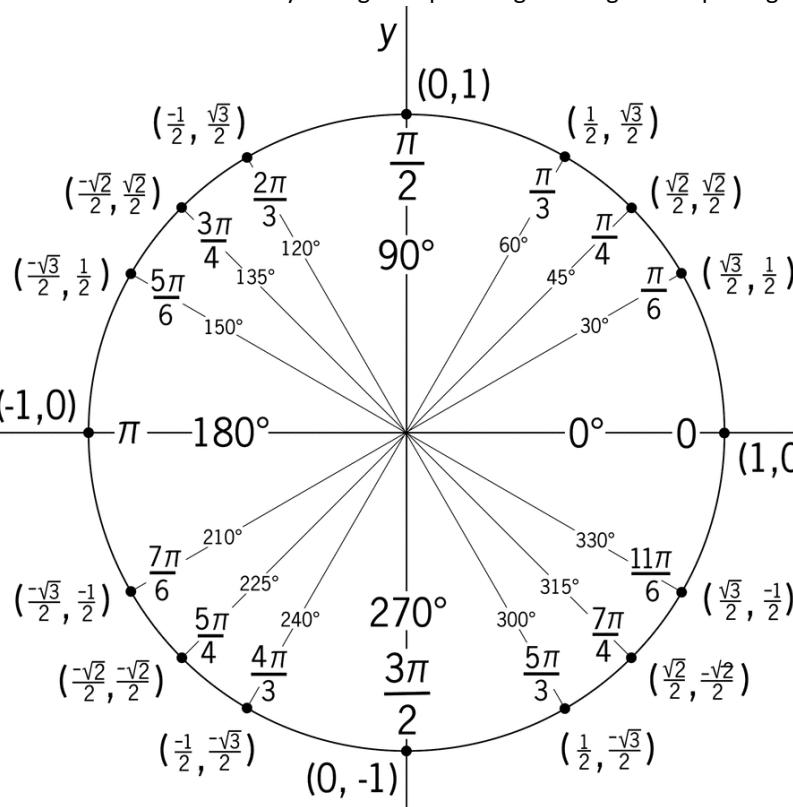


11.2 Unit Circle

The unit circle is created by taking the special right triangles and placing them around the origin to give us the coordinates in an xy-plane.



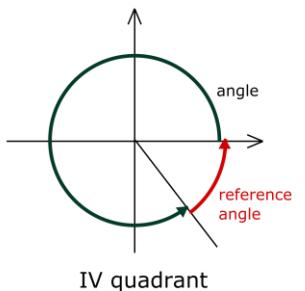
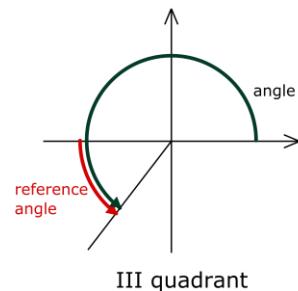
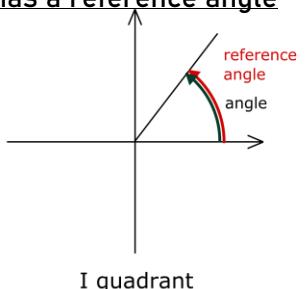
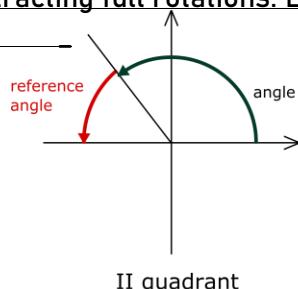
θ°	0°	30°	45°	60°	90°
$\sin \theta$					
$\cos \theta$					
$\tan \theta$					

What does $\sin(\theta)$ represent on the circle? Dot y value

What does $\cos(\theta)$ represent on the circle? Dot x value

What is a co-terminal angle?. The angle that results by subtracting full rotations. Ex1: 405° has a reference angle of 45° . Ex2: -1° has a reference angle of 359° .

What is a reference angle? A refence angle (indicated to the right in red) is the acute angle that falls back to the x-axis it allows us to use our special right triangle values.



Examples: Find the exact values for the trig functions.

1. $\csc \frac{11\pi}{4}$

2. $\cot 30^\circ$

3. $\sec 2\pi$

4. Find the exact values of $\sin \theta$, $\cos \theta$, and $\tan \theta$ if the terminal side of θ in standard position contains the given point P(1, -8).

5. Suppose θ is an angle in standard position whose terminal side lies in the given quadrant. Find the exact values of the remaining five trig functions of θ for:

$$\sin \theta = -\frac{4}{5}, \text{ in Quadrant IV.}$$

6. If $\cot \theta = -\frac{5}{2}$, find all possible values of $\cos \theta$ and $\csc \theta$.

Trig Practice part #1 – Find the exact value of each trigonometric function.

1. $\sin(-135^\circ)$

2. $\cos 405^\circ$

3. $\tan 315^\circ$

4. $\sin 2\pi$

5. $\cos \frac{\pi}{4}$

6. $\sin \frac{11\pi}{4}$

7. $\tan 90^\circ$

8. $\cos 450^\circ$

9. $\sin(-45^\circ)$

10. $\cos 150^\circ$

11. $\cos \frac{11\pi}{3}$

12. $\tan 135^\circ$

13. $\sin 240^\circ$

14. $\sin \frac{3\pi}{2}$

15. $\cos(-60^\circ)$

16. $\sin(-180^\circ)$

17. $\tan 405^\circ$ 18. $\tan\left(-\frac{5\pi}{6}\right)$

Change each degree measure into radian measure.

19. 60°

20. 315°

21. -135°

22. 45°

23. 24°

Change each radian measure to degree measure.

24. $-\pi$

25. $\frac{3\pi}{2}$

26. $\frac{7\pi}{12}$

27. $-\frac{17\pi}{30}$

28. $-2\frac{1}{3}$

Find one positive angle and one negative angle that are co-terminal with each angle.

29. 50°

30. 125°

31. 550°

32. -2π

33. $\frac{12\pi}{5}$

Trig part #2 – Lets only do one of these Other work is optional

Find the exact value of all six trig functions if the terminal side of θ in standard position contains the given point.

1. $P(-15, 8)$

2. $P(-3, 0)$

3. $P(5, -3)$

Suppose θ is an angle in standard position whose terminal side lies in the given quadrant. For each function, find the exact values of the remaining five trigonometric functions of θ .

4. $\cos \theta = -\frac{1}{2}$; Quadrant II 5. $\tan \theta = 3$; Quadrant III

6. $\sin \theta = -\frac{1}{5}$; Quadrant IV

Find the values indicated.

7. If $\cos \theta = \frac{2}{3}$, find all possible values of $\sin \theta$.

8. If $\sec \theta = -3$, find all possible values of $\sin \theta$ and $\cos \theta$.

9. If $\cos \theta = 0$, find all possible values of $\sin \theta$ and $\tan \theta$.

Suppose θ is an angle in standard position with the given conditions. State the quadrant or quadrants in which the terminal side of θ lies.

10. $\sin\theta > 0$

11. $\sin\theta > 0, \cos\theta < 0$

12. $\tan\theta > 0, \cos\theta < 0$

Find the exact value of each trigonometric function. Do only 5 from this section.

13. $\tan 135^\circ$

14. $\sec \frac{\pi}{6}$

15. $\csc -\frac{\pi}{6}$

16. $\cot 210^\circ$

17. $\sec 210^\circ$

18. $\csc \left(-\frac{3}{4}\pi \right)$

19. $\tan \frac{5}{3}\pi$

20. $\cot(-405^\circ)$

21. $\csc(-390^\circ)$

22. $\sec 270^\circ$

23. $\cot(-87\pi)$

24. $\tan \frac{13}{6}\pi$

25. $\sec(-225^\circ)$

26. $\csc 4\frac{2}{3}\pi$

27. $\tan(-720^\circ)$

28. $\cot(-90^\circ)$

29. $\sec 330^\circ$

30. $\csc -\frac{11\pi}{6}$

31. $\cot \frac{9\pi}{4}$

32. $\tan -\frac{3\pi}{4}$