Lecture 28

Trig functions in right triangles, Identities(Cofunction, Reciprocal, Quotient, Pythagorean), Reference angles, Angles of elevation/depression

1.

The reference angle of 227 degrees is _________ degrees.
The reference angle of 327 degrees is _________ degrees.
The reference angle of -143 degrees is _________ degrees.

2.

The reference angle of $\frac{12}{5}\pi$ radians is _________ radians.
The reference angle of $-\frac{3}{10}$ radians is _________ radians.
The reference angle of $\frac{7}{5}\pi$ radians is _________ radians.

3.

If $\cos(38°) = \sin(\theta)$ and $0° < \theta < 90°$, then

$\theta =$ _________degrees

4.

If $\sin\left(\frac{\pi}{6}\right) = \cos(\theta)$ and $0° < \theta < \frac{\pi}{2}$, then

$\theta =$_________

5.

Find the **exact value** of each of the following.

$\sin(30°) =$________

$\cos(30°) =$________

$\tan(30°) =$________

$\csc(30°) =$________

$\sec(30°) =$________

$\cot(30°) =$________

6.

Find the **exact value** of each of the following.

$\tan(60°) =$________

$\csc(30°) =$________

$\cos(45°) =$________

7.

For $0 < \theta < \frac{\pi}{2}$, find the values of the trigonometric functions based on the given one

(give your answers with THREE DECIMAL PLACES or as expressions, e.g. you can enter 3/5).

If $\sin(\theta) = \frac{8}{9}$ then
$\cos(\theta) =$________
$\sec(\theta) =$________
$\csc(\theta) =$________
$\tan(\theta) =$________
$\cot(\theta) =$________

8.

Suppose that θ is an angle in quadrant I and $\sin(\theta) = \frac{2}{13}$. Find the values of the other five trigonometric functions for θ . Give exact answers, but do not rationalize denominators.

$\cos(\theta) =$________

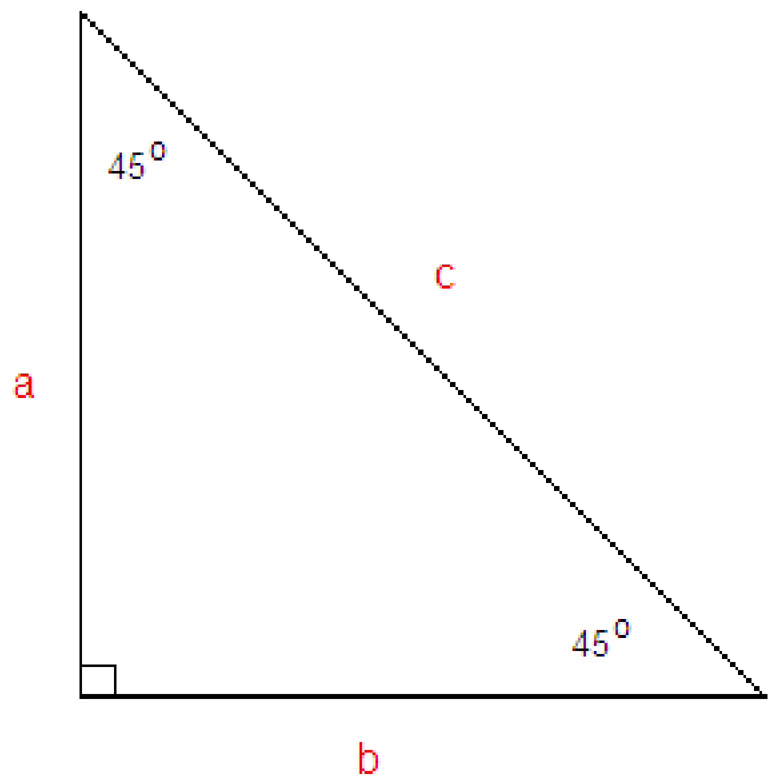
$\tan(\theta) =$________

$\csc(\theta) =$________

$\sec(\theta) =$________

$\cot(\theta) =$________

9.



Note: Triangle may not be drawn to scale.

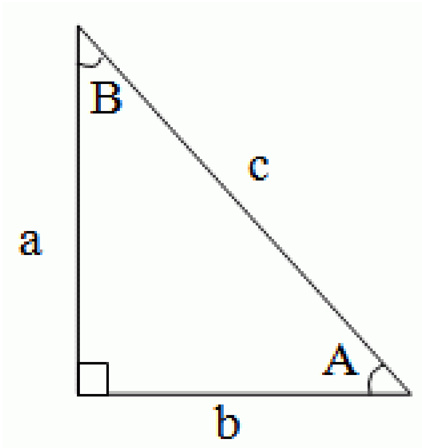
Suppose $b = 4$

Find exact values for the other sides.

$a =$_________

$c =$_________

10.



Note: Triangle may not be drawn to scale.

Suppose a = 8 and b = 10.

Find an exact value or give at least two decimal places:

sin(A) =_________

cos(A) =_________

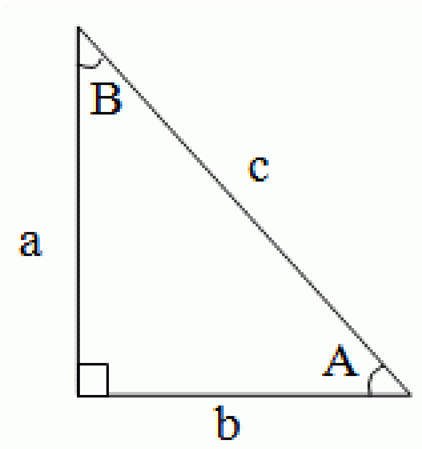
tan(A) =_________

sec(A) =_________

csc(A) =_________

cot(A) =_________

11.



Note: Triangle may not be drawn to scale.

Suppose a = 6 and A = 30 degrees.

Find:

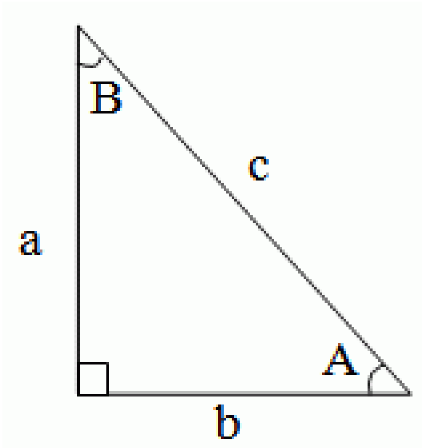
b =__________

c =__________

B = __________degrees

Give all answers to at least one decimal place. Give angles in **degrees**

12.



Note: Triangle may not be drawn to scale.

Suppose c = 10 and A = 15 degrees.

Find:

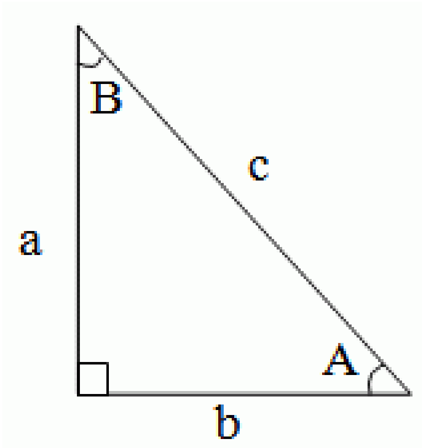
a =__________

b =__________

B = __________degrees

Give all answers to at least one decimal place. Give angles in **degrees**

13.



Note: Triangle may not be drawn to scale.

Suppose $a = 120$ and $b = 119$ and $c = 169$.

Find an exact value (report answer as a fraction):

$\sin(A) =$_________

$\cos(A) =$_________

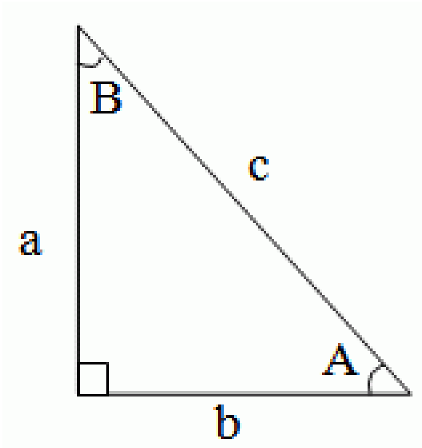
$\tan(A) =$_________

$\sec(A) =$_________

$\csc(A) =$_________

$\cot(A) =$_________

14.



Note: Triangle may not be drawn to scale.

Suppose a = 7 and b = 10.

Find an exact value for each of the following trig functions.

sin(A) =_________

cos(A) =_________

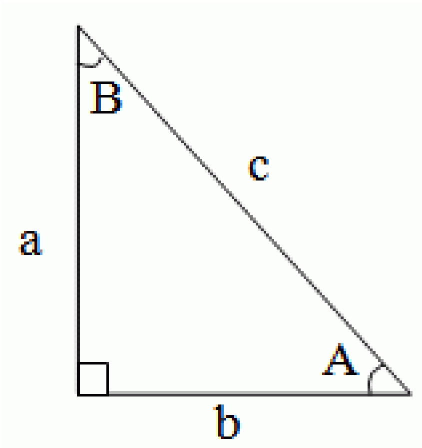
tan(A) =_________

sec(A) =_________

csc(A) =_________

cot(A) =_________

15.



Note: Triangle may not be drawn to scale.

Suppose $a = 105$ and $b = 88$.

Find an exact value (report answer as a fraction):

$\sin(B) =$_________

$\cos(B) =$_________

$\tan(B) =$_________

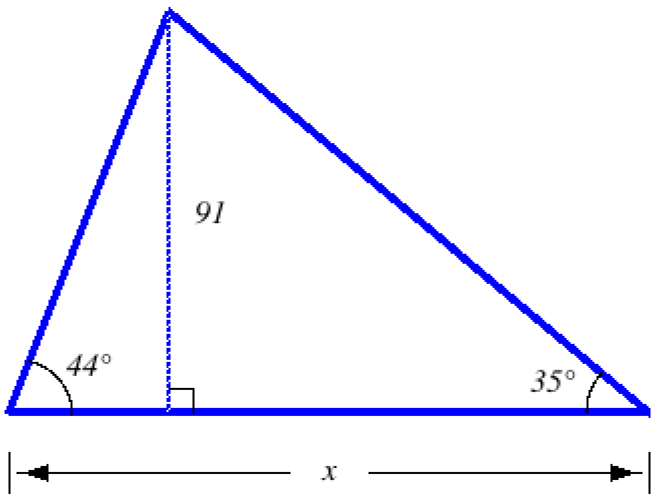
$\sec(B) =$_________

$\csc(B) =$_________

$\cot(B) =$_________

16.

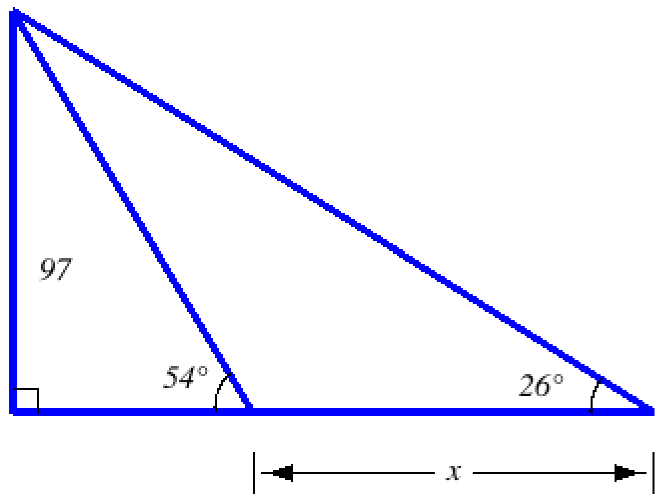
Find x correct to 2 decimal places.
NOTE: The triangle is NOT drawn to scale.



$x =$________

17.

Find x correct to 2 decimal places.
NOTE: The triangle is NOT drawn to scale.



$x =$_________

18.

A 32 -ft ladder leans against a building so that the angle between the ground and the ladder is 81° .

How high does the ladder reach on the building? _________ft

19.

From the top of a 153-ft lighthouse, the angle of depression to a ship in the ocean is 28°. How far is the ship from the base of the lighthouse?
distance =_________ feet
Report answer accurate to 2 decimal places.

20.

A survey team is trying to estimate the height of a mountain above a level plain. From one point on the plain, they observe that the angle of elevation to the top of the mountain is 26° . From a point 2000 feet closer to the mountain along the plain, they find that the angle of elevation is 31° .
How high (in feet) is the mountain?

21.

The angle of elevation to the top of a Building in New York is found to be 3 degrees from the ground at a distance of 2 miles from the base of the building. Using this information, find the height of the building. Round to the tenths. Hint: 1 mile = 5280 feet

Your answer is _________ feet.

22.

A radio tower is located 275 feet from a building. From a window in the building, a person determines that the angle of elevation to the top of the tower is 32° and that the angle of depression to the bottom of the tower is 28° . How tall is the tower?

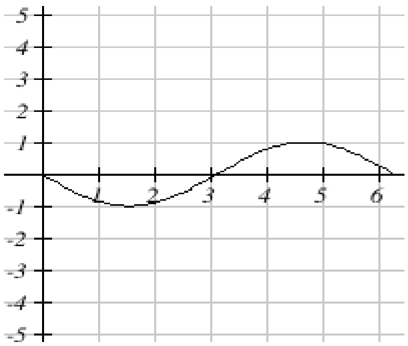
_________ feet

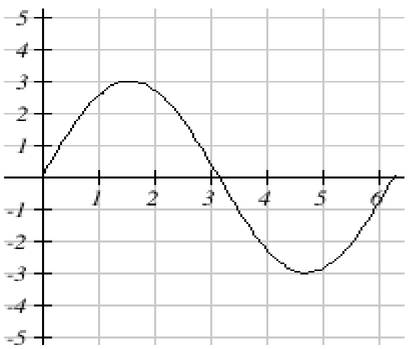
Lecture 29

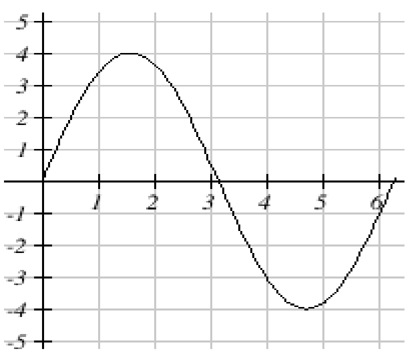
Period, Amplitude, Phase shift, Vertical translation

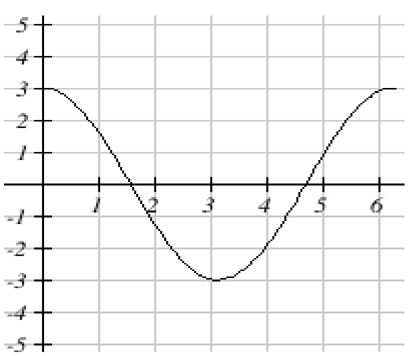
1.

Which of the following graphs is the correct plot of $y = 3\sin(x)$?



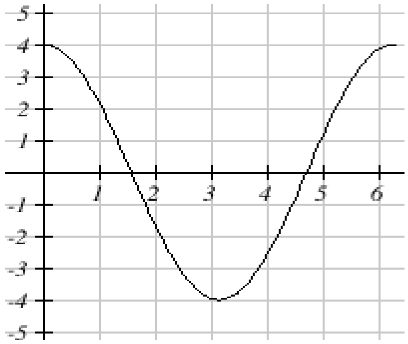


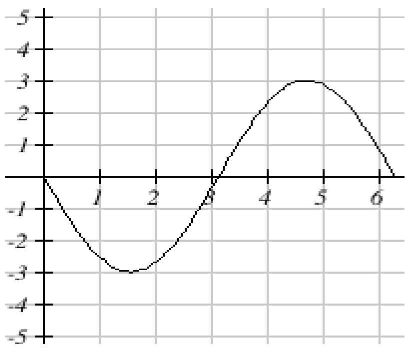


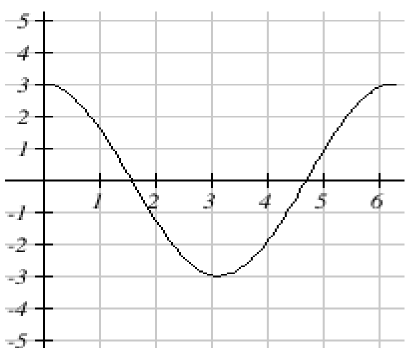


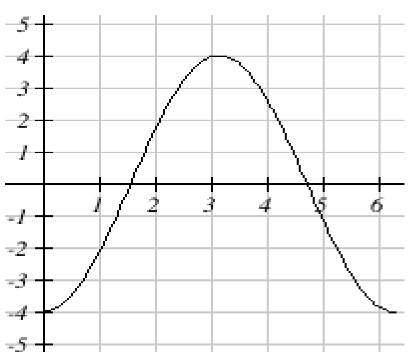
2.

Which of the following graphs is the correct plot of $y = 4\cos(x)$?









3.

Find the equation of a sine wave that is obtained by shifting the graph of $y = \sin(x)$ to the right 5 units and downward 8 units and is vertically stretched by a factor of 8 when compared to $y = \sin(x)$.

$f(x) =$_______

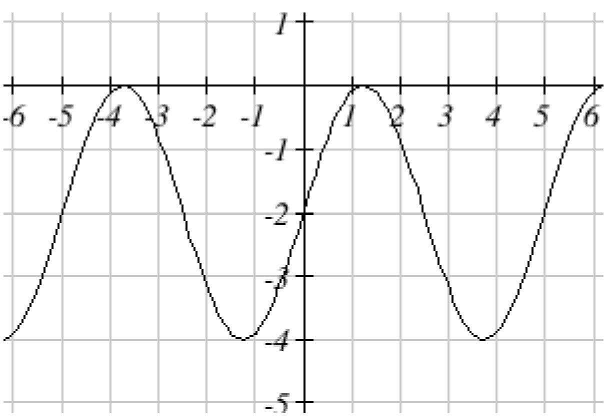
4.

For $y = 6\sin 6x$,
its amplitude is _______
its period is _______

5.

For $y = -2\cos\frac{1}{8}x$,
its amplitude is _______
its period is _______

6.



Based on the graph above, determine the amplitude, midline, and period of the function

Amplitude: _______

Period: _______

Midline: y =_______

7.

Given the equation $y = 5\sin\big(8(x - 3)\big) + 4$

The amplitude is: _______

The period is: _______

The horizontal shift is: _______ units to the (Right/ Left)

The midline is: y =_______

8.

Given the equation $y = 5\sin(6x - 42) + 3$

The amplitude is: _______

The period is: _______

The horizontal shift is: _______ units to the (Right/ Left)

The midline is: y =

9.

Given the equation $y = 5\sin\left(\frac{\pi}{6}x + \frac{\pi}{3}\right) + 3$

The amplitude is:_________

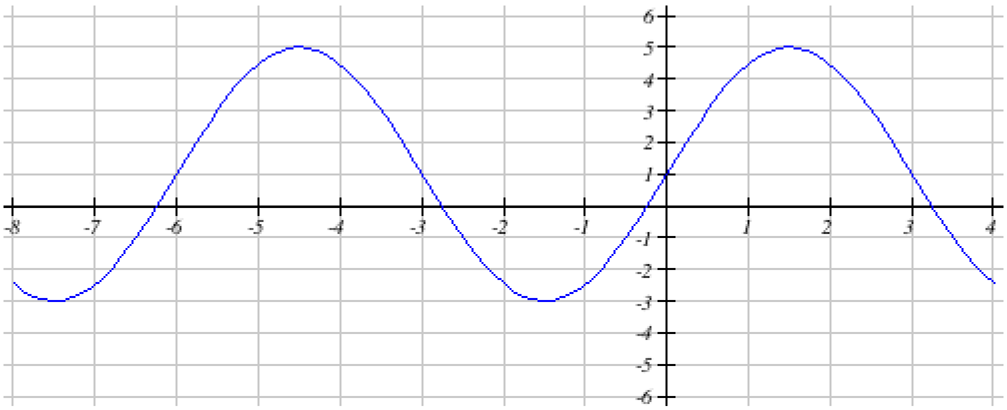
The period is: _________

The horizontal shift is: _______ units to the (Right/ Left)

The midline is: y =_________

10.

Find a function of the form $y = A\sin(kx) + C$ or $y = A\cos(kx) + C$ whose graph matches the function shown below:

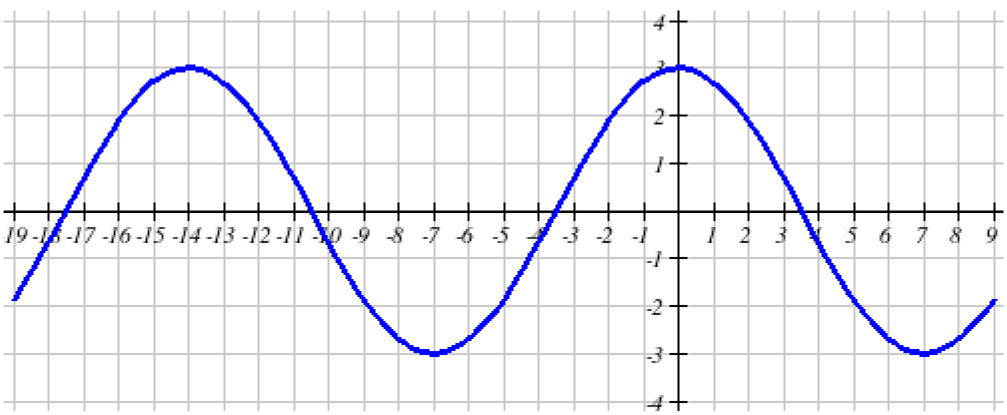


Leave your answer in exact form.

$y =$ ________

11.

Find a function of the form $y = A\sin(kx) + C$ or $y = A\cos(kx) + C$ whose graph matches this one:

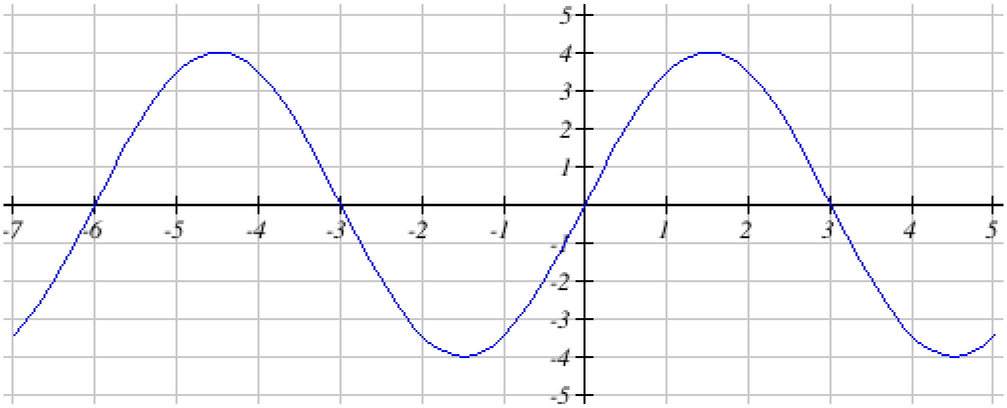


Leave your answer in exact form.

$y =$ ________

12.

Find a function of the form $y = A\sin(kx)$ or $y = A\cos(kx)$ whose graph matches the function shown below:



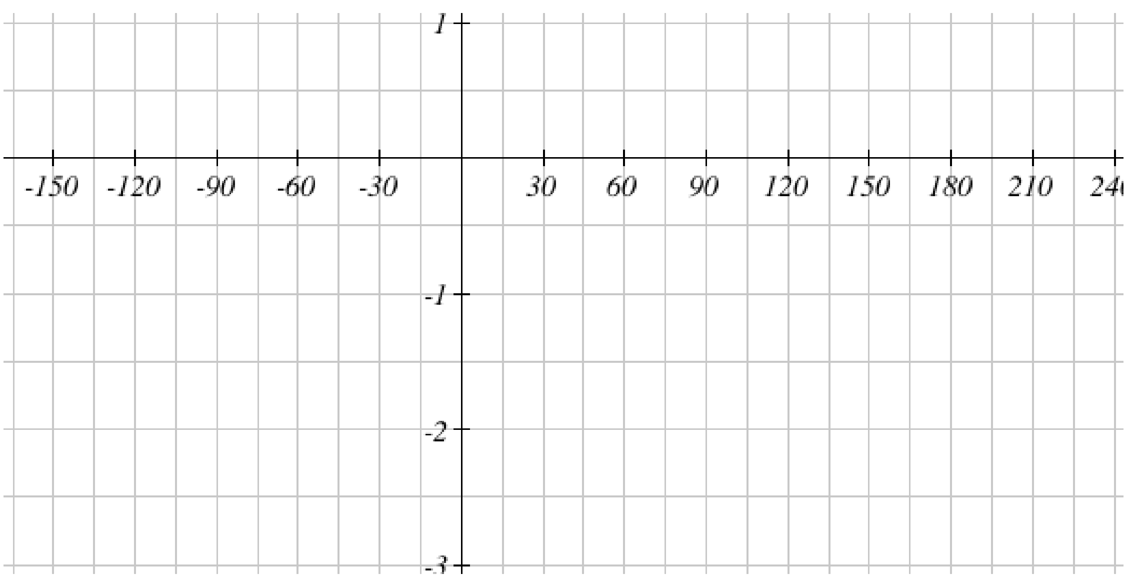
Leave your answer in exact form.

$y =$ ________

13.

Draw the following graph on the interval $-165° < x < 240°$:

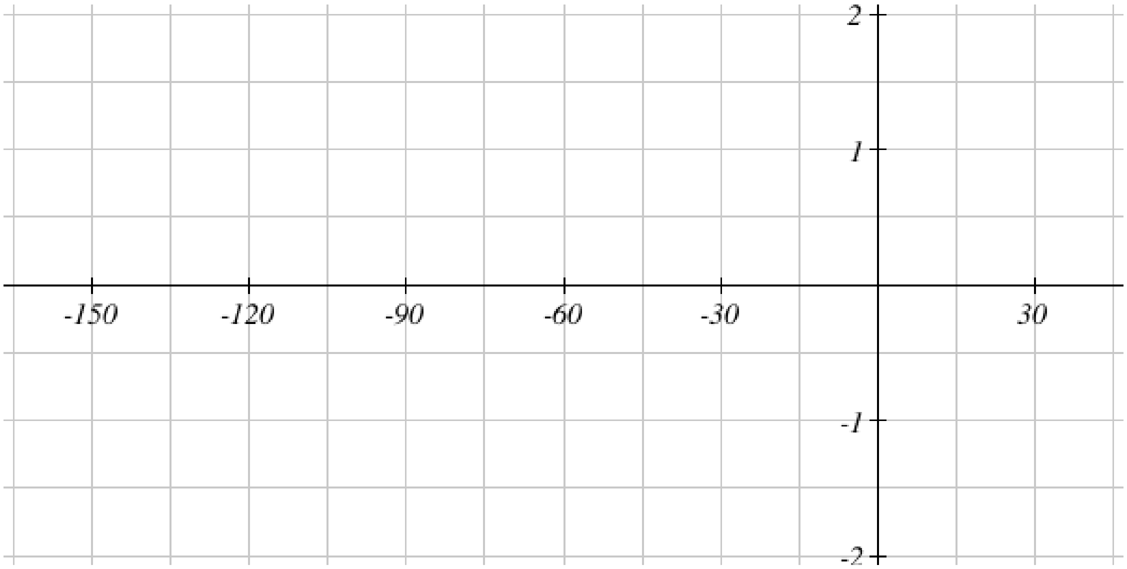
$y = -\sin(x) - 1$



14.

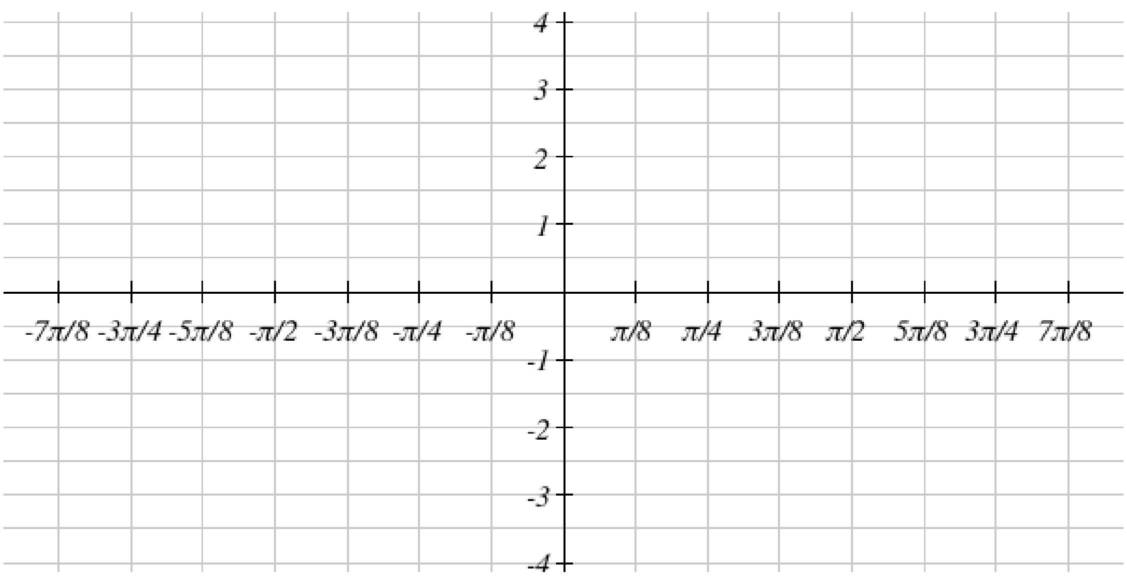
Draw the following graph on the interval $-165° < x < 45°$:

$y = \sin(2x)$



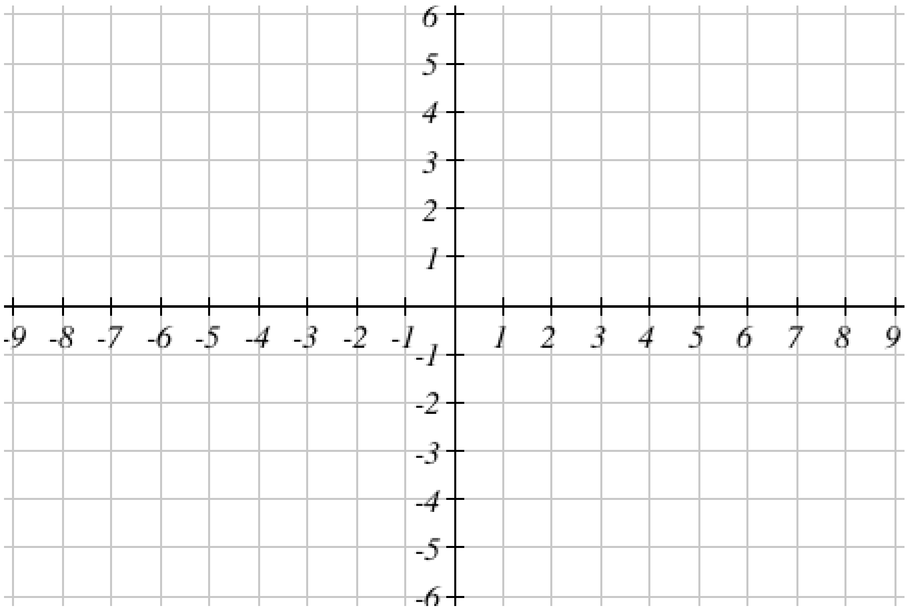
15.

Sketch a graph of the function $f(x) = -2\sin(2x)$.



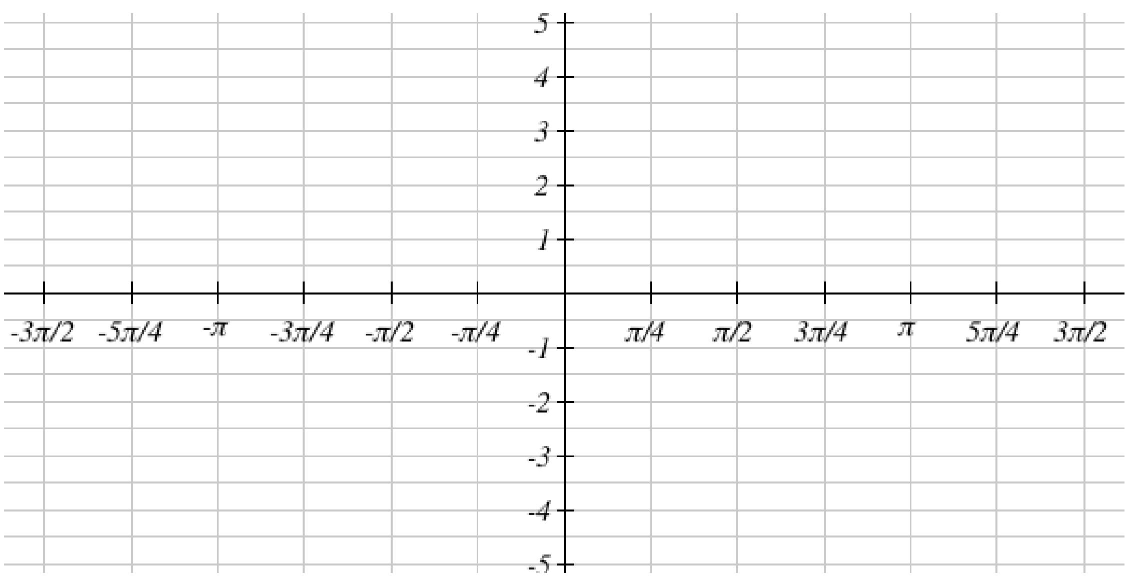
16.

Sketch a graph of the function $f(x) = 3\sin\left(\frac{\pi}{2}x\right) - 2$



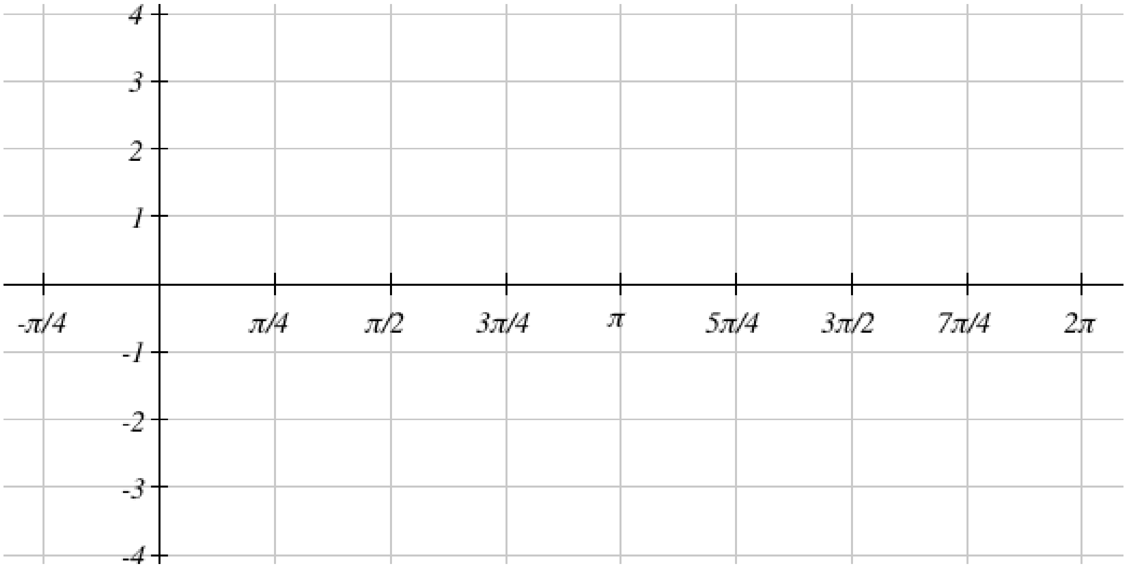
17.

Sketch a graph of the function $f(x) = -2\sin\left(x - \frac{3\pi}{4}\right) + 1$.



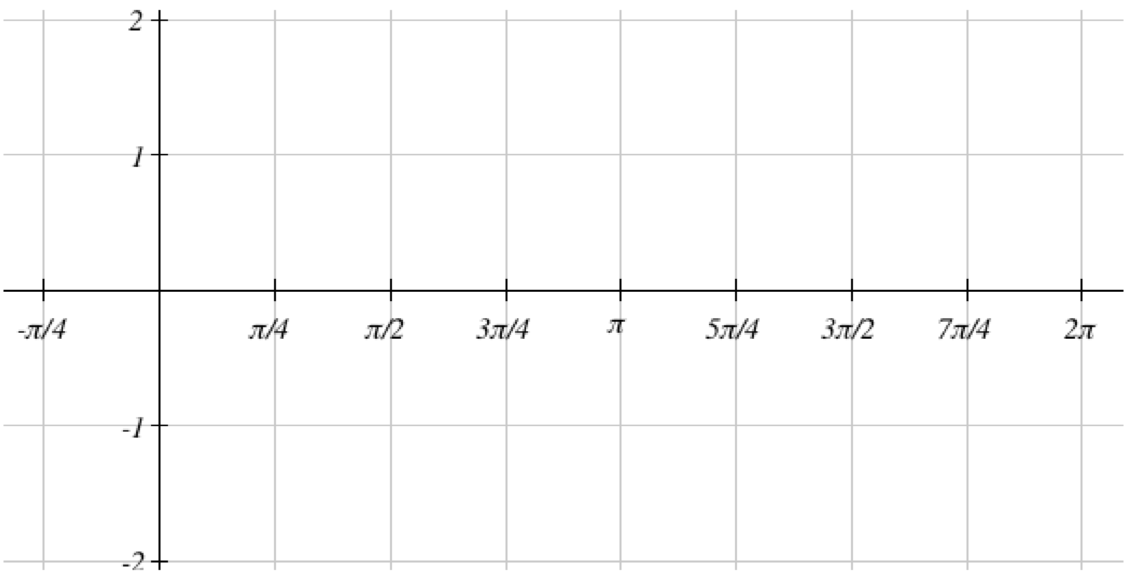
18.

Sketch a graph of the function $f(x) = \sin(x) + 1$.



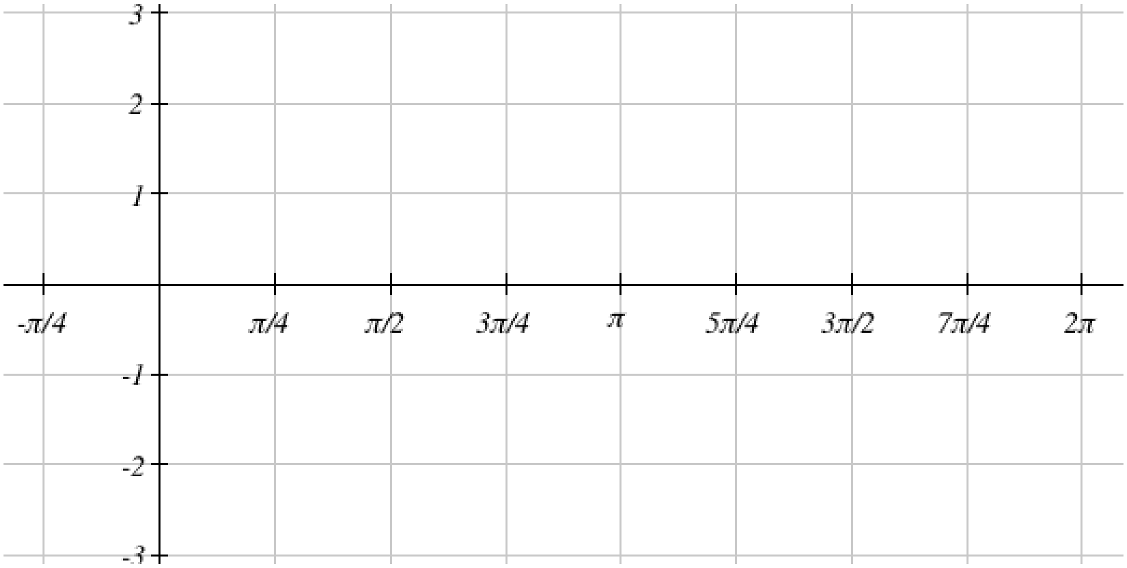
19.

Sketch a graph of the function $f(x) = \sin(x)$.



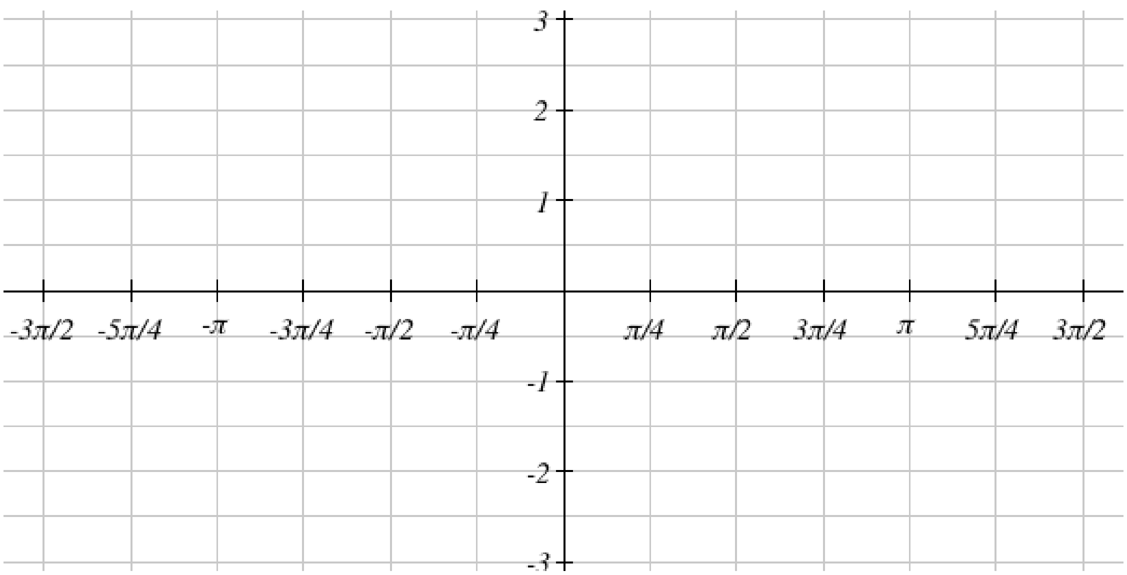
20.

Sketch a graph of the function $f(x) = -2\sin(x)$.



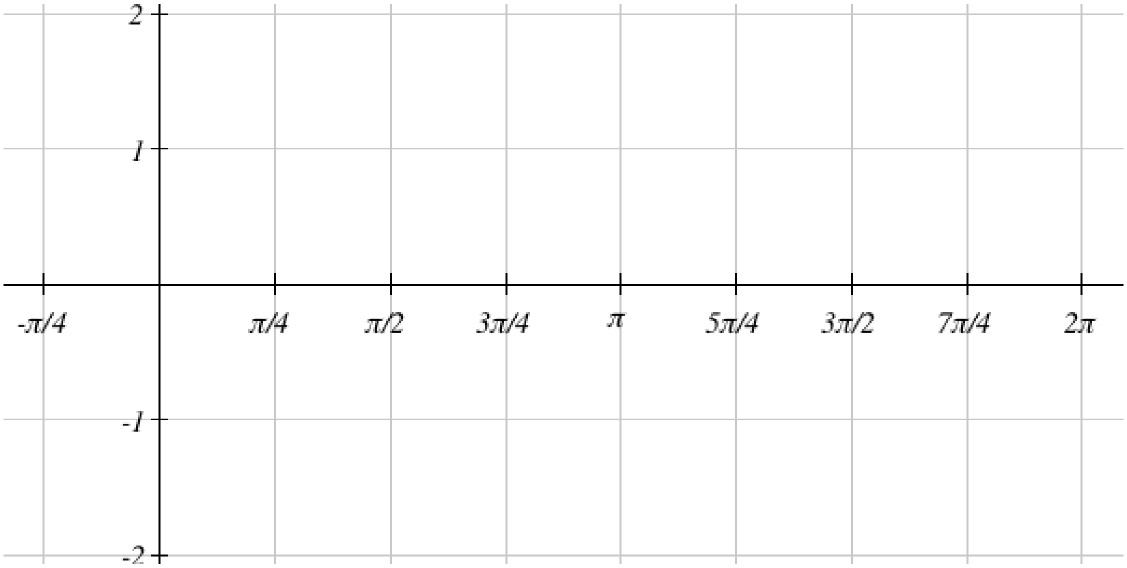
21.

Sketch a graph of the function $f(x) = \sin\left(x + \frac{3\pi}{4}\right)$.



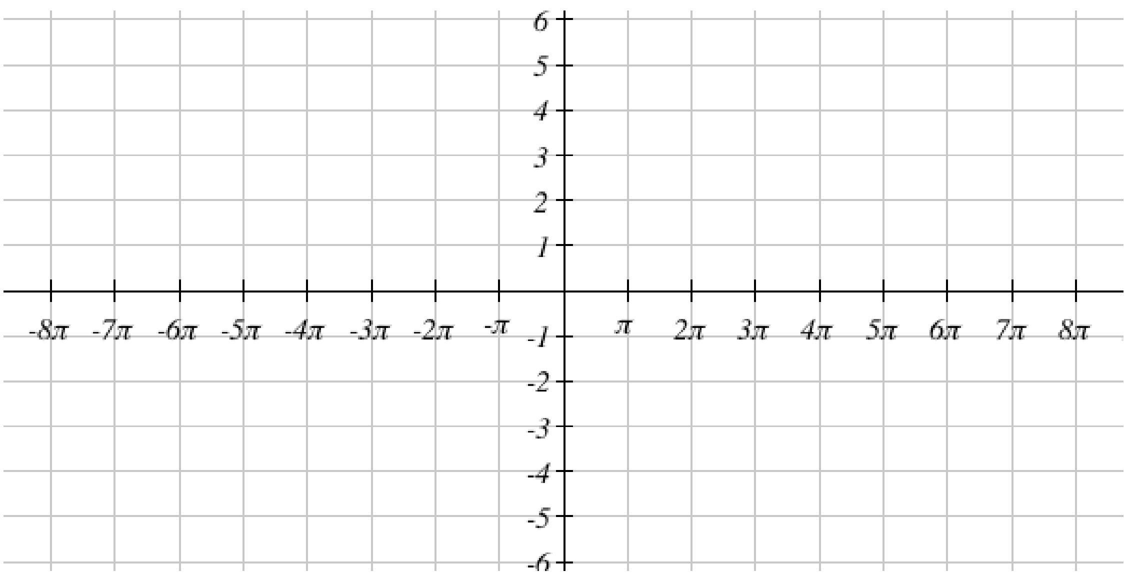
22.

Sketch a graph of the function $f(x) = \cos(x)$.



23.

Sketch a graph of the function $f(x) = -4\cos\left(\frac{2}{5}x\right) < b\frac{r}{>}$



24.

Outside temperature over a day can be modeled as a sinusoidal function. Suppose you know the temperature is 70 degrees at midnight and the high and low temperature during the day are 81 and 59 degrees, respectively. Assuming t is the number of hours since midnight, find an equation for the temperature, *D*, in terms of t.

$D(t)$ =__________

25.

A ferris wheel is 15 meters in diameter and boarded from a platform that is 4 meters above the ground. The six o'clock position on the ferris wheel is level with the loading platform. The wheel completes 1 full revolution in 4 minutes. The function *h = f(t)* gives your height in meters above the ground *t* minutes after the wheel begins to turn.

What is the Amplitude? _________ meters
What is the Midline? y =_________ meters
What is the Period? _________ minutes
How High are you off of the ground after 2 minutes? _________ meters

26.

A ferris wheel is 30 meters in diameter and boarded from a platform that is 4 meters above the ground. The six o'clock position on the ferris wheel is level with the loading platform. The wheel completes 1 full revolution in 4 minutes. The function *h = f(t)* gives your height in meters above the ground *t* minutes after the wheel begins to turn. Write an equation for *h = f(t)*.

f(t) =_________

Lecture 30

Sec/csc, tan/cot, periods, asymptotes, transformations

1.

On the interval $[0,2\pi)$ determine which angles are not in the domain of the tangent function, $f(\theta) = \tan(\theta)$

What angles are NOT in the domain of the tangent function on the given interval? _________

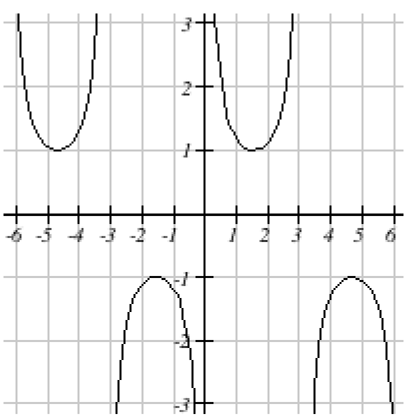
2.

On the interval $[0,2\pi)$ determine which angles are not in the domain of the given functions.

What angles are NOT in the domain of the secant function on the given interval? _________

What angles are NOT in the domain of the cosecant function on the given interval? _________

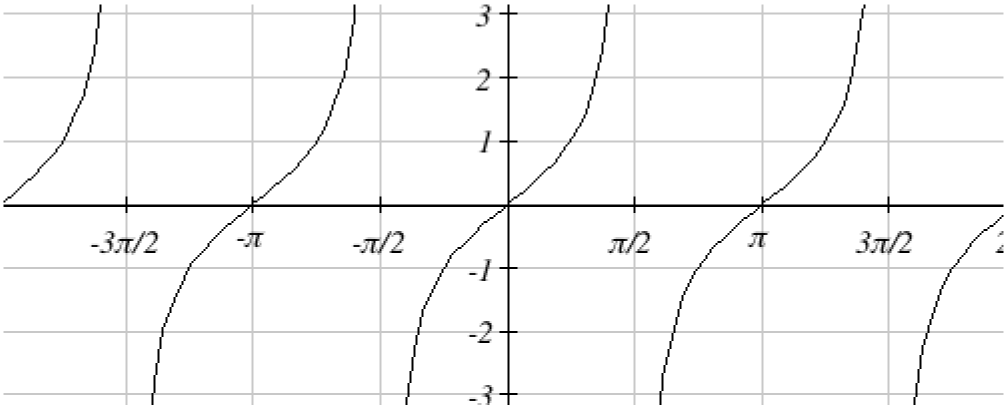
3.



The graph above is a graph of what function?

- y = sin(x)
- y = csc(x)
- y = cos(x)
- y = sec(x)
- y = tan(x)
- y = cot(x)

4.

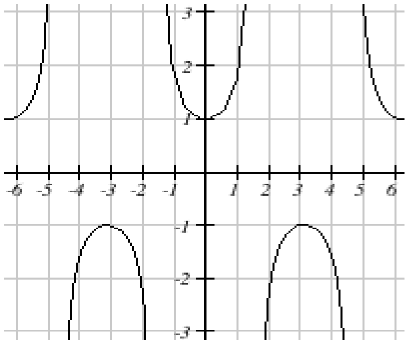
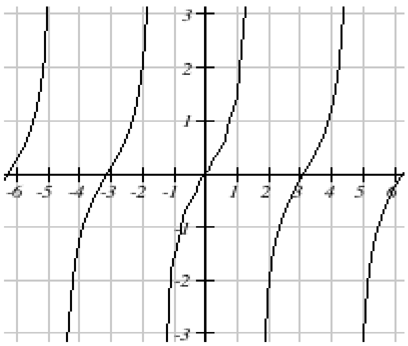
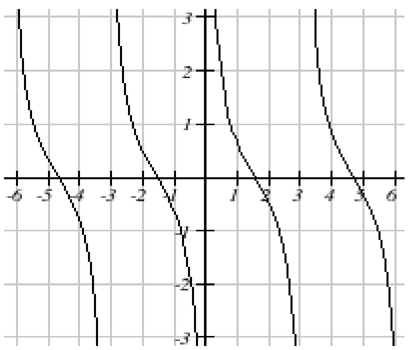
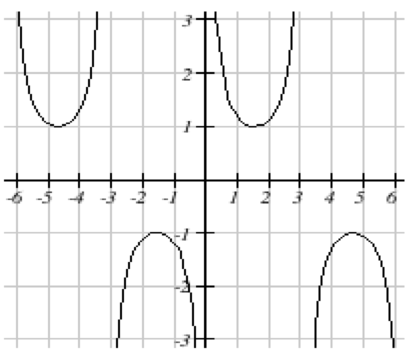


The graph above is a graph of what function?

- y = sin(x)
- y = sec(x)
- y = cot(x)
- y = cos(x)
- y = csc(x)
- y = tan(x)

5.

Match each graph with its equation. Not all equations will be used.

- 
- 
- 
- 

a. y = cot(x)
b. y = csc(x)
c. y = tan(x)
d. y = cos(x)
e. y = sec(x)
f. y = sin(x)

6.

What is the period of the graph of the function $y = \tan\left(\frac{7\pi}{5}x\right)$?
period =_________

7.

What is the period of the graph of the function $y = \csc\left(\frac{5x}{8}\right)$?
period =_________

8.

What is the period of the graph of the function $y = \sec\left(\frac{9\pi}{2}x - 7\right)$?
period =_________

9.

Given the equation $y = 6\tan(3x - 6)$

The exact period (in terms of π) is: _________

The phase shift is: _________ units to the (Left/Right)

10.

Given the equation $y = 2\sec(3x + 24)$

The exact period (in terms of π) is: _________

The phase shift is: _________ units to the (Left/Right)

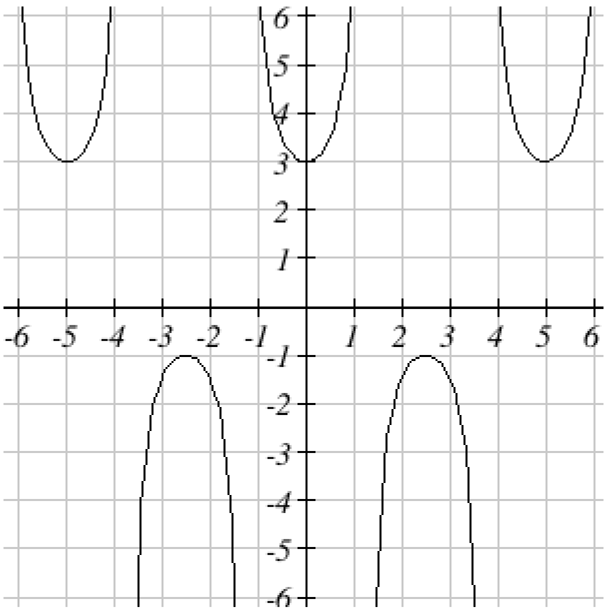
11.

Given the equation $y = 7\csc\left(\frac{2\pi}{3}x + \frac{10\pi}{3}\right)$

The exact period (give as an integer or fraction) is: _________

The horizontal shift is: _________ units to the (Left/Right)

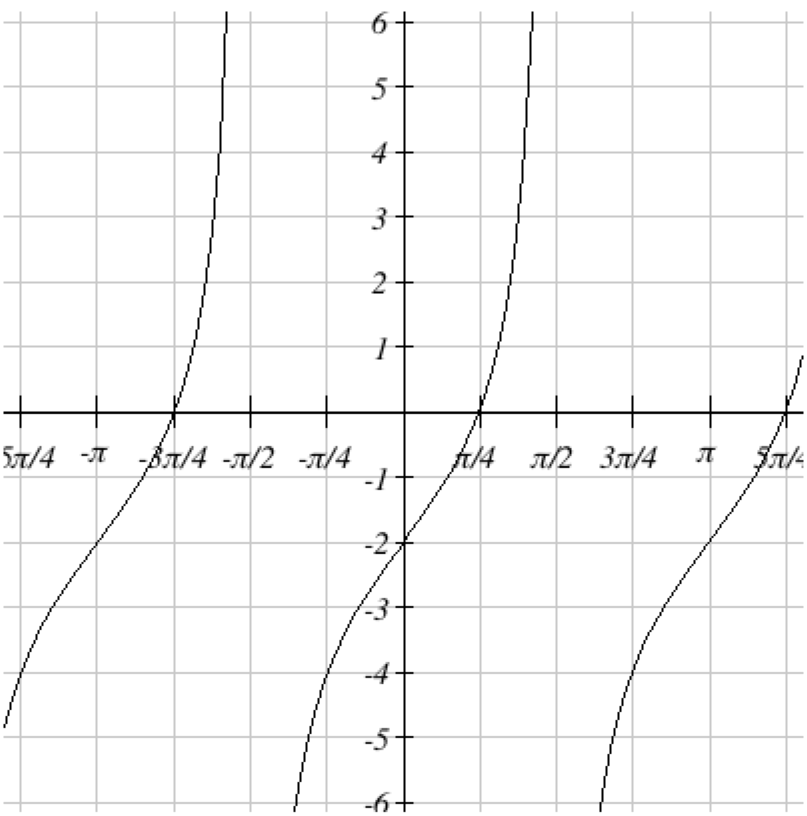
12.



Write an equation for the function graphed above. (There are multiple correct answers)

$y =$_________

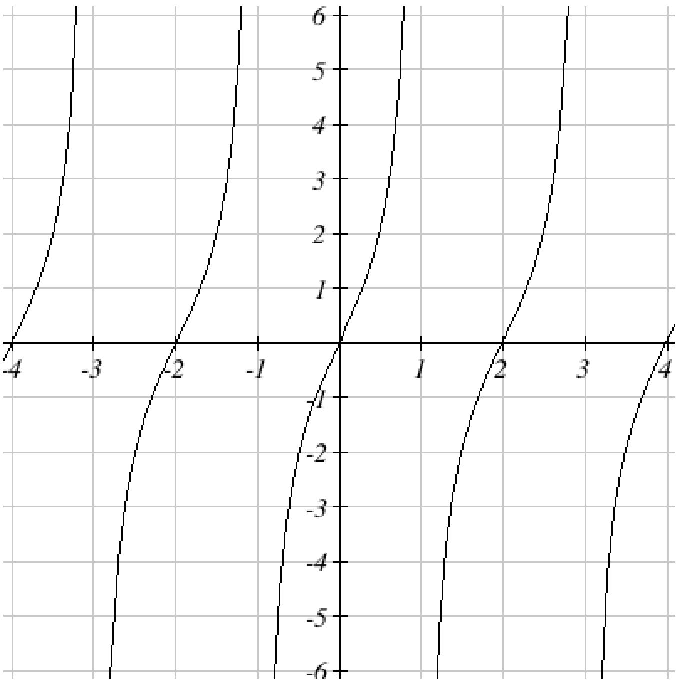
13.



Identify the function whose graph appears above. (There are multiple correct answers.)

$f(x) =$_________

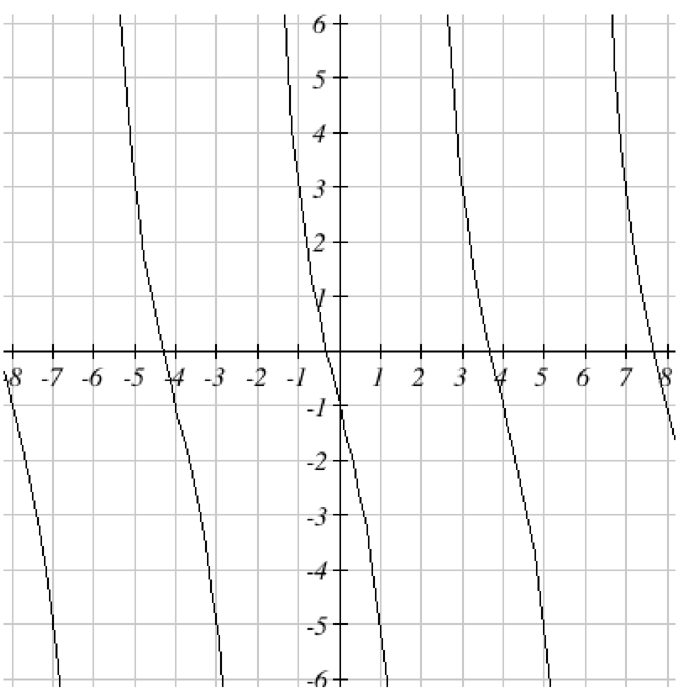
14.



Identify the function whose graph appears above. (There are multiple correct answers.)

$f(x) =$_________

15.



Give the equation for the function whose graph appears above. (There are multiple correct answers.)
$f(x) =$_________

Lecture 31

Inverse sin/cos/tan, restrictions, properties, composition, examples

1.

Evaluate the following expressions. Your answer must be an angle in radians.

(a) $\sin^{-1}(-1) =$________

(b) $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) =$________

(c) $\sin^{-1}(1) =$________

2.

Evaluate the following expressions. Your answer must be an exact angle in radians.

(a) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) =$________

(b) $\cos^{-1}\left(\frac{1}{2}\right) =$________

(c) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) =$________

3.

Evaluate the following expressions. Your answer must be an exact angle in radians.
(a) $\tan^{-1}(1) =$________

(b) $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) =$________

(c) $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) =$________

4.

Use your calculator to evaluate $\cos^{-1}(0.58)$ to at least 3 decimal places. Give the answer in radians.

5.

Suppose $\sin\theta = -\frac{1}{10}$, and θ is an angle in standard position.

Then the terminal side of θ could be in (choose all that apply):

- Quadrant 1
- Quadrant 2
- Quadrant 3
- Quadrant 4

$\arcsin\left(-\frac{1}{10}\right)$ is an angle whose terminal side is in (choose all that apply):

- Quadrant 1
- Quadrant 2
- Quadrant 3
- Quadrant 4

6.

Suppose $\cos\theta = -\frac{9}{10}$, and θ is an angle in standard position.

Then the terminal side of θ could be in (choose all that apply):

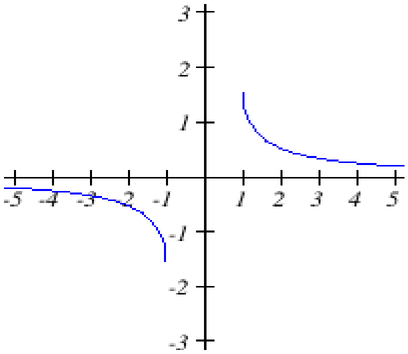
- Quadrant 1
- Quadrant 2
- Quadrant 3
- Quadrant 4

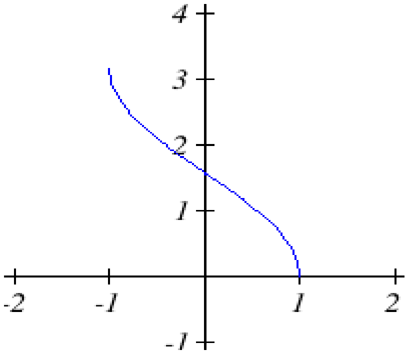
$\arccos\left(-\frac{9}{10}\right)$ is an angle whose terminal side is in (choose all that apply):

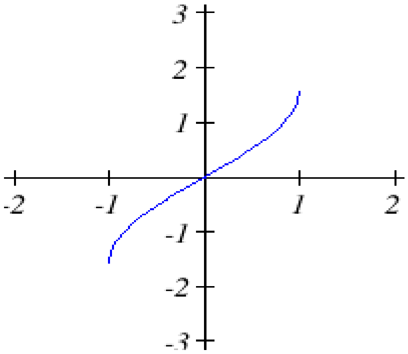
- Quadrant 1
- Quadrant 2
- Quadrant 3
- Quadrant 4

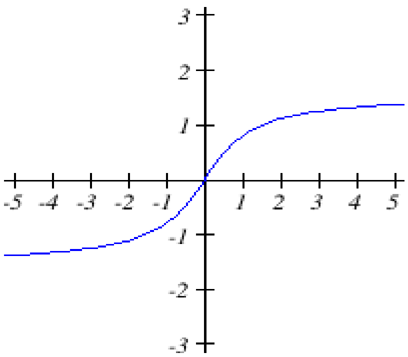
7.

Match each graph with its equation. Not all equations will be used.

- 

- 

- 

- 

a. y = arccot(x)
b. y = arccsc(x)
c. y = arcsec(x)
d. y = arcsin(x)
e. y = arccos(x)
f. y = arctan(x)

8.

Evaluate the following expression.

$\sin(\arcsin(0.6)) =$ ________

9.

Evaluate the following expression.

$\cos(\arccos(2.3)) =$ ________

10.

Evaluate the following expression.

$\arcsin\left(\sin\left(\frac{-3\pi}{7}\right)\right) =$ ________

11.

Evaluate the following expression.

$\arcsin\left(\sin\left(\frac{19\pi}{12}\right)\right) =$ ________

12.

Evaluate the following expression.

$\sin^{-1}\left(\sin\left(\frac{-7\pi}{4}\right)\right) =$ ________

13.

Find the exact value or state that it is undefined. In the latter case, enter "DNE".

$\sin^{-1}\left(\sin\left(\frac{3\pi}{4}\right)\right) =$________

14.

Find $\arcsin(\sin 230^{o})$.

$\arcsin(\sin 230^{o}) =$ ________degrees.

15.

Evaluate the following expression.

$\tan(\arctan(1.3)) =$ ________

16.

Evaluate the following expression.

$\arctan\left(\tan\left(\frac{32\pi}{9}\right)\right) =$ ________

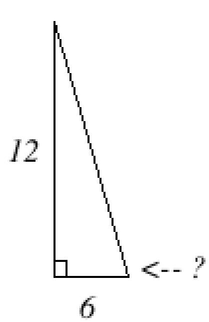
17.

Find the exact value or state that it is undefined. In the latter case, enter "DNE".

$\tan(\tan^{-1}(1)) =$________

18.

For the right triangle below, find the measure of the angle.
Figure is not to scale.



________degrees

19.

Evaluate the expression: $\cos^{-1}\left(\sin\left(\frac{\pi}{6}\right)\right)$ =________

20.

Evaluate the expression: $\sin^{-1}\left(\cos\left(\frac{7\pi}{4}\right)\right)$ =________

21.

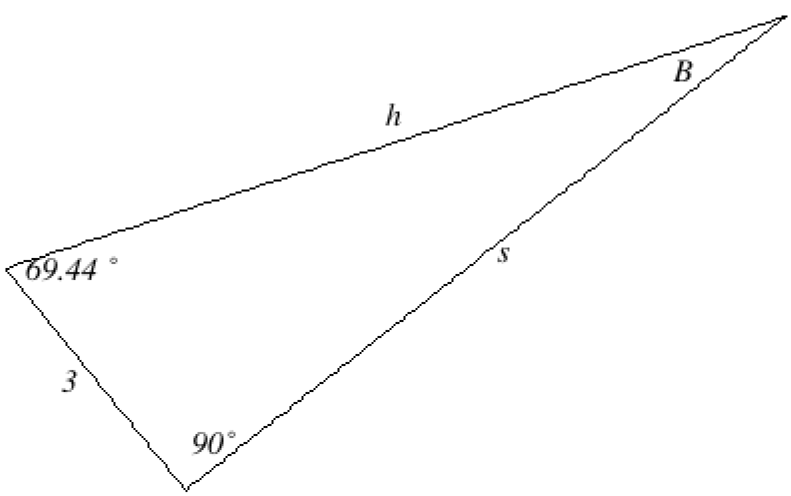
Evaluate: $\sin\left(\cos^{-1}\left(\frac{1}{3}\right)\right)$=________

22.

Find an algebraic expression for $\cos\left(\tan^{-1}\left(\frac{a}{3}\right)\right)$

23.

Find the unknowns in the graph below:



$B =$________

$h =$________

$s =$________

24.

Write the given expression in algebraic form.

$\cos\left(\tan^{-1}(y)\right) =$________

25.

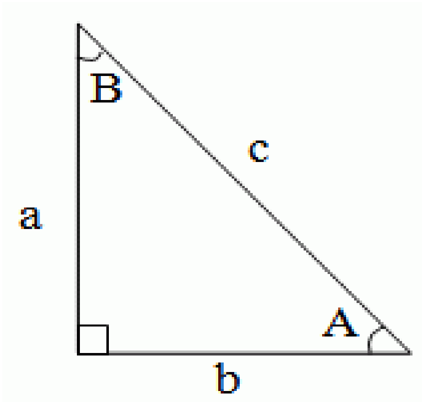
Write the given expression in algebraic form.

$\cot\left(\sin^{-1}(x)\right) =$________

Lecture 32

Solving triangles, bearing, other applications

1.



Suppose a = 8 and c = 13.

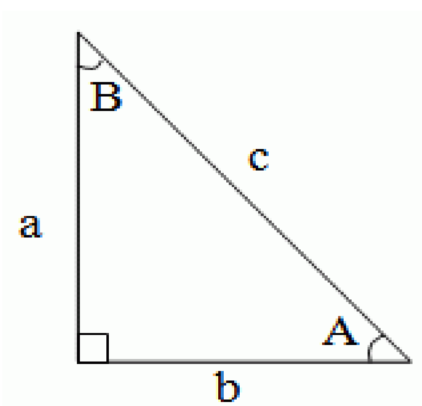
Find:

b = _________

A =_________ degrees

B =_________ degrees

2.



Suppose a = 7 and b = 2.

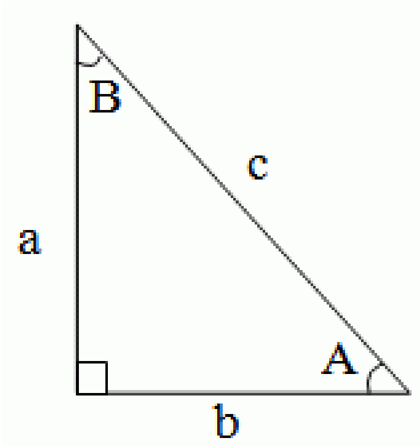
Find:

c =_________

A = _________degrees

B = _________degrees

3.



Suppose a = 5 and A = 70 degrees.

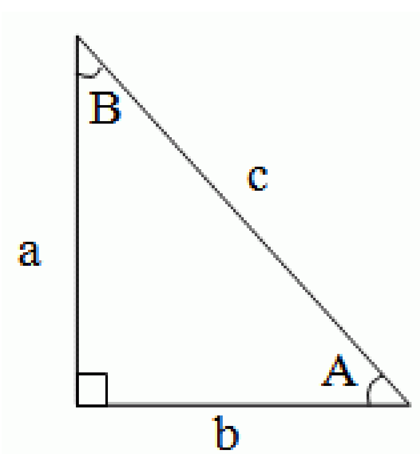
Find:

b =_________

c =_________

B = _________degrees

4.



Suppose c = 7 and A = 10 degrees. Find:

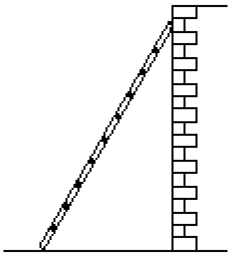
a =_________

b =_________

B =_________ degrees

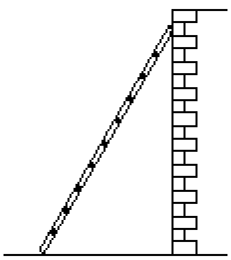
5.

The proper angle for a ladder is about 75° from the ground. Suppose you have a 12 foot ladder. How far from the house should you place the base of the ladder? _________ feet

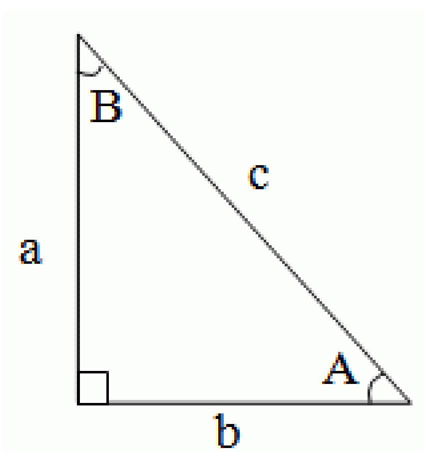


6.

The proper angle for a ladder is about 75° from the ground. Suppose you have a 13 foot ladder. How high can it reach? _________ feet



7.



Suppose $\angle A = 30°$ and $a = 22$.

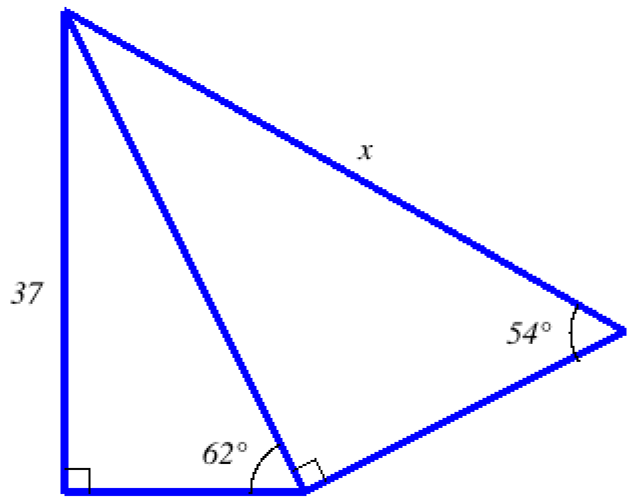
$\angle B =$ °

Find an exact value (report answer as a fraction, use `sqrt` if necessary):

$c =$_________ feet

8.

Find x correct to 2 decimal places.
NOTE: The triangle is NOT drawn to scale.



$x =$_________ feet

9.

To measure the height of the cloud cover at an airport, a worker shines a spotlight upward at an angle of 65° from the horizontal. An observer 682 m away measures the angle of elevation to the spot of light to be 41°. Find the height of the cloud cover.
height = _________ m

10.

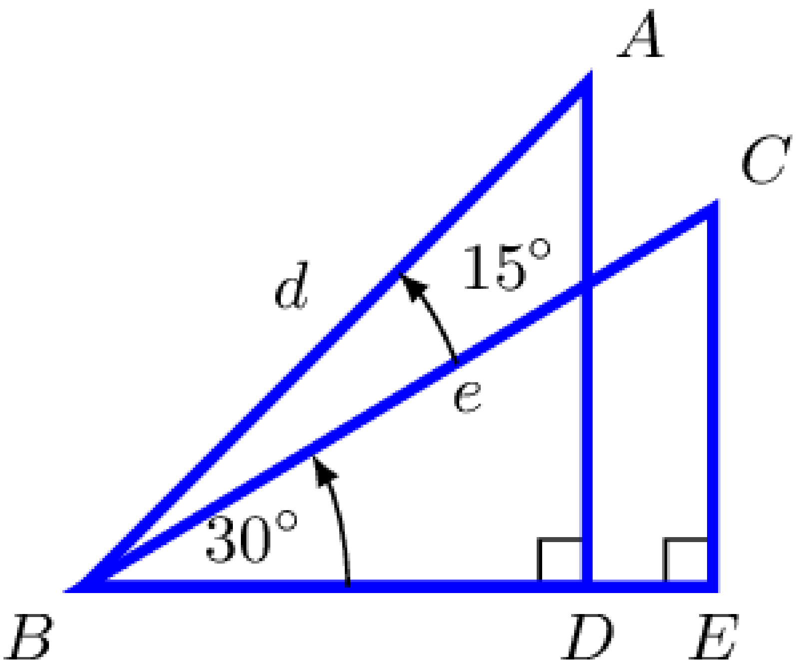
From the top of a 183-ft lighthouse, the angle of depression to a ship in the ocean is 27°. How far is the ship from the base of the lighthouse?
distance = _________feet

11.

A smokestack is 160 feet high. A guy wire must be fastened to the stack 20 feet from the top. The guy wire makes an angle of 40° with the ground. Find the length of the guy wire rounded to the nearest foot.

_________feet

12.



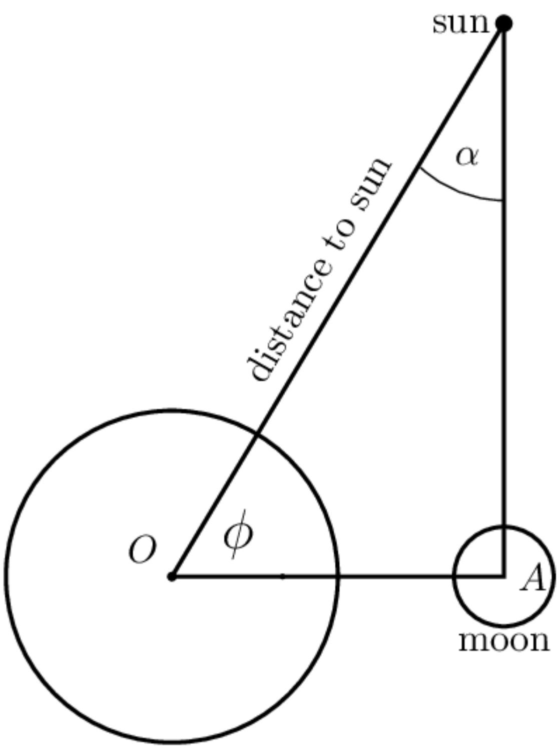
Using the special triangles, determine the exact value of segment DE. Segments d= BA and e = BC have length 2. Express your answer in simplified radical form.

DE =__________

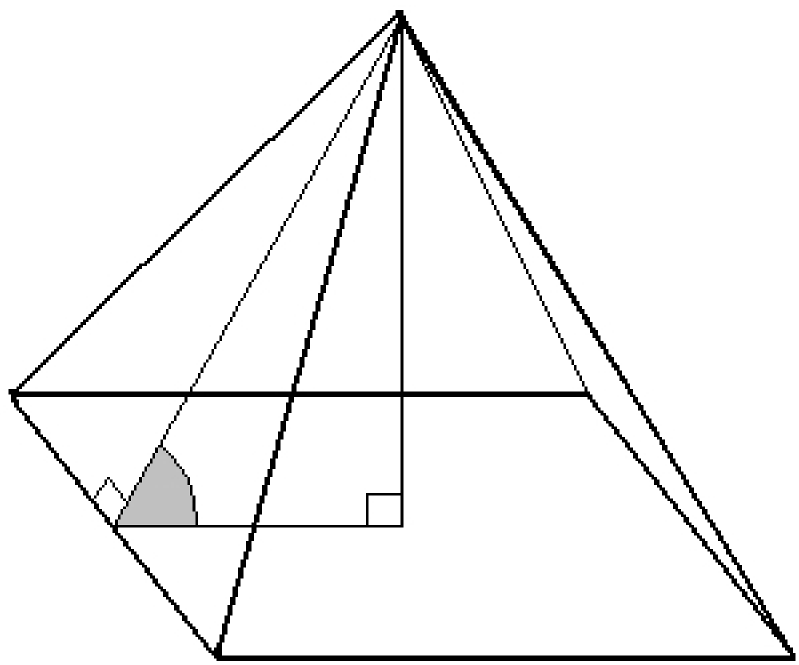
13.

An alien on a distant planet realizes that using trigonometry and the distance to one of its moons it is possible to calculate the distance to the nearby sun. Let **O** be the center of the planet and let **A** be the center of the moon. The alien begins with the premise that, during a half moon, the moon forms a right triangle with the Sun and the planet. By observing the angle between the Sun and Moon, ϕ = 89.43 degrees and knowing the distance to the moon is about 179000 km estimate the distance from the planet to the sun using these values. Round to the nearest 1000 km

distance =



14.



Consider a square-based straight pyramid. Suppose that the base is a square with sides 6 cm long, and all other edges are 7 cm long. Find an approximate value of the angle formed between the base and a triangular face. Present your answer in degrees, accurate up to four or more decimal places.

$\alpha =$ ________∘ (degrees)

15.

From a fire tower 200 feet above level ground in the Sasquatch National Forest, a ranger spots a fire off in the distance. The angle of depression to the fire is 2.7º. How far away from the base of the tower is the fire? Round to the nearest foot.

________ft

16.

From the observation deck of the lighthouse at Sasquatch Point 48 feet above the surface of Lake Ippizuti, a lifeguard spots a boat out on the lake sailing directly toward the light house. The first sighting had a angle of depression of 8.2º and the second sighting had an angle of depression of 26º. How far had the boat traveled between the sightings?

________ft

Lecture 33

Identities: Reciprocal, Quotient, Pythagorean, Even/odd, Cofunction

Simplifying, Factoring expressions, Combining using identities, Trig substitution, Simplifying log expressions

1.

Simplify $\sin(t)\sec(t)$ to a single trig function or constant.

2.

Simplify $\frac{\csc(t)}{\sec(t)}$ to a single trig function.

3.

Simplify $\frac{\cot(t)}{\csc(t)-\sin(t)}$ to a single trig function.

4.

Simplify $\frac{1+\csc(t)}{1+\sin(t)}$ to a single trig function.

5.

Simplify $\frac{\cos^2(t)}{1-\cos^2(t)}$ to an expression involving a single trig function with no fractions.

6.

Fill in the blanks:

1. If $\tan x = -3$ then $\tan(-x)$ =_________

2. If $\sin x = 0.1$ then $\sin(-x)$ =_________

3. If $\cos x = 0.7$ then $\cos(-x)$ =_________

4. If $\tan x = -3.5$ then $\tan(\pi + x)$ =_________

7.

Simplify to an expression involving a single trigonometric function with no fractions.

$\cot(-x)\cos(-x) + \sin(-x)$=________

8.

Simplify and write the trigonometric expression in terms of sine and cosine:
$\tan^2 x - \sec^2 x =$ ________.

9.

Determine the value of $\sin^2 x + \cos^2 x$ for x = 50 degrees.

10.

Simplify and write the trigonometric expression in terms of sine and cosine:

$$\cot(-x)\cos(-x) + \sin(-x) = -\frac{1}{f(x)}$$

$f(x) =$ ________.

11.

If $\tan^2 t - \sin^2 t = \frac{\sin^a t}{\cos^b t}$, then
the positive power $a =$ ________,
the positive power $b =$ ________.

12.

Simplify and write the trigonometric expression in terms of sine and cosine:

$$\frac{2 + \tan^2 x}{\sec^2 x} - 1 = g(x)$$

$g(x) =$ ________.

13.

Simplify $\frac{1+\csc(t)}{1+\sin(t)}$ to a single trig function.

14.

Simplify and write the trigonometric expression without any fractions:

$\tan u + \cot u$ =________

15.

Factor: $2\sin^2(x) - 3\sin(x) + 1$=________

16.

Factor: $2\sin^2(x) - \sin(x) - 1$=________

17.

Suppose that α is an acute angle with $\tan\alpha = \frac{11}{10}$. Compute the exact value of $\sec\alpha$. You do not have to rationalize the denominator.

$\sec\alpha$ =________

18.

Use a substitution $x = f(t)$ to re-express $\sqrt{49 - x^2}$ as a trigonometric expression in terms of t . State the function $f(t)$ used for substitution and the new expression.

$f(t) =$________

$\sqrt{49 - x^2}$ can be rewritten as ________

19.

Use a substitution $x = f(t)$ to re-express $\sqrt{x^2 + 4}$ as a trigonometric expression in terms of t . State the function $f(t)$ used for substitution and the new expression.

$f(t) =$________

$\sqrt{x^2 + 4}$ can be rewritten as ________

20.

Use a substitution $x = f(t)$ to re-express $\sqrt{x^2 - 25}$ as a trigonometric expression in terms of t . State the function $f(t)$ used for substitution and the new expression.

$f(t) =$________

$\sqrt{x^2 - 25}$ can be rewritten as ________

Lecture 34

Linear, quadratic, multiple angle, and using inverse trig functions

1.

Find all solutions to $2\sin(\theta) = 1$ on the interval $0 \leq \theta < 2\pi$

θ = _________

Give your answers as exact values, as a list separated by commas.

2.

Find all solutions to $2\sin(\theta) = \sqrt{2}$ on the interval $0 \leq \theta < 2\pi$

θ =_________

Give your solutions as exact values, separating multiple solutions by commas.

3.

Find all solutions to $2\sin(\theta) = -\sqrt{2}$ on the interval $0 \leq \theta < 2\pi$.

θ =_________

Give your answers as exact values in a list separated by commas.

4.

Find all solutions to $2\cos(\theta) = \sqrt{3}$ on the interval $0 \leq \theta < 2\pi$.

θ =_________

Give your answers as exact values in a list separated by commas.

5.

Solve $\sin(x) = 0.42$ on $0 \leq x < 2\pi$.

There are two solutions, A and B, with A < B.

A =_________

B =_________

Give your answers accurate to 3 decimal places.

6.

Solve $\cos(x) = 0.31$ on $0 \leq x < 2\pi$.

There are two solutions, A and B, with A < B.

A =_________

B =_________

Give your answers accurate to 3 decimal places.

7.

Find all solutions of the equation $2\cos x - 1 = 0$.

_________$+2k\pi$ where k is any integer

8.

Solve $5\cos(w) = 0$ for all solutions.

w = _________where k is any integer

9.

Solve $2\sin(x) = 2$ for all solutions.

x =_________ where k is any integer

10.

Without using a calculator, find all the solutions of

$\tan(t) = 1$

$t =$ ________ where $-\pi < t \leq \pi$.

11.

Find the exact solutions to $\sin(x) = \cos(x)$ in the interval $[0,2\pi)$. If the equation has no solutions, answer DNE.

12.

Solve $2\sin^2(t) + 3\sin(t) + 1 = 0$ for all solutions $0 \leq t < 2\pi$.

$t =$ ________

Give your answers as exact values in a list separated by commas.

13.

Solve $2\cos^2(w) + 3\cos(w) + 1 = 0$ for all solutions.

$w =$ ________ $+2k\pi$ where k is any integer

Give your answers as exact values in a list separated by commas.

14.

Solve $2\cos^2(x) - 7\cos(x) + 5 = 0$ for all solutions.

$x =$ ________ where k is any integer

15.

Find all solutions of $\sin^2(x) - 4\cos(x) = 4$.

$x =$ ________ where n is any integer

16.

Find all solutions of $\sin^2(x) - 8\cos(x) = -8$.

$x =$________ where n is any integer.

17.

Find all solutions on the interval $[0,2\pi)$. Give exact answers.

$\sin^2(x) - \cos^2(x) + \sin(x) = 0$

$x =$________

18.

Solve for the exact solutions in the interval $[0,2\pi)$. If the equation has no solutions, respond with DNE.

$\sec(x) = 2\csc(x)$

$x =$________

19.

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20.

Suppose $\sin 3x = -\frac{\sqrt{3}}{2}$.

Find all solutions $0 \leq x \leq 2\pi$. Give exact values in radians.

$x =$________

21.

Find all solutions in the interval $[0, 360°)$. List your answers in degrees. If there is no real solution, answer DNE.

$\tan 3x = 0$

$x =$_________

22.

Find all solutions in the interval $[0, 360°)$. List your answers in degrees. If there is no real solution, answer DNE.

$\sin 2x = -\frac{1}{2}$

$x =$_________

Lecture 35

Conditional vs identity equations, guidelines for verifying

1.

If $(\tan x + \sec x)^2 = \frac{A+\sin x}{B-\sin x}$, then
$A =$ _________,
$B =$ _________.

2.

The expression $3\tan(x)\sin(x) + 5\sec(x)$ simplifies to $A\sec(x) - B\cos(x)$, determine A and B .

$A =$_________ $B =$_________

3.

$\tan(x) + \sec(x)$ simplifies to $\frac{f(x)}{\cos(x)}$ where

$f(x) =$_________

4.

Simplify $\frac{1+\cos(t)}{1+\sec(t)}$ to a single trig function.

5.

Simplify $\frac{\sin^2(t)+\cos^2(t)}{\sin^2(t)}$ to an expression involving a single trig function with no fractions.

6.

Simplify and write the trigonometric expression in terms of sine and cosine:
$\frac{1+\cos y}{1+\sec y} =$ _________.

7.

Simplify the lefthandside so that $LHS = RHS$:

$$-\frac{\cos(x)}{1-\sin(x)}+\frac{\cos(x)}{1+\sin(x)}=-2\tan(x)$$

________=

________ =

________ =

________ =

________$= -2\tan(x)$

8.

Simplify the lefthandside so that $LHS = RHS$:

$$\left(\frac{1}{\tan(y)}+\frac{1}{\sin(y)}\right)^2=\frac{1+\cos(y)}{1-\cos(y)}$$

________=

________=

________=

________=

________$=\frac{1+\cos(y)}{1-\cos(y)}$

9.

Prove the given identity.

$$\frac{1}{1-\sin x}-\frac{1}{1+\sin x}=2\tan x\sec x$$

10.

Prove the given identity.

$$\frac{1+\tan^2 x}{1-\tan^2 x}=\frac{1}{\cos^2 x-\sin^2 x}$$

11.

Prove the given identity.

$$\frac{\tan x+\tan y}{\cot x+\cot y}=\tan x\tan y$$

12.

Prove the given identity.

$$\tan^2 x-\sin^2 x=\tan^2 x\sin^2 x$$