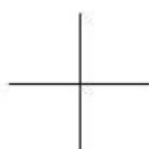
7. $\theta = 315^\circ$ $\theta' =$



7a. $\sin(315^\circ) =$

7b. $\sec(315^\circ) =$

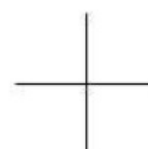
8. $\theta = 240^\circ$ $\theta' =$



8a. $\cos(240^\circ) =$

8b. $\cot(240^\circ) =$

9. $\theta = 135^\circ$ $\theta' =$



9a. $\tan(135^\circ) =$

9b. $\csc(135^\circ) =$

10. $\theta = -45^\circ$ $\theta' =$



10a. $\sin(-45^\circ) =$

10b. $\cot(-45^\circ) =$

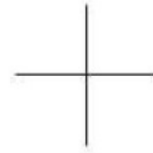
11. $\theta = -150^\circ$ $\theta' =$



11a. $\cos(-150^\circ) =$

11b. $\csc(-150^\circ) =$

12. $\theta = 390^\circ$ $\theta' =$



12a. $\tan(390^\circ) =$

12b. $\sec(390^\circ) =$

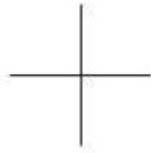
13. $\theta = 330^\circ$ $\theta' =$



13a. $\sin(330^\circ) =$

13b. $\sec(330^\circ) =$

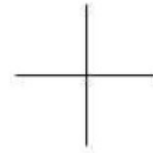
14. $\theta = 480^\circ$ $\theta' =$



14a. $\cos(480^\circ) =$

14b. $\cot(480^\circ) =$

15. $\theta = -225^\circ$ $\theta' =$



15a. $\tan(-225^\circ) =$

15b. $\csc(-225^\circ) =$