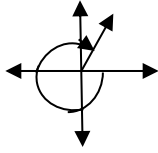


Intro to Trigonometry

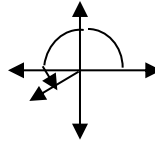
Show all your work.

1. Sketch the angle in standard position with the degree measure given.

a) -290°



b) 4 radians



2. For each angle, state a) the quadrant in which the terminal side lies, b) one positive coterminal angle, and c) one negative coterminal angle.

-30°

a) IV

b) 330°

c) -390°

$\frac{3\pi}{4}$

a) II

b) $\frac{11\pi}{4}$

c) $-\frac{5\pi}{4}$

4. Evaluate the 3 trig functions for the angle in standard position whose terminal side contains the given point.

a) $(-3, 4)$

$$\sin \theta = \frac{4}{5}$$

$$\cos \theta = -\frac{3}{5}$$

$$\tan \theta = -\frac{4}{3}$$

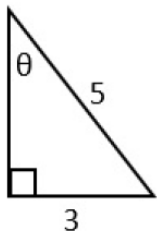
b) $(-2, 3)$

$$\sin \theta = \frac{3}{\sqrt{13}}$$

$$\cos \theta = -\frac{2}{\sqrt{13}}$$

$$\tan \theta = -\frac{3}{2}$$

5. Use the triangle to find the exact values of the six trig functions of θ .



$$\sin \theta = \frac{4}{5}$$

$$\tan \theta = \frac{4}{3}$$

$$\cot \theta = \frac{3}{4}$$

$$\sec \theta = \frac{5}{3}$$

$$\csc \theta = \frac{5}{4}$$

$$\cos \theta = \frac{3}{5}$$

6. Suppose θ is an angle in standard position. Under each of the given conditions, in which quadrant does the terminal side lie?

a) $\cos\theta < 0, \tan\theta < 0$

Q II

b) $\cos\theta > 0, \sin\theta < 0$

Q IV

7. Convert the following radian measures to degrees.

a) $\frac{\pi}{9} = 20^\circ$

b) $\frac{2\pi}{3} = 120^\circ$

8. Convert the following degree measures to radians. Leave your answers in terms of π .

a) $30^\circ = \frac{\pi}{6}$

b) $-150^\circ = -\frac{5\pi}{6}$
or $210^\circ = \frac{7\pi}{6}$

Evaluate the 3 trig functions for each of the angles in standard position. No decimal approximations.

9. 60°

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\cos \theta = \frac{1}{2}$$

$$\tan \theta = \sqrt{3}$$

10. $-210^\circ = 150^\circ$

$$\sin \theta = \frac{1}{2}$$

$$\cos \theta = -\frac{\sqrt{3}}{2}$$

$$\tan \theta = -\frac{\sqrt{3}}{3}$$

11. π

$$\sin \theta = 0$$

$$\cos \theta = -1$$

$$\tan \theta = 0$$

13. $\frac{7\pi}{4}$

$$\sin \theta = -\frac{\sqrt{2}}{2}$$

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\tan \theta = -1$$

14. Use trigonometric identities to transform the left side of the equation to the right side. (You want both sides to be equivalent.)

$$\cos\theta \sec\theta = 1$$

$$\cos\theta \cdot \frac{1}{\cos\theta}$$

1

15. For the given function value, find the remaining 5 trig functions.

$$\tan \theta = -\frac{4}{3}, \text{ Quadrant II } \therefore x < 0 \text{ and } y > 0$$

$$\sin \theta = \frac{4}{5} \qquad \csc \theta = \frac{5}{4} \qquad \cot \theta = -\frac{3}{4}$$

$$\cos \theta = -\frac{3}{5} \qquad \sec \theta = -\frac{5}{3}$$

16. Solve for θ , in degrees and radians.

a) $\sin \theta = -1$

$$\theta = \frac{3\pi}{2}, 270^\circ$$

b) $\tan \theta = \sqrt{3}$

$$\theta = \frac{\pi}{3}, 60^\circ \text{ or } \frac{4\pi}{3}, 240^\circ$$

17. Find the length of the intercepted arc of a circle with central angle 1.5 radians and radius 3 cm.

$$S = r\theta = 4.5 \text{ cm}$$

18. Find the radius of a circle with central angle $\pi/6$ that intercepts an arc of length 15 cm.

$$r = \frac{S}{\theta} = 28.65 \text{ cm}$$

19. Find a) the radian measure and b) the degree measure of the angle that intercepts an arc of length 24 inches of a circle with radius 15 inches.

$$\theta = \frac{S}{r} = 1.6 \text{ radians} = 91.7^\circ$$

20. a) Find the angular velocity of a ceiling fan if the fan rotates 40 times per minute.
b) Calculate the linear velocity of a point on the tip of the fan blade if the diameter of the fan blade is 4 feet.

a) $\omega = \frac{\theta}{t} = \frac{40 \cdot 2\pi}{1} = 80\pi \approx 251.33$ radians per minute

b) $v = \frac{S}{t} = \frac{2 \cdot 80\pi}{1} = 160\pi \approx 502.65$ feet per minute

21. Find the area of the sector of a circle with radius of 18 inches and central angle $\theta = 120^\circ$.

$$A = \frac{1}{2}r^2\theta = \frac{324\pi}{3} \approx 339.29 \text{ in}^2$$