

**Angles in Degrees**

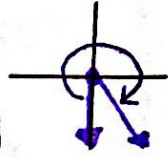
Sketch each angle in standard position. State the quadrant in which it terminates.

1.  $150^\circ$



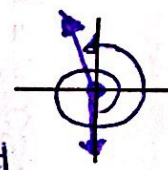
Quadrant: II

2.  $-340^\circ$



Quadrant: I

3.  $560^\circ$



Quadrant: III

Find the coterminal angle between  $0^\circ$  and  $360^\circ$ .

4.  $750^\circ$

$30^\circ$

5.  $-270^\circ$

$90^\circ$

6.  $405^\circ$

$45^\circ$

**Angles in Radians**

Convert each angle into radians.

7.  $230^\circ$

$\frac{23\pi}{18}$

8.  $-400^\circ$

$-\frac{20\pi}{9}$

Convert each angle into degrees.

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

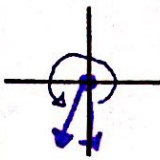
$120^\circ$

10.  $-\frac{\pi}{4}$

$-45^\circ$

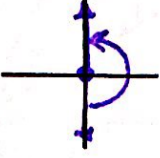
Sketch each angle in standard position. State the quadrant in which it terminates.

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



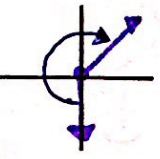
Quadrant: IV

12.  $\pi$



Quadrant: II

13.  $-\frac{5\pi}{4}$

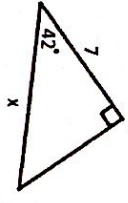


Quadrant: II

**Right Triangle Trig**

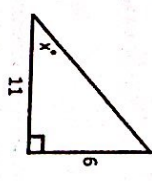
Find the value of x using trigonometric ratios.

14.



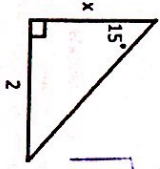
$x = 9.442$

15.



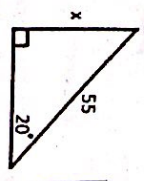
$x = 28.61^\circ$

16.



$x = 7.446$

17.

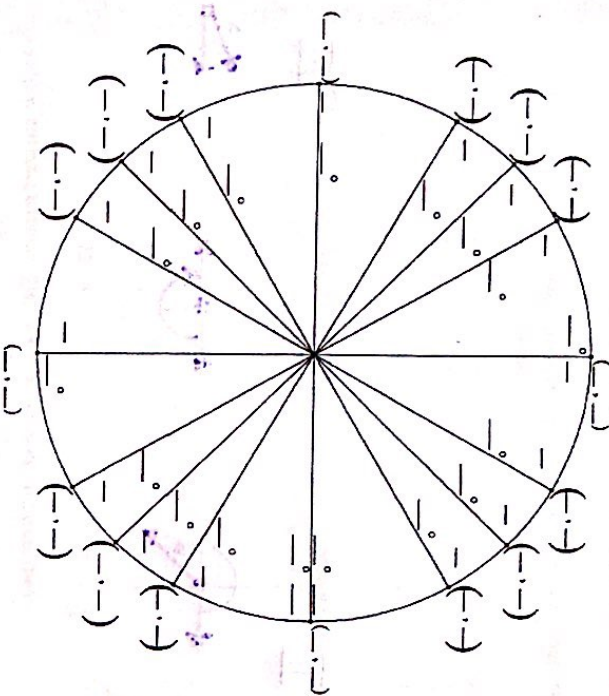


$x = 18.81$

18. To find the height of the Times Square New Year's Eve Ball, a partygoer moves 140 feet away from the base of the pole and estimates the angle of elevation to the NYE Ball to be about  $44^\circ$ . About how high is the ball?

$135.20 \text{ ft}$

**Exact Values of Trig Functions**  
Complete the unit circle.



Determine the exact value of each trig function by using the unit circle.

19.  $\sin 180^\circ = 0$

20.  $\cos \frac{4\pi}{3} = -\frac{\sqrt{3}}{2}$

21.  $\cot 60^\circ = \frac{\sqrt{3}}{3}$

22.  $\sec -45^\circ = \sqrt{2}$

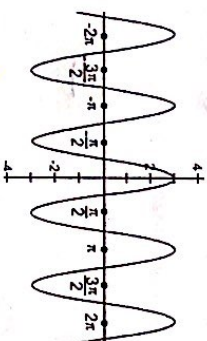
23.  $\csc \frac{13\pi}{6} = 2$

24.  $\tan \frac{\pi}{2} = \text{undefined}$

**Graphs and Equations of Sine and Cosine**

For each graph, determine the amplitude, period, frequency, and vertical shift. Then write the equation.

25.

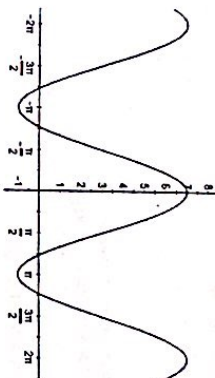


Amplitude: 3 Period: π

Frequency: 1/π Vertical Shift: 0

Equation: y = 3 \cos 2x

26.



Amplitude: 4 Period: π

Frequency: 1/π Vertical Shift: 3

Equation: y = 4 \cos(\frac{1}{2}x) + 3

27.  $y = -2 \cos(\frac{1}{3}x) - 7$

Amplitude: 2 Period: 6π

Frequency: 1/6π Vertical Shift: down 7

28.  $y = 4 \sin(-4x) + 2$

Amplitude: 4 Period: π/2

Frequency: 2/π Vertical Shift: up 2

**Applications of Trig Function**

29. An elk population fluctuates periodically over time. The average population is 300 antelopes. Every 5 years the population reaches a maximum of 350 elk. Write a cosine function to model the elk population over time, where x represents time in years.

$y = 50 \cos(\frac{2\pi}{5}x) + 300$

30. Each day, the tide continuously goes in and out, raising and lowering a boat in the harbor. At low tide, the boat is only 2 feet above the ocean floor. And, 6 hours later, at peak high tide, the boat is 40 feet above the ocean floor. Write a sine function that describes the boat's distance above the ocean floor as it relates to time, where x represents time in hours.

$y = 19 \sin(\frac{\pi}{3}x) + 21$