

Warm up

1. Find an equation for

$$y = -2 \csc\left(4\left(x - \frac{\pi}{8}\right)\right) - 7$$

May 6-6:59 AM

GO COUGARS!

p 328 **Homework Questions**

1. In Exercises 1-4, find the period and equation.

2. $y = 2 \sin 2x$ 3. $y = 3 \cos 3x$

4. $y = \frac{1}{2} \sin \frac{x}{2}$ 5. $y = -3 \sin \frac{x}{3}$

6. $y = \frac{1}{4} \sin \frac{\pi x}{2}$ 7. $y = \frac{1}{2} \cos \frac{\pi x}{3}$

8. $y = \frac{1}{3} \sin \frac{\pi x}{4}$ 9. $y = \frac{1}{2} \cos \frac{\pi x}{5}$

10. $y = \frac{1}{5} \sin \frac{\pi x}{6}$ 11. $y = \frac{1}{4} \cos \frac{\pi x}{7}$

12. In Exercises 12-16, sketch the graph of the function.

12. $y = \cos \frac{x}{2}$ 13. $y = \sin \frac{x}{3}$

14. $y = 2 \cos \frac{x}{4}$ 15. $y = -3 \sin \frac{x}{5}$

16. $y = \frac{1}{2} \sin \frac{x}{6}$ 17. $y = \frac{1}{4} \cos \frac{x}{7}$

18. In Exercises 18-22, use a graphing utility to graph the function. Include two full periods. Be sure to choose an appropriate viewing window.

18. $y = \cos \frac{x}{2}$ 19. $y = \sin \frac{x}{3}$

20. $y = 2 \cos \frac{x}{4}$ 21. $y = -3 \sin \frac{x}{5}$

22. $y = \frac{1}{2} \sin \frac{x}{6}$ 23. $y = \frac{1}{4} \cos \frac{x}{7}$

24. **Graphical Reasoning** In Exercises 24-26, find a and b for the function $f(x) = a \sin bx + b$ such that the graph of f matches the figure.

24. 25. 26.

27. **Graphical Reasoning** In Exercises 27-30, find a , b , and c for the function $f(x) = a \sin bx + c$ such that the graph of f matches the figure.

27. 28. 29. 30.

31. In Exercises 31-40, match the function with its graph. State the period of the function. The graphs are labeled (a) through (h).

31. $y = \cos x$ 32. $y = \sin x$

33. $y = \frac{1}{2} \cos \pi x$ 34. $y = -\frac{1}{2} \sin \pi x$

35. $y = \frac{1}{3} \sin \frac{\pi x}{2}$ 36. $y = -\frac{1}{4} \cos \frac{\pi x}{3}$

37. In Exercises 37-40, sketch the graph of the function. Include two full periods.

37. $y = 2 \cos \frac{x}{2}$ 38. $y = -3 \sin \frac{x}{3}$

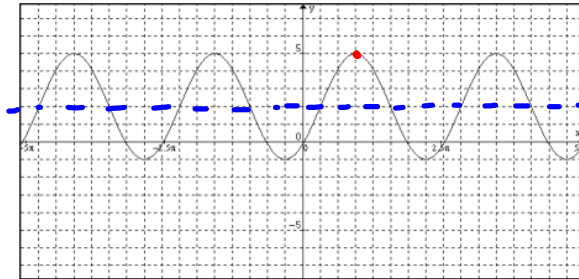
39. $y = \frac{1}{2} \sin \frac{x}{4}$ 40. $y = \frac{1}{4} \cos \frac{x}{5}$

Feb 2-9:51 PM

1. Simple harmonic motions are motions that are periodic in nature such as oscillations of a pendulum, the orbit of a satellite, the vibrations of a tuning fork, etc., which can be described by sine or cosine curves. The graph indicates the depth of the water off a certain pier in Port Aransas, Texas, beginning at noon, March 19th.

Note: t = hours after noon on March 19th $t_{scl} = 1$
 y = depth of water in meters $y_{scl} = 1$

Notes in
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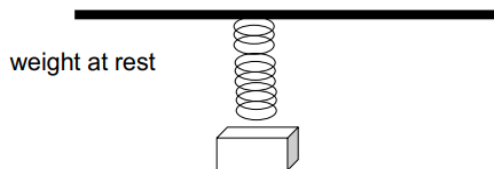


$y = 2$
 $b = \frac{\pi}{4}$
 amp 3
 $\frac{2\pi}{b} = 8$
 $8b = 2\pi$
 $b = \frac{2\pi}{8} = \frac{\pi}{4}$

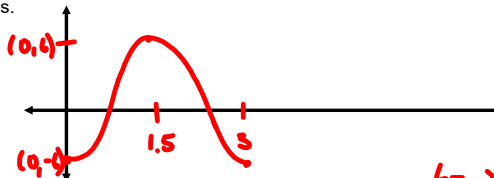
- At what time and date is the first high tide? 3pm March 19
 The second high tide? 11pm March 19
 The first low tide? 7pm March 19
- How long does it take the tide to complete one cycle? 8 hours
- How much of the cycle is completed in one hour? $\frac{1}{8}$
- Write an equation in terms of sine: $y = 3\sin(\frac{\pi}{4}(t-1)) + 2$
- Write an equation in terms of cosine: $y = 3\cos(\frac{\pi}{4}(t-3)) + 2$
- What is the depth of the tide at midnight March 19? 4 meters
- At what time is the depth of the tide 1-meter? 12:30 pm

Feb 4-5:54 AM

2. A weight is at rest hanging from a spring. It is then pulled down 6 cm and released. The weight oscillates up and down, completing one cycle every 3 seconds.



a) Make a sketch of the curve. Include three points and label each axis.



- Write an equation to describe the curve: $y = -6\cos(\frac{2\pi}{3}x)$
- Determine the position of the weight at 1.5 seconds: 6cm
- Use the graph to find the time when $y = 3.5$ for the first time: 1.047 sec
- What does the 3.5 represent? position of weight

$y_1 = 3.5$
 $y_2 = -6\cos(\frac{2\pi}{3}x)$

amp 6 flip
 $\frac{2\pi}{b} = 3$
 $\frac{2\pi}{3} = b$
 $\frac{3.5}{-6} = \frac{-6\cos(\frac{2\pi}{3}x)}{-6}$
 $-.58 = \cos \frac{2\pi}{3}x$
 $\frac{3}{2\pi} (\cos^{-1}(-.58)) = \frac{2\pi}{3}x$
 $x = 1.047 \text{ sec}$

Feb 4-6:00 AM

HOMWORK



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Aug 29-6:38 AM

Sinusoidal Worksheet #1

a. $h(t) = 20 \cos\left(\frac{\pi}{4}(t-3)\right) + 23$
 $h(t) = 20 \sin\left(\frac{\pi}{4}(t-1)\right) + 23$
 c. 3 feet
 d. i. 8.86 ft, ii. 33 ft
 iii. 23 ft, iv. 8.86 ft

a. $h(t) = 9 \sin\left(\frac{\pi}{5}(t-1.5)\right) + 7$
 $h(t) = 9 \cos\left(\frac{\pi}{5}(t-4)\right) + 7$
 i. 14.28 ft, ii. 4.22 ft
 d. .082 sec out, 7.92 sec in, 10.08 sec out

a. $h(t) = -10 \sin\left(\frac{2\pi}{3}(t-1.05)\right) + 50$
 $h(t) = 10 \cos\left(\frac{2\pi}{3}(t-.3)\right) + 50$
 43.31 cm
 58.09 cm e. .52 sec

May 9-5:59 AM

Sinusoidal Worksheet #2 (answers of equations may vary)

1.

2a. 5 ft below equilibrium

$$6. y = 2\cos\left(\frac{\pi}{5}(x - 2.5)\right)$$

b. 5 ft above equilibrium

c. $y = 5\cos\frac{7\pi}{6} = 4.33$ above equilibrium

7a. 1.72

3. $y = 20\sin(2\pi x) + 160$

b. 2.27

4a. 12.5

c. 12.3 hr

b. 53.5

d.

c. $y = 12.5\sin\left(\frac{\pi}{6}(x - 4)\right) + 53.5$

$$y = -1.72\sin\left(\frac{20\pi}{123}(x - 3.11)\right) + 2.27$$

$$y = -12.5\cos\left(\frac{\pi}{6}(x - 1)\right) + 53.5$$

$$y = 1.72\cos\left(\frac{20\pi}{123}(x - .05)\right) + 2.27$$

d. 42.7

5a. 6.5

e. 3.97 ft at noon

b. 0.5

8. $V(t) = 120\sin\frac{\pi}{30}t$

c. 6/5 or 1.2 sec

d. 2 ft

Apr 13-6:36 AM

2. Evaluate:

a. $\tan(\arcsin(-1))$

b. $\sec\left(\arctan\frac{2}{5}\right)$

c. $\sin\left(\cos^{-1}\frac{x}{3}\right)$

3. State the range

a. $\tan^{-1}x$


b. $\text{arc sec } x$

c. $\sin^{-1}x$

Feb 4-5:49 AM

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Homework Questions




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Library of Inverse Functions In Exercises 1–9, find the exact value of each expression without using a calculator.


1. (a) $\arcsin \frac{1}{2}$ (b) $\arcsin 0$
2. (a) $\arccos \frac{1}{2}$ (b) $\arccos 0$
3. (a) $\arcsin 1$ (b) $\arccos 1$
4. (a) $\arctan 1$ (b) $\arctan 0$
5. (a) $\arctan \frac{\sqrt{3}}{3}$ (b) $\arctan(-1)$
6. (a) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ (b) $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
7. (a) $\arctan(-\sqrt{3})$ (b) $\arctan \sqrt{3}$
8. (a) $\arccos\left(-\frac{1}{2}\right)$ (b) $\arcsin \frac{\sqrt{2}}{2}$
9. (a) $\sin^{-1} \frac{\sqrt{3}}{2}$ (b) $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

In Exercises 25–28, find the length of the third side of the triangle in terms of x . Then find θ in terms x for all three inverse trigonometric functions.


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
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27.



28.



In Exercises 29–46, use the properties of inverse functions to find the exact value of the expression.

29. $\sin(\arcsin 0.7)$	30. $\tan(\arctan 35)$
31. $\cos(\arccos -0.3)$	32. $\sin[\arcsin(-0.1)]$
33. $\arcsin(\sin 3\pi)$	34. $\arccos\left(\cos \frac{7\pi}{2}\right)$
35. $\tan^{-1}\left(\tan \frac{11\pi}{6}\right)$	36. $\sin^{-1}\left(\sin \frac{7\pi}{4}\right)$
37. $\sin^{-1}\left(\sin \frac{5\pi}{2}\right)$	38. $\cos^{-1}\left(\cos \frac{3\pi}{2}\right)$
39. $\sin^{-1}\left(\tan \frac{5\pi}{4}\right)$	40. $\cos^{-1}\left(\tan \frac{3\pi}{4}\right)$
41. $\tan(\arcsin 0)$	42. $\cos(\arctan(-1))$
43. $\sin(\arcsin 1)$	44. $\sin(\arctan(-1))$
45. $\arcsin\left[\cos\left(\frac{\pi}{6}\right)\right]$	46. $\arccos\left[\sin\left(\frac{\pi}{6}\right)\right]$

In Exercises 47–54, find the exact value of the expression. Use a graphing utility to verify your result. (Hint: Make a sketch of a right triangle.)

47. $\sin(\arcsin \frac{1}{2})$	48. $\sec(\arcsin \frac{1}{2})$
49. $\cos(\arcsin \frac{2}{3})$	50. $\csc(\arcsin(-\frac{1}{2}))$
51. $\sec[\arcsin(-\frac{1}{2})]$	52. $\tan[\arcsin(-\frac{1}{2})]$
53. $\sin[\arccos(-\frac{1}{2})]$	54. $\cot(\arcsin \frac{1}{2})$

In Exercises 55–62, write an algebraic expression that is equivalent to the expression. (Hint: Sketch a right triangle, as demonstrated in Example 7.)

55. $\cot(\arcsin x)$	56. $\sin(\arcsin x)$
57. $\tan[\arccos(x+2)]$	58. $\sec(\arcsin(x-1))$
59. $\tan(\arccos \frac{4}{5})$	60. $\cos(\arcsin \frac{4}{5})$
61. $\csc(\arcsin \frac{4}{5})$	62. $\cos(\arcsin \frac{b}{r})$

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