F Math 12

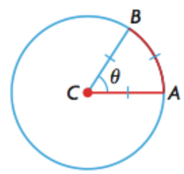
8.1 Understanding Angles p. 514

Name ______________

Date ______________

Goal: Estimate and determine benchmarks for angle measure.

1. **radian**: The measure of the central angle of a circle subtended by an arc that is the same length as the radius of the circle.



$\angle\theta = 1$

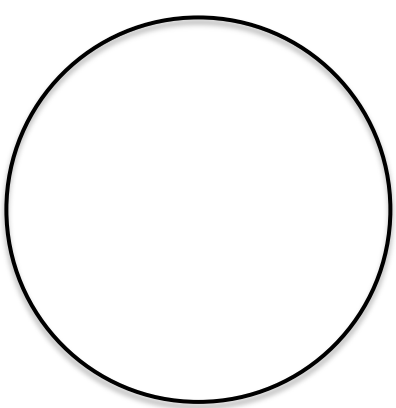
Key Ideas:

- Angles can be measured using different units. These include degrees, radians, gradients and minutes and seconds.

- Any angle measures presented a real numbers without units are considered to be in radians.

Units of Measurement for Angles

- Degrees: devised in ancient Babylon; ______________________________
- Gradients: devised in 18th century; ______________________________
- Radians: devised by mathematicians and scientists; ____________________



$\theta = 1\, radian \approx 57.296°$

$2\pi\, radians \approx 6.28\, radians = 360°$

$\pi\, radians \approx 3.14\, radians = 180°$

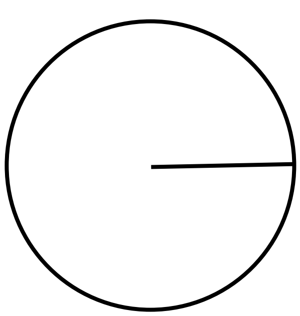
Example 1: Relating degrees to radians in a circle.

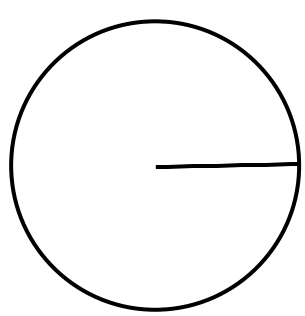
Example 2: Calculate the value of each angle in **radian** measure, to the nearest tenth, and then sketch each angle.

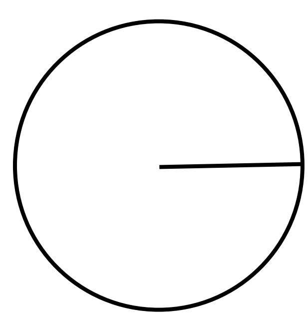
a. $100°$

b. $290°$

c. $590°$





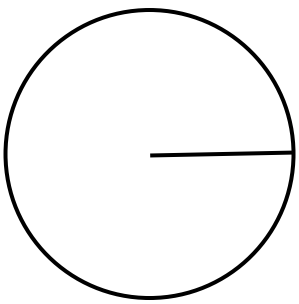


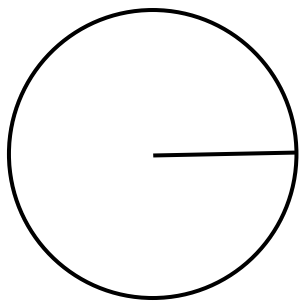
Example 3: Calculate the value of each angle in **degree** measure, to the nearest degree, and then sketch each angle.

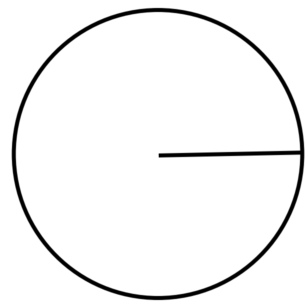
a. 5.7696

b. 0.7854

c. 14.8353







Example 4: For each pair of angle measures, determine which measure is greater.

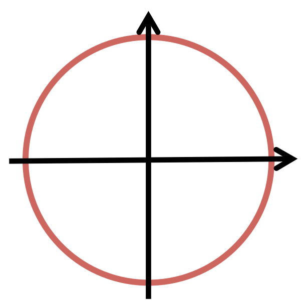
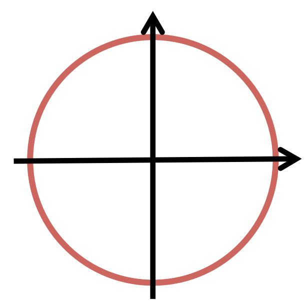
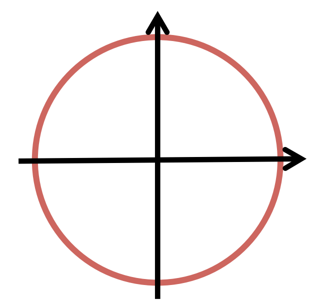
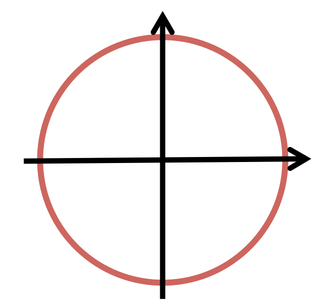
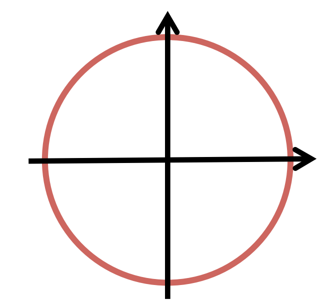
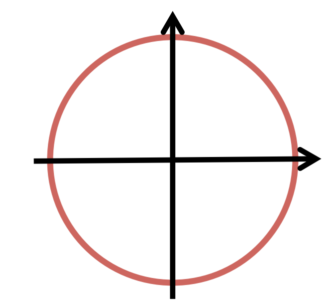
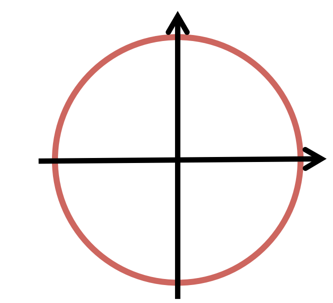
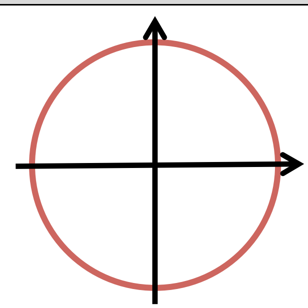
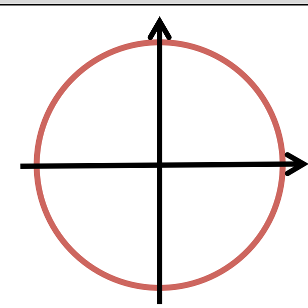
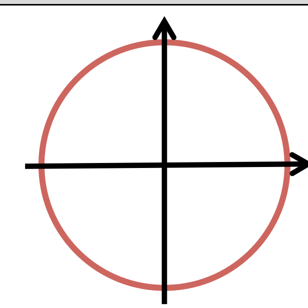
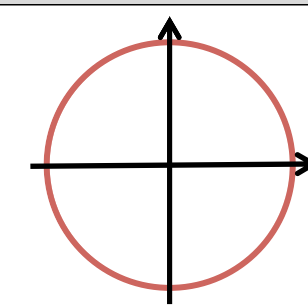
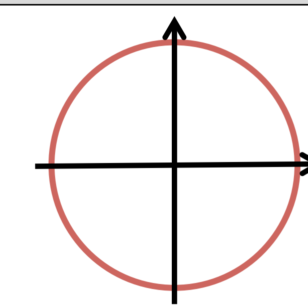
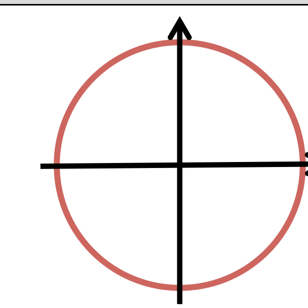
a. 3π radians or 8 radians

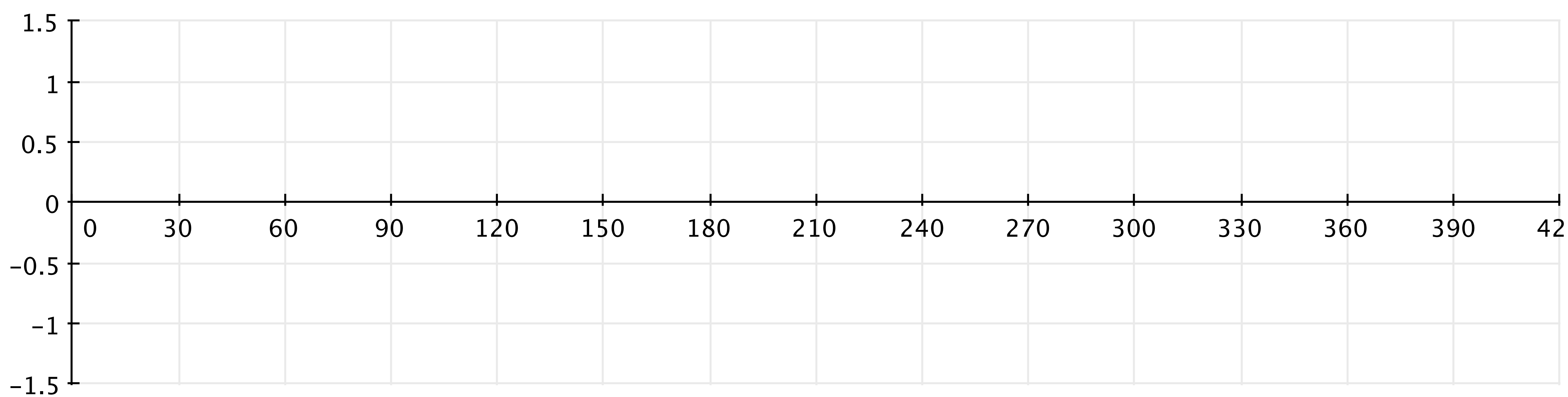
b. $400°$ or 6.5 radians

HW: 8.1 pp. 519-520 #1, 2, 4-6, 8 & 11

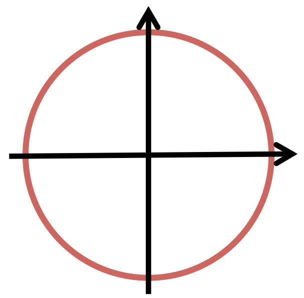
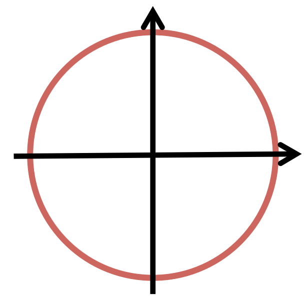
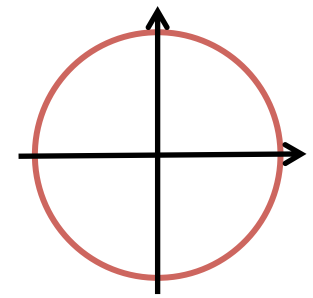
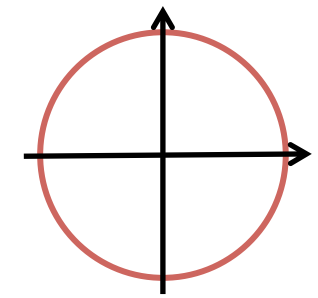
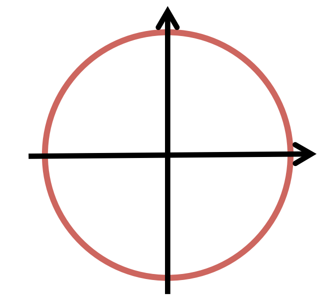
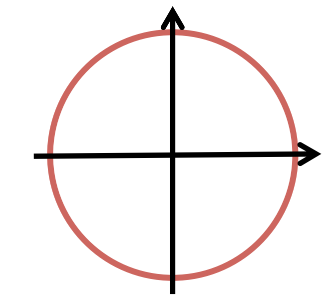
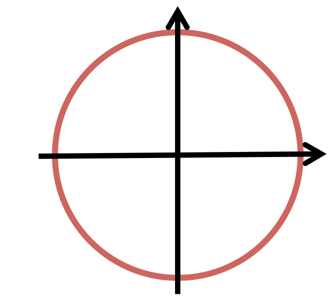
8.2 Exploring the Graphs of Periodic Functions (p.521)

1. Graph $y = sin\theta,\ 0° \leq \theta \leq 360°$

0°or ____________	30°or ____________	60°or ____________	90°or ____________	120°or ____________	150°or ____________	180°or ____________
						
210°or ____________	240°or ____________	270°or ____________	300°or ____________	330°or ____________	360°or ____________	
						



1. Graph $y = cos\theta$, $0° \leq \theta \leq 360°$

0°or ______________	30°or ______________	60°or ______________	90°or ______________	120°or ______________	150°or ______________	180°or ______________
						
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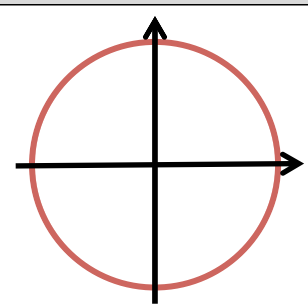
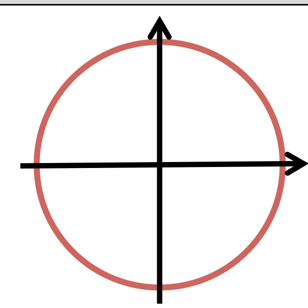
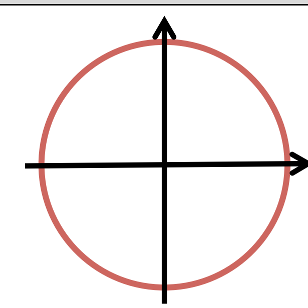
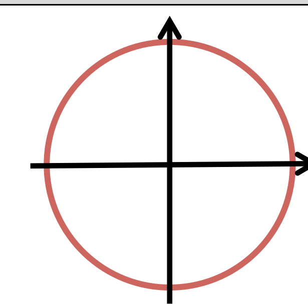
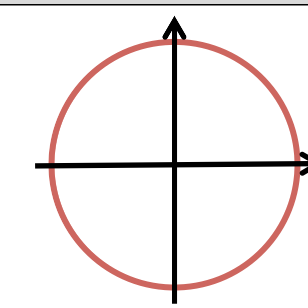
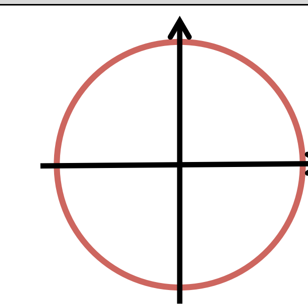
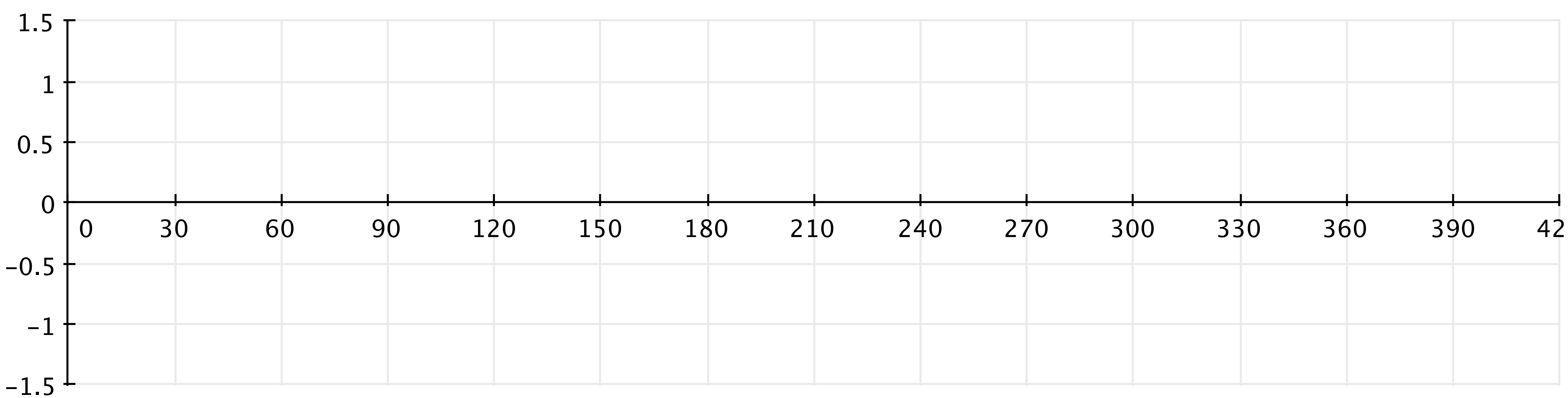
						



8.2 Exploring the Graphs of Periodic Functions p. 521

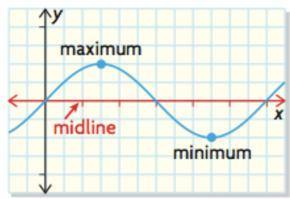
Name ________________

Date ________________

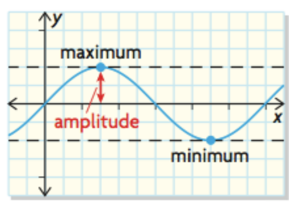
Goal: Investigate the characteristics of the graphs of sine and cosine functions.

1. **periodic function**: A function whose graph repeats in regular intervals or cycles.

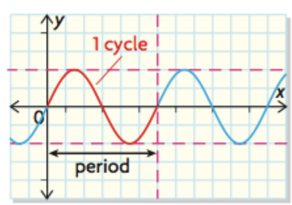
2. **midline**: The horizontal line halfway between the maximum and minimum values of a periodic function.



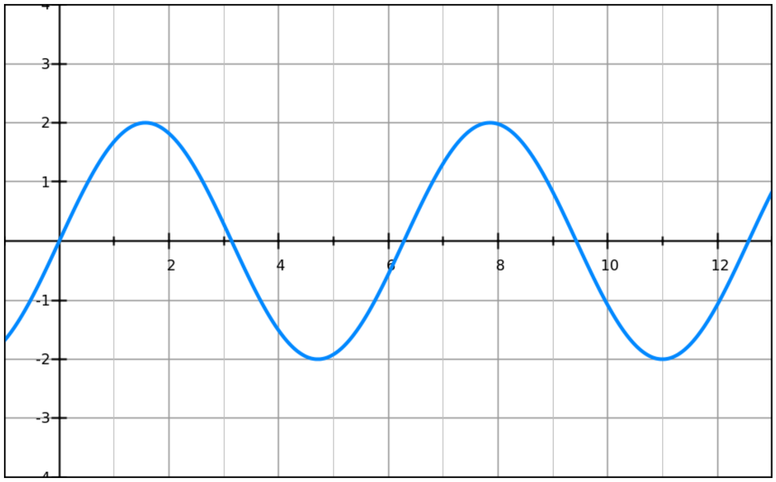
3. **amplitude**: The distance from the midline to either the maximum or minimum value of a periodic function; the amplitude is always expressed as a positive number.

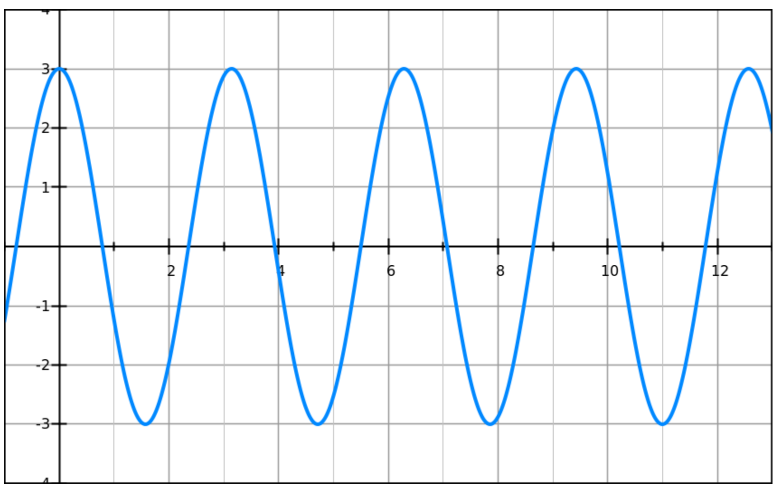


4. **period**: The length of the interval of the domain to complete one cycle.



Example 1: Correctly label the **midline**, **maximum** and **minimum** points, **amplitude** and **period** for the graphs below. State which graph is a **sine** function and which graph is a **cosine** function.





HW: 8.2 pp. 524-525 #1-6

8.3 The Graphs of Sinusoidal Functions p. 527

Name ____________________

Date ____________________

Goal: Identify characteristics of the graphs of sinusoidal functions.

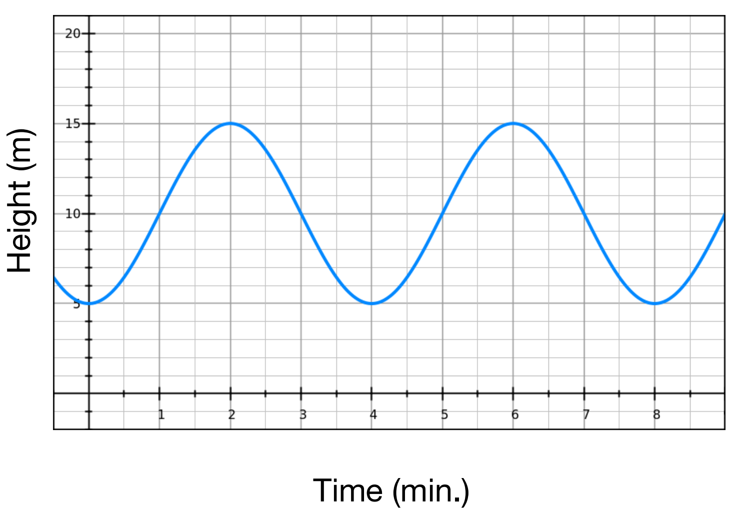
1. **sinusoidal function**: Any periodic function whose graph has the same shape as that of $y = \sin x$.

Key Ideas:

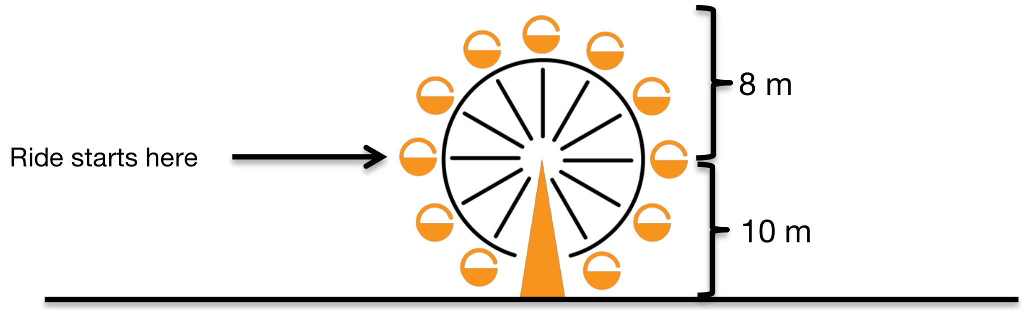
- Range =
- Amplitude =
- Equation of Midline =
- Period: ____

____

Example 1: The sine curve below shows a person's height above the ground as the person rides a Ferris wheel. Label the **range**, **amplitude**, **midline** and **period.**



Example 2: The diagram below displays some of the key information about a particular Ferris wheel. One ride last 600 s and completes 10 rotations.



a. Complete the table below to show a rider's height above the ground.

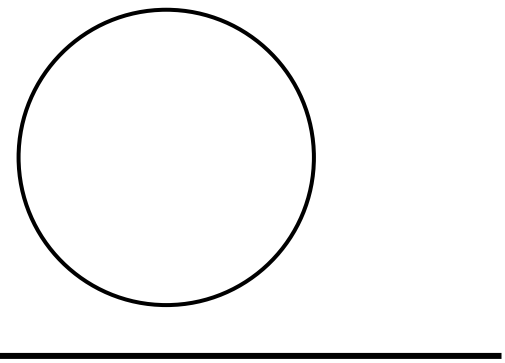
Time on ride (s)	0	15	30	45	60	75	90
Height above the ground (m)							

b. Sketch a graph to represent the rider's height above the ground during the ride. Label the **range**, **amplitude**, **midline** and **period**.

c. How is this graph, and Ferris wheel, different from the graph and Ferris wheel in Example 1?

Example 3: The original Ferris wheel, designed by George Ferris in 1893, could carry 2 160 people at a time. It had a maximum height of 80.4 m and a radius of 38 m.

a. Fill in the table below for the height above the ground of a person on the Ferris wheel. Assume that the person got on the ride at the wheel's lowest point and that one rotation took 16 min.



Time on ride (min)	0	4	8	12	16	20	24
Height above the ground (m)							

b. Sketch a graph to represent the rider's height above the ground during the ride. Label the **range**, **amplitude**, **midline** and **period**.

HW: 8.3 pp. 536-542 #4, 6, 8 & 9

F Math 12

8.4 The Equations of Sinusoidal Functions p. 546

Name ____________________

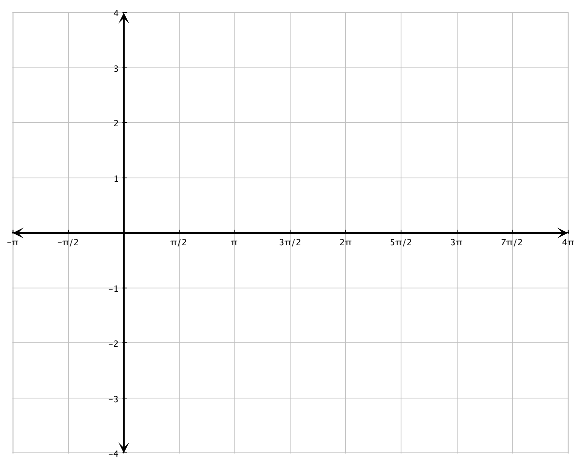
Date ____________________

Goal: Identify characteristics of the equations of sinusoidal functions.

Investigating the characteristics of $\boldsymbol{y = a\sin b(\theta - c) + d}$

$$\boldsymbol{y = \sin\theta}$$

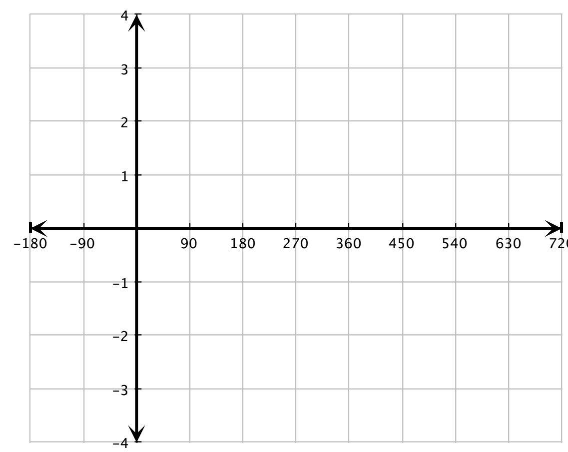
Radians



Amplitude =

Period =

Degrees

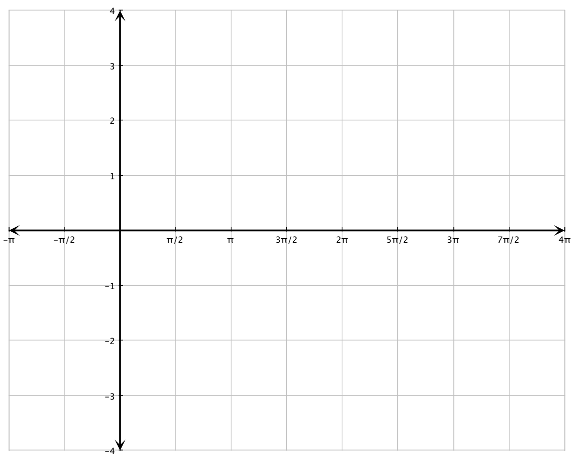


Amplitude =

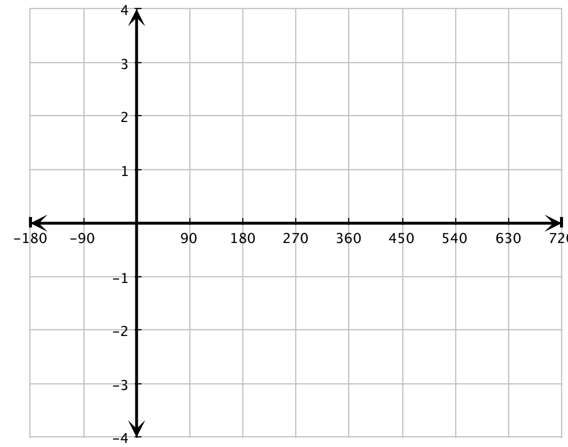
Period =

$y = 2\sin\theta \quad (a = \qquad)$

$y = 4\sin\theta \quad (a = \qquad)$



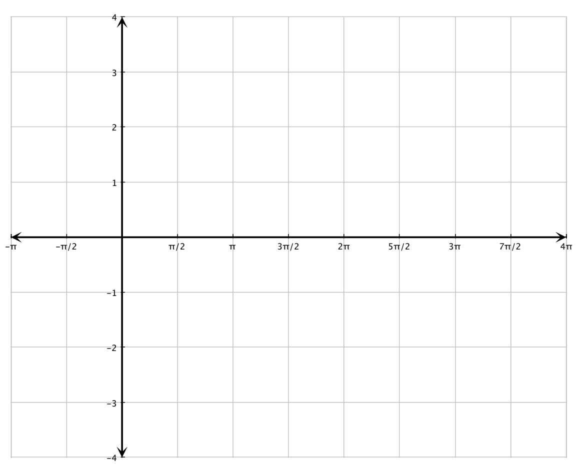
3"

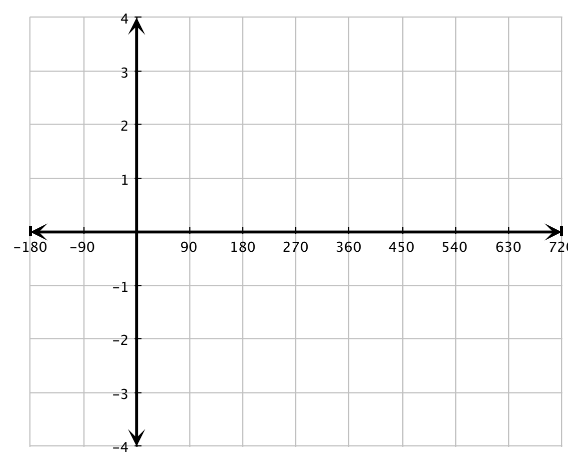


$y = \boldsymbol{a}\sin\theta$ What does the value of "$\boldsymbol{a}$" do to the **original** ($y = sin\theta$) sine function?

$y = \sin 2\theta \quad (b = \qquad)$

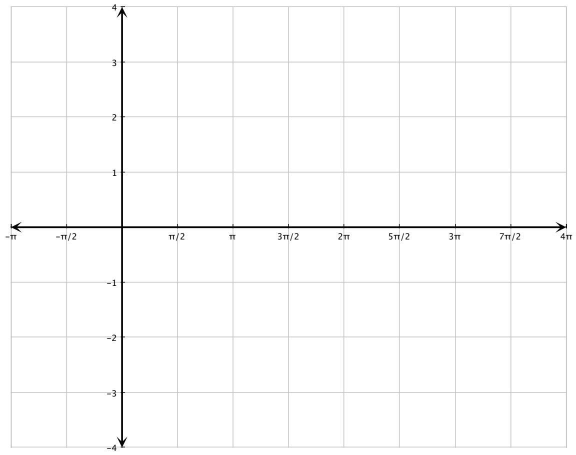
$y = \sin 0.5\,\theta \quad (b = \qquad)$



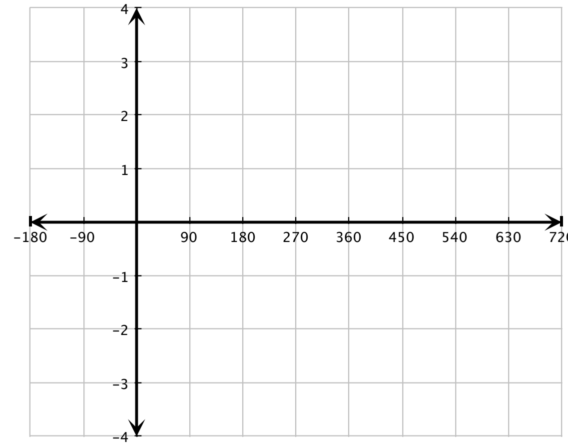


$y = \sin\boldsymbol{b}\theta$ What does the value of "$\boldsymbol{b}$" do to the **original** ($y = sin\theta$) sine function?

$y = \sin(\theta - \pi)$ $(c = \quad)$

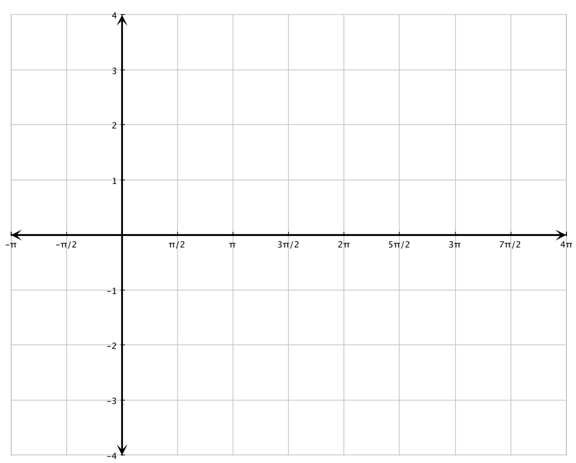


$y = \sin(\theta + 90°)$ $(c = \quad)$

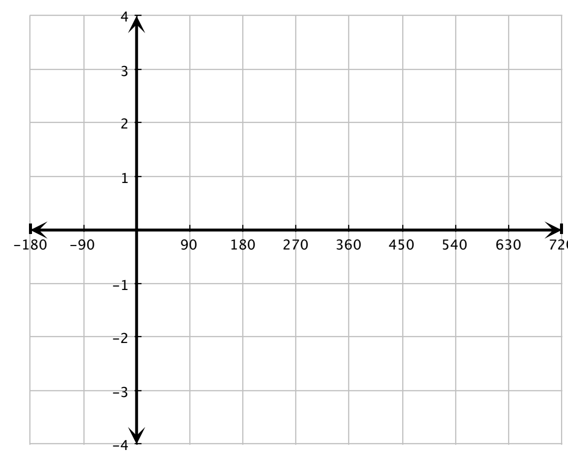


$y = \sin(\theta - \boldsymbol{c})$ What does the value of "$\boldsymbol{c}$" do to the **original** ($y = sin\theta$) sine function?

$y = \sin\theta + 2$ $(d = \quad)$



$y = \sin\theta - 3$ $(d = \quad)$

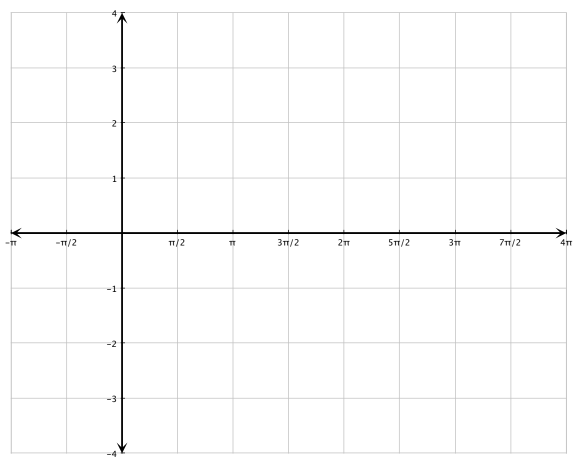


$y = \sin\theta + \boldsymbol{d}$ What does the value of "$\boldsymbol{d}$" do to the **original** ($y = sin\theta$) sine function?

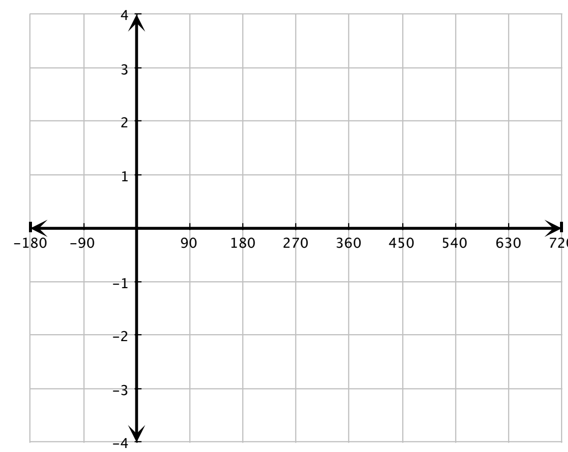
$$y = a \sin b(\theta - c) + d$$

$$y = a \cos b(\theta - c) + d$$

$y = \sin 2\theta - 3$



$y = 3\sin(\theta - 45°) + 1$



HW: 8.4 pp. 558-561 1-4, 5-9,12, 13 & 14