WebAssign
3.3 Funciones Trigonometricas (Homework)

David Corzo
Diferencial, section B, Spring 2019
Instructor: Christiaan Ketelaar

Current Score : 57.5 / 50 **Due :** Friday, March 15, 2019 11:59 PM CST**Last Saved : n/a Saving... ()**

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension

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1. 1/1 points | Previous AnswersSPreCalc6 5.1.001.

(
$$0,0

(a) The unit circle is the circle centered at ✓ $\boxed{0, 0}$) with radius $\boxed{1}$ ✓ 1 .

(b) The equation of the unit circle is
$$x2+y2=1

✓ $\boxed{x^2 + y^2 = 1}$.

(c) Suppose the point *P*(*x*, *y*) is on the unit circle. Find the missing coordinate.

(i) *P*(1, $\boxed{0}$ ✓ 0)

(ii) *P*($\boxed{0}$ ✓ 0 , 1)

(iii) *P*(−1, $\boxed{0}$ ✓ 0)

(iv) *P*($\boxed{0}$ ✓ 0 , −1)

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2. 1/1 points | Previous AnswersSPreCalc6 5.1.009.

Find the missing coordinate of *P*, using the fact that *P* lies on the unit circle in the given quadrant.

Coordinates	Quadrant
P$\left(-\frac{12}{13},\right.$ $$−513 ✓ $\boxed{-\frac{5}{13}}$)	III

3. 1/1 points | Previous AnswersSPreCalc6 5.1.006.

Show that the point is on the unit circle.

$$\left(-\frac{5}{7}, -\frac{2\sqrt{6}}{7}\right)$$

We need to show that the point satisfies the equation of the unit circle, that is, $x^2 + y^2 =$ 1 ✓ 1 .

$$x^2 + y^2 = \left(\boxed{-5/7}\ \checkmark\ -5/7\right)^2 + \left(-\frac{2\sqrt{6}}{7}\right)^2$$

$$= \boxed{25/49}\ \checkmark\ 25/49 + \frac{24}{49}$$

$$= \boxed{1}\ \checkmark\ 1$$

Hence, the point is ✓ is on the unit circle.

4. 1/1 points | Previous AnswersSPreCalc6 5.1.013.

Find the missing coordinate of P, using the fact that P lies on the unit circle in the given quadrant.

Coordinates	Quadrant
$P\left(\right.$ $$3√57 ✓ $\boxed{\frac{3\sqrt{5}}{7}}, -\frac{2}{7}\Big)$	IV

5. 1/1 points | Previous AnswersSPreCalc6 5.1.028.

Find the terminal point $P(x, y)$ on the unit circle determined by the given value of t.

$$t = \frac{5\pi}{3}$$

$P(x, y) = \Big($

$$12,−√32

✓ $\boxed{\frac{1}{2}, -\frac{\sqrt{3}}{2}}\Big)$

6. 1/1 points | Previous AnswersSPreCalc6 5.1.032.

Find the terminal point $P(x, y)$ on the unit circle determined by the given value of t.

$$t = \frac{11\pi}{6}$$

$P(x, y) = \Big($

$$√32,−12

✓ $\boxed{\frac{\sqrt{3}}{2}, -\frac{1}{2}}\Big)$

7. 1.5/1.5 points | Previous AnswersSPreCalc6 5.2.001.

Let $P(x, y)$ be the terminal point on the unit circle determined by t. Then sin t =
$$y

$\boxed{y}$, cos t =
$$x

$\boxed{x}$, and tan t =
$$yx

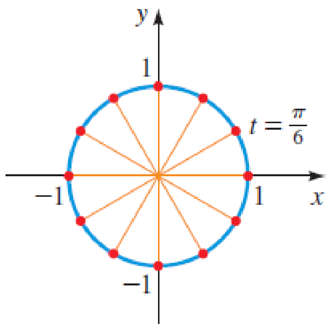
$\boxed{\frac{y}{x}}$.

8. 1/1 points | Previous AnswersSPreCalc6 5.2.002.

If $P(x, y)$ is on the unit circle, then $x^2 + y^2 = \boxed{1}$ 1 . So for all t we have $\sin^2 t + \cos^2 t = \boxed{1}$ 1 .

9. 1.5/1.5 points | Previous Answers SPreCalc6 5.2.004.

Find sin t and cos t for the values of t whose terminal points are shown on the unit circle in the figure. t increases in increments of $\pi/6$.



t	sin t	cos t
0	$$0 0	$$1 1
$\frac{\pi}{6}$	$$12 $\frac{1}{2}$	$$√32 $\frac{\sqrt{3}}{2}$
$\frac{\pi}{3}$	$$√32 $\frac{\sqrt{3}}{2}$	$$12 $\frac{1}{2}$
$\frac{\pi}{2}$	$$1 1	$$0 0
$\frac{2\pi}{3}$	$$√32 $\frac{\sqrt{3}}{2}$	$$−12 $-\frac{1}{2}$
$\frac{5\pi}{6}$	$$12 $\frac{1}{2}$	$$−√32 $-\frac{\sqrt{3}}{2}$
π	$$0 0	$$−1 -1
$\frac{7\pi}{6}$	$$−12 $-\frac{1}{2}$	$$−√32 $-\frac{\sqrt{3}}{2}$
	$$−√32	$$−12

$\frac{4\pi}{3}$	$\boxed{-\frac{\sqrt{3}}{2}}$	$\boxed{-\frac{1}{2}}$
$\frac{3\pi}{2}$	$$−1 $\boxed{-1}$	$$0 $\boxed{0}$
$\frac{5\pi}{3}$	$$−√32 $\boxed{-\frac{\sqrt{3}}{2}}$	$$12 $\boxed{\frac{1}{2}}$
$\frac{11\pi}{6}$	$$−12 $\boxed{-\frac{1}{2}}$	$$√32 $\boxed{\frac{\sqrt{3}}{2}}$

10.1.5/1.5 points | Previous AnswersSPreCalc6 5.2.005.

Find the exact value of the trigonometric function at the given real number.

(a) $\sin \frac{2\pi}{3}$

$$√32

$\boxed{\frac{\sqrt{3}}{2}}$

(b) $\cos \frac{2\pi}{3}$

$$−12

$\boxed{-\frac{1}{2}}$

(c) $\tan \frac{2\pi}{3}$

$$−√3

$\boxed{-\sqrt{3}}$

11.1.5/1.5 points | Previous AnswersSPreCalc6 5.2.010.

Find the exact value of the trigonometric function at the given real number.

(a) $\sin \frac{3\pi}{4}$

$$\sqrt{2}2

$\boxed{\frac{\sqrt{2}}{2}}$

(b) $\sin \frac{7\pi}{4}$

$$-\sqrt{2}2

$\boxed{-\frac{\sqrt{2}}{2}}$

(c) $\sin \frac{9\pi}{4}$

$$\sqrt{2}2

$\boxed{\frac{\sqrt{2}}{2}}$

12.1.5/1.5 points | Previous AnswersSPreCalc6 5.2.011.

Find the exact value of the trigonometric function at the given real number.

(a) $\sin \frac{13\pi}{6}$

$$12

$\boxed{\frac{1}{2}}$

(b) $\csc \frac{13\pi}{6}$

$$2

$\boxed{2}$

(c) $\cot \frac{13\pi}{6}$

$$\sqrt{3}

$\boxed{\sqrt{3}}$

13. 1.5/1.5 points | Previous Answers SPreCalc6 5.2.019.

Find the exact value of the trigonometric function at the given real number.

(a) $\cos\left(-\frac{\pi}{4}\right)$

$$√22

$\boxed{\frac{\sqrt{2}}{2}}$

(b) $\csc\left(-\frac{\pi}{4}\right)$

$$−2√2

$\boxed{-\sqrt{2}}$

(c) $\cot\left(-\frac{\pi}{4}\right)$

$$−1

$\boxed{-1}$

14. 1.5/0 points | Previous Answers SPreCalc6 5.2.024.

Find the exact value of the trigonometric function at the given real number.

(a) $\sin \frac{25\pi}{2}$

$$1

$\boxed{1}$

(b) $\cos \frac{25\pi}{2}$

$$0

$\boxed{0}$

(c) $\cot \frac{25\pi}{2}$

$$0

$\boxed{0}$

15.1.5/1.5 points | Previous AnswersSPreCalc6 5.2.029.

The terminal point $P(x, y)$ determined by a real number t is given. Find $\sin t$, $\cos t$, and $\tan t$.

$\left(\frac{4}{5}, \frac{3}{5}\right)$

$$35

$\sin t =$ $\boxed{\frac{3}{5}}$

$$45

$\cos t =$ $\boxed{\frac{4}{5}}$

$$34

$\tan t =$ $\boxed{\frac{3}{4}}$

16.1/1 points | Previous AnswersSPreCalc6 5.2.047.

Find the sign of the expression if the terminal point determined by t is in the given quadrant.

$\sin t \cos t$, Quadrant IV

- positive
- (selected) negative

17.1/1 points | Previous AnswersSPreCalc6 5.2.048.

Find the sign of the expression if the terminal point determined by t is in the given quadrant.

$\tan t \sec t$, Quadrant II

- (selected) positive
- negative

18.1/1 points | Previous AnswersSPreCalc6 5.2.052.

From the information given, find the quadrant in which the terminal point determined by t lies.

$\tan t > 0$ and $\sin t < 0$

- I
- II
- (selected) III
- IV

19. 2/0 points | Previous Answers SPreCalc6 5.2.056.

Write the first expression in terms of the second if the terminal point determined by t is in the given quadrant.

cos t, sin t; Quadrant IV

cos t =
$$√1−sin2(t)

$\sqrt{1-\sin^2(t)}$

20. 1/1 points | Previous Answers SPreCalc6 5.2.075.

Determine whether the function is even, odd, or neither.

$f(x) = \sin x \cos x$

- even
- odd
- neither

21. 1/1 points | Previous Answers SPreCalc6 5.2.078.MI.

Determine whether the function is even, odd, or neither.

$f(x) = x \sin^7 x$

- even
- odd
- neither

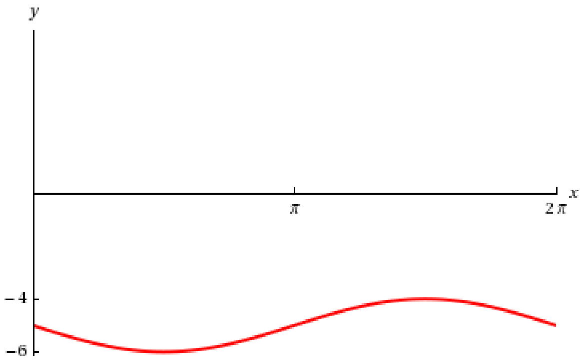
Solution or Explanation

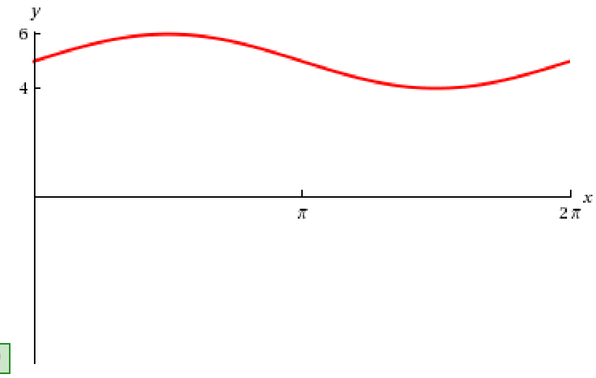
$f(-x) = -x \sin^7(-x) = -x[\sin(-x)]^7 = -x(-\sin x)^7 = x \sin^7 x = f(x)$, so f is even.

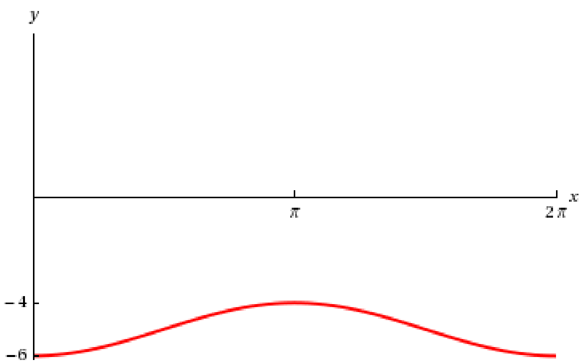
22. 1/1 points | Previous Answers SPreCalc6 5.3.004.MI.

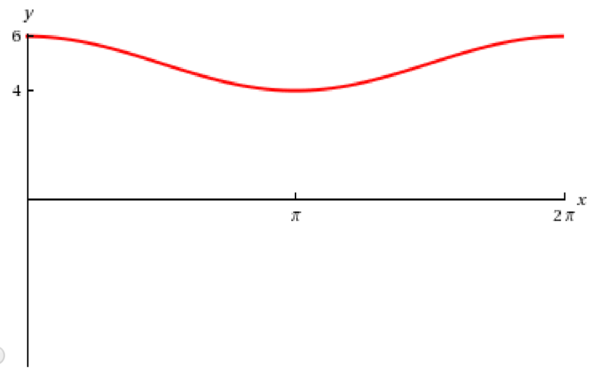
Graph the function.

$f(x) = 5 + \sin x$



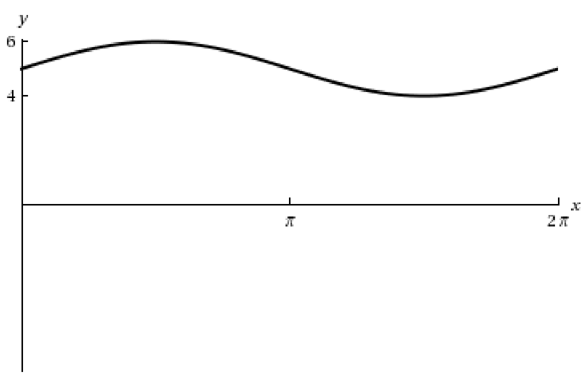






Solution or Explanation

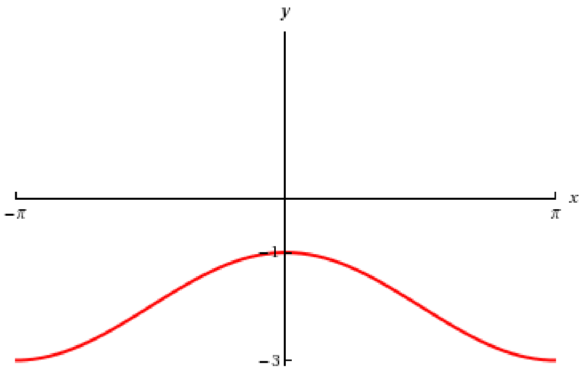
$f(x) = 5 + \sin x$

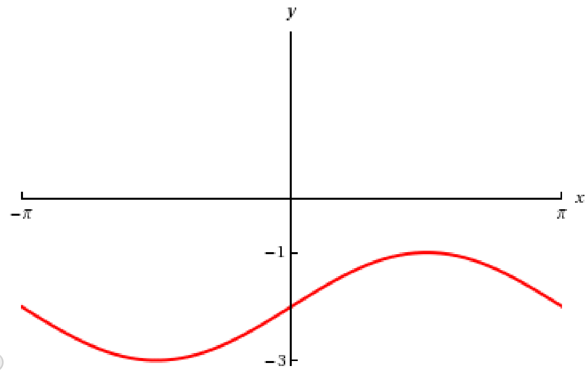


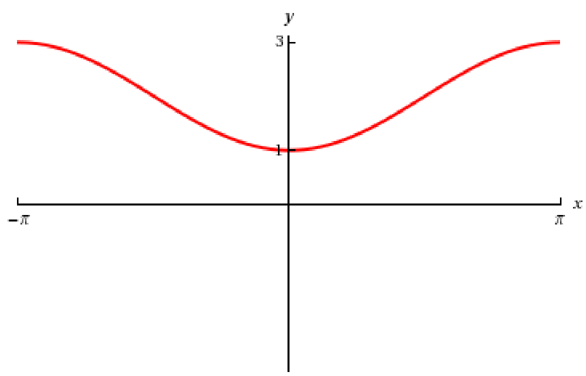
23. 1/1 points | Previous Answers SPreCalc6 5.3.006.

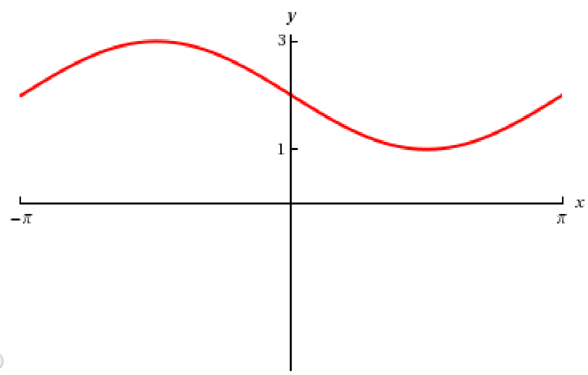
Graph the function.

$f(x) = 2 - \cos x$





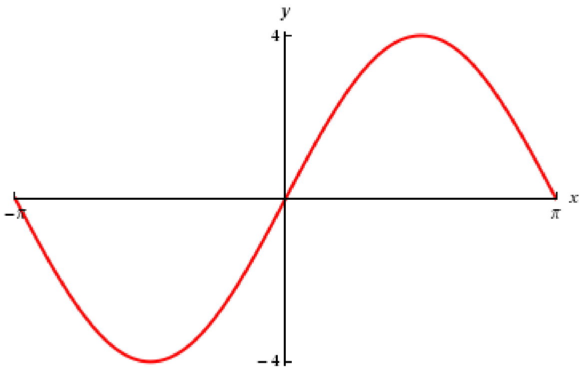


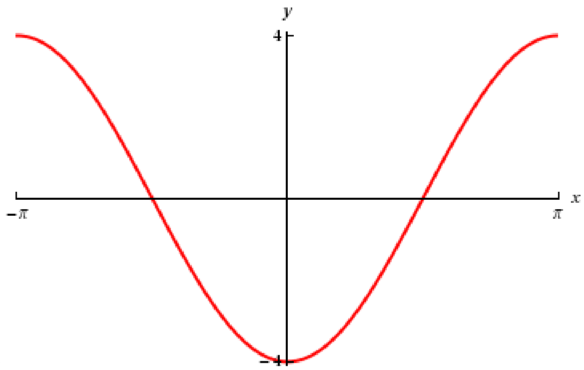


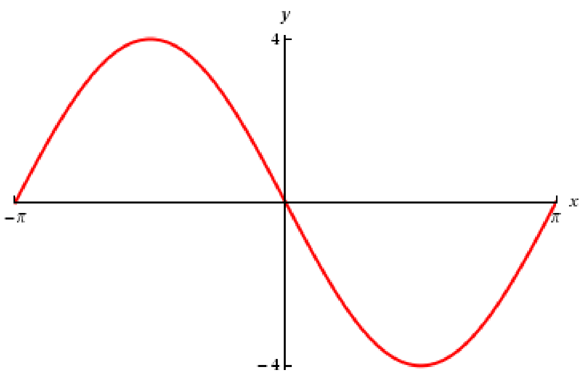
24.1/1 points | Previous AnswersSPreCalc6 5.3.009.

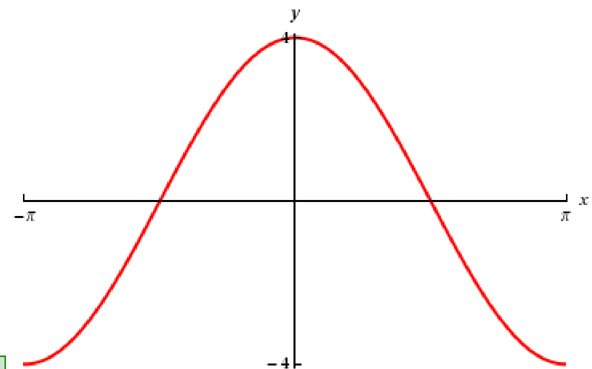
Graph the function.

$g(x) = 4 \cos x$





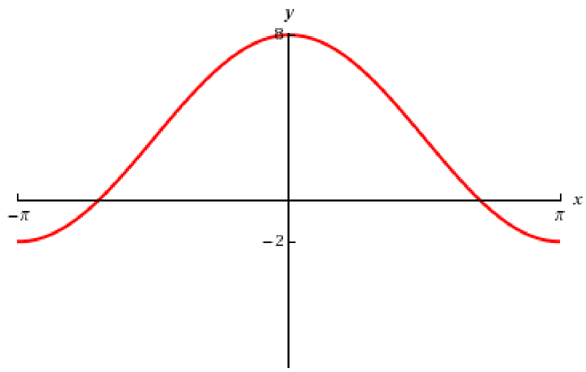


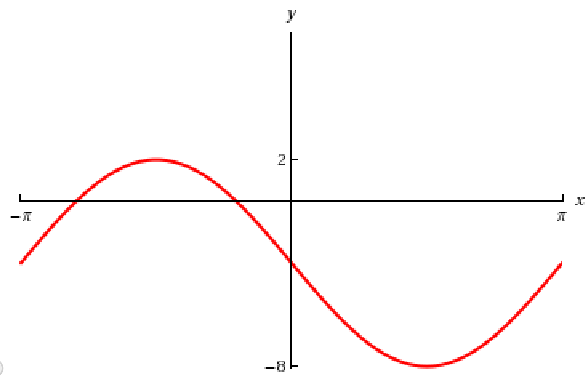


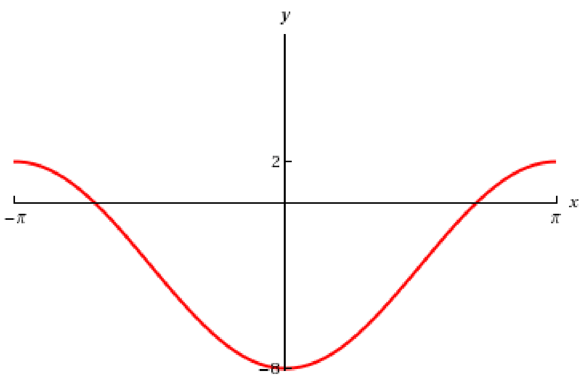
25. 1/1 points | Previous Answers SPreCalc6 5.3.013.

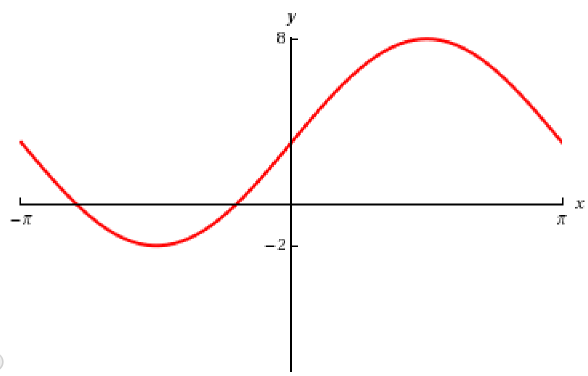
Graph the function.

$g(x) = 3 + 5 \cos x$









26.1.5/1.5 points | Previous AnswersSPreCalc6 5.3.020.MI.

Find the amplitude and period of the function.

$y = \frac{1}{2} \cos 4x$

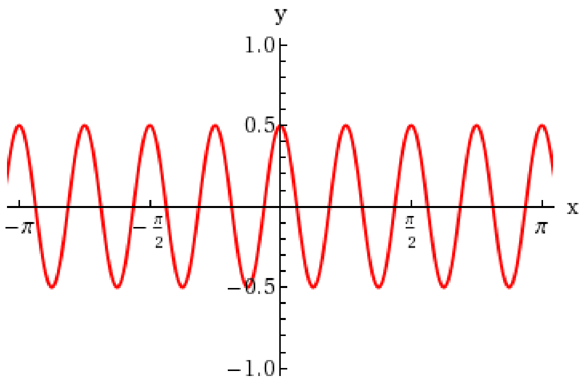
amplitude $\boxed{1/2}$ 1/2

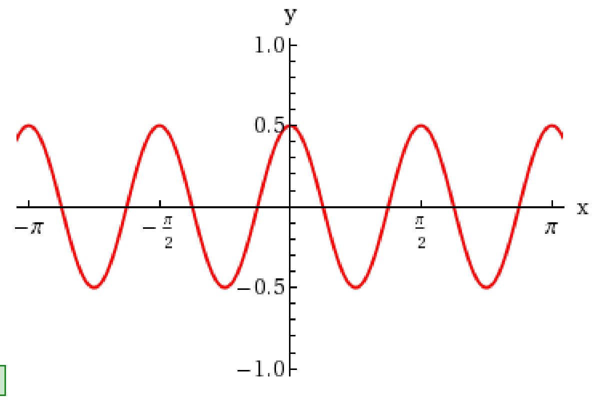
$$п2

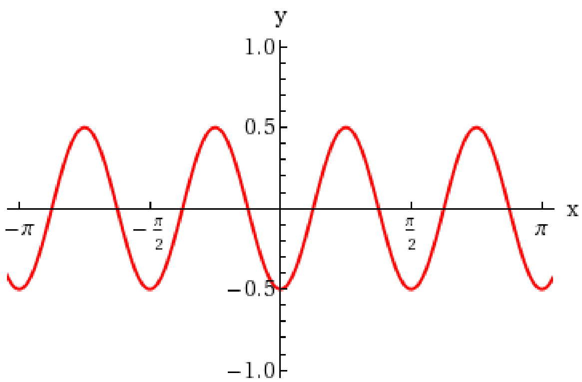
period

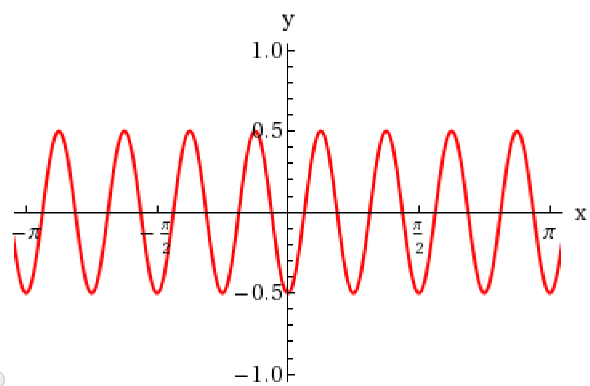
$\boxed{\frac{\pi}{2}}$

Sketch the graph of the function.



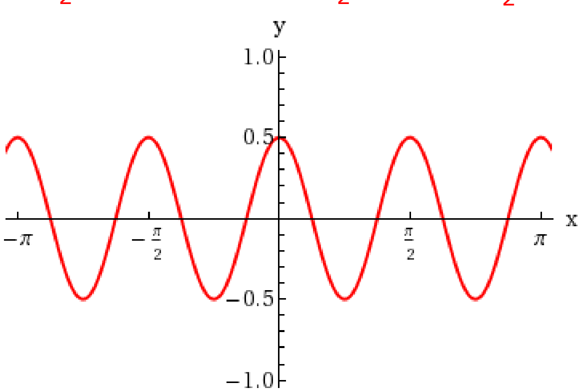






Solution or Explanation

$y = \frac{1}{2} \cos 4x$ has amplitude $\frac{1}{2}$ and period $\frac{\pi}{2}$

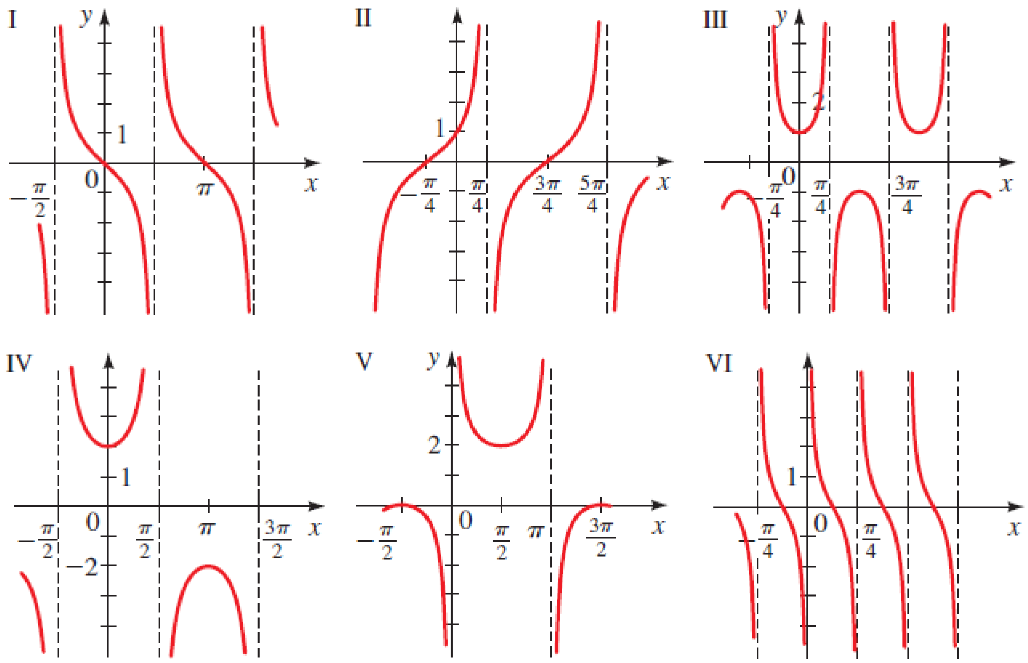


27. 1/1 points | Previous Answers SPreCalc6 5.4.003.

Match the trigonometric function with one of the graphs I-VI.

$f(x) = \tan\left(x + \frac{\pi}{4}\right)$

graph II ✓ graph II

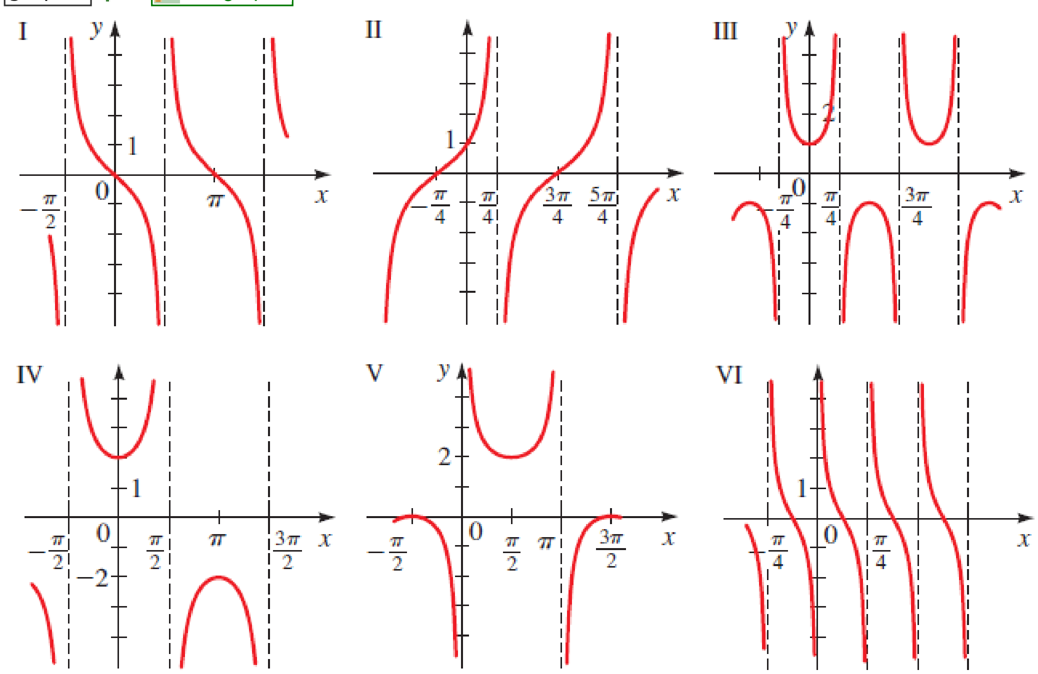


28. 1/1 points | Previous Answers SPreCalc6 5.4.006.

Match the trigonometric function with one of the graphs I-VI.

$f(x) = -\tan x$

graph I ✓ graph I



29. 1/1 points | Previous Answers SCalcET8 3.3.001.

Differentiate.

$f(x) = x^2 \sin(x)$

$f'(x) =$

$$2xsin(x)+x2cos(x)

$x^2 \cos(x) + 2x \sin(x)$

Solution or Explanation

$f(x) = x^2 \sin(x) \overset{\text{PR}}{\Rightarrow} f'(x) = x^2 \cos(x) + (\sin(x))(2x) = x^2 \cos(x) + 2x \sin(x)$

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30. 1/1 points | Previous Answers SCalcET8 3.3.005.

Differentiate.

$y = \sec(\theta) \tan(\theta)$

$y' =$

$$sec(θ)tan2(θ)+sec3(θ)

$\sec(\theta)\left(\tan^2(\theta) + \sec^2(\theta)\right)$

Solution or Explanation

$y = \sec(\theta) \tan(\theta)$

$y' = \sec(\theta)\sec^2(\theta) + \tan(\theta)(\sec(\theta) \tan(\theta)) = \sec(\theta)(\sec^2(\theta) + \tan^2(\theta))$ or $\sec^3(\theta) + \tan^2(\theta)\sec(\theta)$.

Using the identity $1 + \tan^2(\theta) = \sec^2(\theta)$, we can write alternative forms of the answer as $\sec(\theta)(1 + 2 \tan^2(\theta))$ or $\sec(\theta)(2 \sec^2(\theta) - 1)$.

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31. 1/1 points | Previous Answers SCalcET8 3.3.022.

Find an equation of the tangent line to the curve at the given point.

$y = 4e^x \cos(x), \quad (0, 4)$

$y =$

$$4(x−0)+4

$4x + 4$

Solution or Explanation

Click to View Solution

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32. 1/1 points | Previous Answers SCalcET8 3.3.027.

If $f(x) = 5 \sec(x) - 3x$, find $f'(x)$.

$f'(x) =$

$$5sec(x)tan(x)−3

$5 \sec(x) \tan(x) - 3$

Solution or Explanation

Click to View Solution

33.2/2 points | Previous AnswersSCalcET8 3.3.028.

If $f(x) = 8e^x \cos(x)$, find $f'(x)$ and $f''(x)$.

$$8excos(x)−8exsin(x)

$f'(x) =$

$8e^x(\cos(x) - \sin(x))$

$$−16exsin(x)

$f''(x) =$

$-16e^x \sin(x)$

Solution or Explanation

Click to View Solution

34.1.5/1.5 points | Previous AnswersSCalcET8 3.3.031.

(a) Use the Quotient Rule to differentiate the function

$$f(x) = \frac{\tan(x) - 1}{\sec(x)}.$$

$f'(x) =$

$$sec2(x)sec(x)−(tan(x)−1)(sec(x)tan(x))(sec(x))2

$$\frac{1 + \tan(x)}{\sec(x)}$$

(b) Simplify the expression for $f(x)$ by writing it in terms of $\sin(x)$ and $\cos(x)$, and then find $f'(x)$.

$f'(x) =$

$$cos(x)+sin(x)

$\sin(x) + \cos(x)$

(c) Are your answers to parts (a) and (b) equivalent?

- (●) Yes
- ( ) No

Solution or Explanation

(a)
$$f(x) = \frac{\tan(x) - 1}{\sec(x)} \Rightarrow$$
$$f'(x) = \frac{\sec(x)(\sec^2(x)) - (\tan(x) - 1)(\sec(x)\tan(x))}{(\sec(x))^2} = \frac{\sec(x)(\sec^2(x) - \tan^2(x) + \tan(x))}{\sec^2(x)} = \frac{1 + \tan(x)}{\sec(x)}$$

(b)
$$f(x) = \frac{\tan(x) - 1}{\sec(x)} = \frac{\frac{\sin(x)}{\cos(x)} - 1}{\frac{1}{\cos(x)}} = \frac{\frac{\sin(x) - \cos(x)}{\cos(x)}}{\frac{1}{\cos(x)}} = \sin(x) - \cos(x) \Rightarrow f'(x) = \cos(x) - (-\sin(x)) = \cos(x) + \sin(x)$$

(c) From part (a), $f'(x) = \dfrac{1 + \tan(x)}{\sec(x)} = \dfrac{1}{\sec(x)} + \dfrac{\tan(x)}{\sec(x)} = \cos(x) + \sin(x)$, which is the expression for $f'(x)$ in part (b).

35. 2/0 points | Previous Answers SCalcET8 3.3.032.

Suppose $f(\pi/3) = 3$ and $f'(\pi/3) = -5$, and let $g(x) = f(x)\sin(x)$ and $h(x) = \cos(x)/f(x)$. Find the following.

(a) $g'(\pi/3)$

$$−5(√32)+3(12)

$\boxed{\dfrac{3-5\sqrt{3}}{2}}$

(b) $h'(\pi/3)$

$$−3√3+518

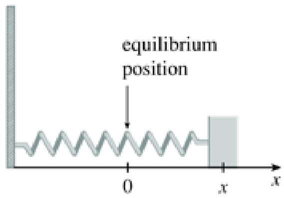
$\boxed{\dfrac{5-3\sqrt{3}}{18}}$

Solution or Explanation

Click to View Solution

36. 3.5/3.5 points | Previous Answers SCalcET8 3.3.035.MI.

A mass on a spring vibrates horizontally on a smooth level surface (see the figure). Its equation of motion is $x(t) = 4\sin(t)$, where t is in seconds and x is in centimeters.



(a) Find the velocity and acceleration at time t.

`$$4cos(t)`

$v(t)$ =

$\boxed{4\cos(t)}$

`$$−4sin(t)`

$a(t)$ =

$\boxed{-4\sin(t)}$

(b) Find the position, velocity, and acceleration of the mass at time $t = 2\pi/3$.

$x\left(\frac{2\pi}{3}\right)$ =

`$$4√32`

$\boxed{2\sqrt{3}}$

$v\left(\frac{2\pi}{3}\right)$ =

`$$−2`

$\boxed{-2}$

$a\left(\frac{2\pi}{3}\right)$ =

`$$−2√3`

$\boxed{-2\sqrt{3}}$

In what direction is it moving at that time?

Since $v\left(\frac{2\pi}{3}\right)$ $\boxed{<}$ $\boxed{<}$ 0, the particle is moving to the $\boxed{\text{left}}$ $\boxed{\text{left}}$.

Solution or Explanation

Click to View Solution

37. 2/2 points | Previous Answers SCalcET8 3.3.053.

Find constants A and B such that the function $y = A\sin(x) + B\cos(x)$ satisfies the differential equation $y'' + y' - 9y = \sin(x)$.

$$−10101

A =

$-\frac{10}{101}$

$$−1101

B =

$-\frac{1}{101}$

Solution or Explanation

$y = A\sin(x) + B\cos(x) \quad \Rightarrow \quad y' = A\cos(x) - B\sin(x) \quad \Rightarrow \quad y'' = -A\sin(x) - B\cos(x)$. Substituting these expressions for y, y', and y'' into the given differential equation $y'' + y' - 9y = \sin(x)$ gives us

$$(-A\sin(x) - B\cos(x)) + (A\cos(x) - B\sin(x)) - 9(A\sin(x) + B\cos(x)) = \sin(x) \quad \Leftrightarrow \quad -10A\sin(x) - B\sin(x) + A\cos(x) - 10B\cos(x) = \sin(x) \quad \Leftrightarrow \quad (-10A - B)\sin(x) + (A - 10B)\cos(x) = 1\sin(x),$$

so we must have $-10A - B = 1$ and $A - 10B = 0$ (since 0 is the coefficient of $\cos(x)$ on the right side). Solving for A and B, we add the first equation to 10 times the second to get $B = -\frac{1}{101}$ and $A = -\frac{10}{101}$.

38. 1/1 points | Previous Answers SCalcET8 3.3.502.XP.

Differentiate.

$$f(x) = 6\sqrt{x}\sin(x)$$

$f'(x) =$

$$3x−12sin(x)+6√xcos(x)

$6\sqrt{x}\cos(x) + \frac{3\sin(x)}{\sqrt{x}}$

Solution or Explanation

Click to View Solution

39. 1/1 points | Previous Answers SCalcET8 3.3.507.XP.

Differentiate.

$$y = 8x^2\sin(x)\tan(x)$$

$y' =$

$$8x(((2sin(x)+xcos(x))tan(x)+xsec2(x)sin(x)))

$8x\sin(x)\left(2\tan(x) + x + x\sec^2(x)\right)$

Solution or Explanation

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40. 1/1 points | Previous Answers SCalcET8 3.3.519.XP.

Find an equation of the tangent line to the curve at the given point.

$$y = 7x + 3\cos(x), \quad P = (0, 3)$$

$y =$

$$ 7(x−0)+3

$\boxed{7x+3}$

Solution or Explanation

Click to View Solution

41. 2/2 points | Previous Answers SCalcET8 3.3.520.XP.

Find an equation of the tangent line to the curve at the given point.

$$y = \frac{9}{\sin(x) + \cos(x)}, \quad P = (0, 9)$$

$y =$

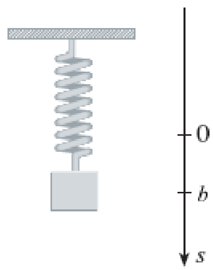
$$−9(x−0)+9

$\boxed{-9x+9}$

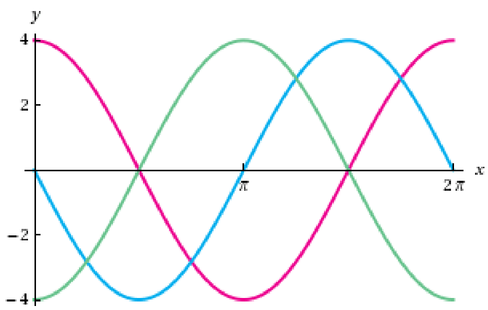
Solution or Explanation

Click to View Solution

42. 2/2 points | Previous Answers SCalcET8 3.3.AE.003.



$b = 4$



Video Example

EXAMPLE 3 An object at the end of a vertical spring is stretched 4 cm beyond its rest position and released at time $t = 0$. (Note the downward direction is positive in the figure.) Its position at time t is

$$s = f(t) = 4\cos(t)$$

Find the velocity and acceleration at time t and use them to analyze the motion of the object.

SOLUTION The velocity and acceleration are

$\frac{ds}{dt} = \frac{d}{dt}(4\cos(t)) = 4\frac{d}{dt}(\cos(t)) =$

$$−4sin(t)

$v =$

✓ $-4\sin(t)$

$\frac{dv}{dt} = \frac{d}{dt}(-4\sin(t)) = -4\frac{d}{dt}(\sin(t)) =$

$$−4cos(t)

$a =$

✓ $-4\cos(t)$

The object oscillates from the lowest point ($s = 4$ cm) to the highest point ($s = -4$ cm). The period of the oscillation is

$$2π

✓ 2π, the period of $\cos(t)$.

$|v| =$

$$4sin(t)

The speed is ✓ $4|\sin(t)|$, which is greatest when $|\sin(t)| =$ 1 ✓ 1, that is, when $\cos(t) =$ 0 ✓ 0. So the object moves fastest as it passes through its equilibrium position ($s = 0$). Its speed is 0 when $\sin(t) =$ 0 ✓ 0, that is, at the high and low points.

$a =$

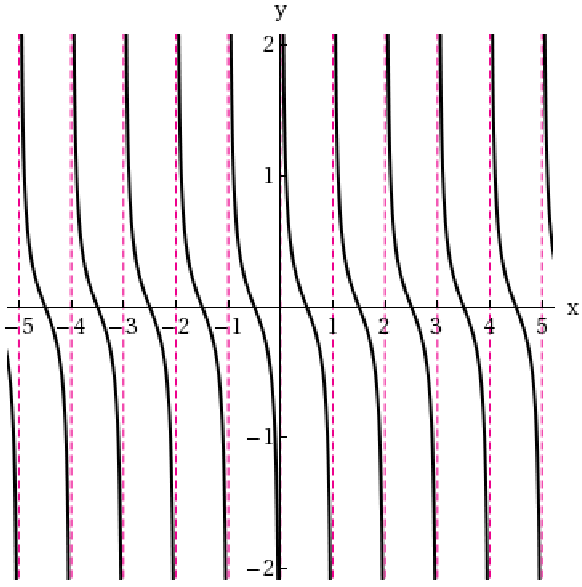
$$−4cos(t)

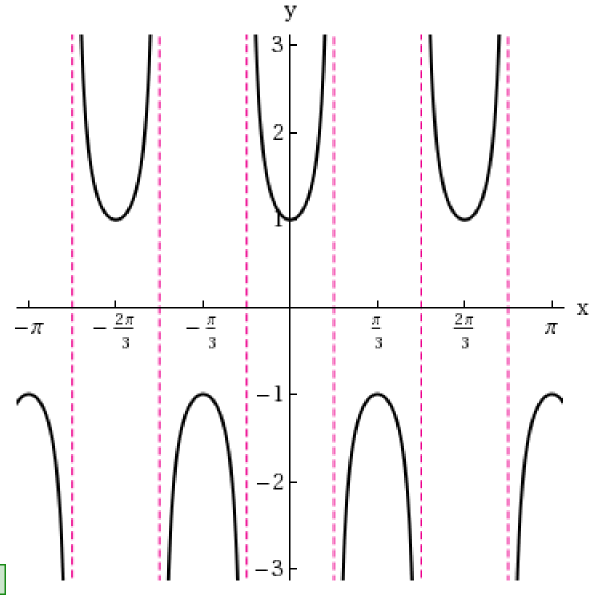
The acceleration ✓ $-4\cos(t)$ = 0 when $s = 0$. It has greatest magnitude at the high and low points. See the graphs to the left.

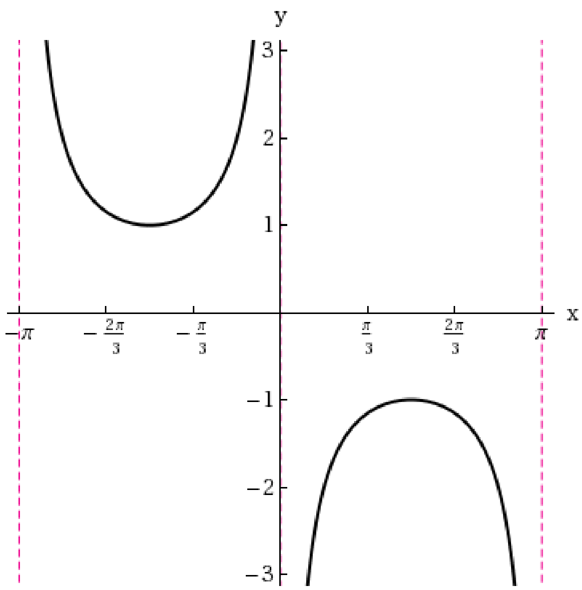
43.2/0 points | Previous AnswersSCalcET8 3.3.JIT.006.

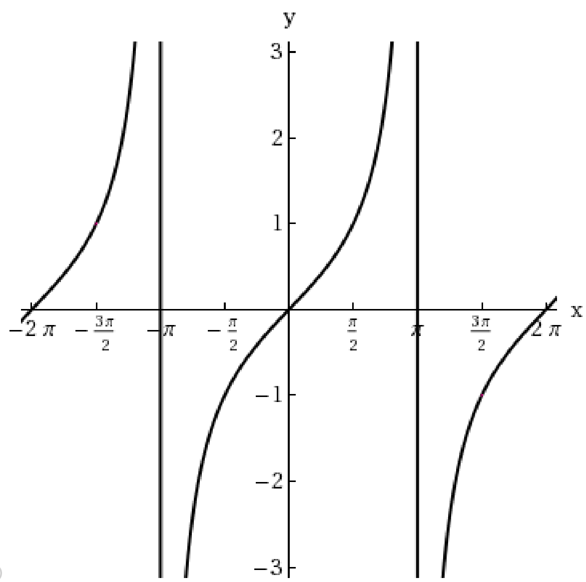
Match the function with its graph.

$y = \sec(3x)$









State the period of the function.

$$2π3

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