MTH 150 Chapter 6

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1 Reflection

When it came to exercises in chapter 6.1 i couldn't recall the steps or functions needed to complete the problems such as how to find the mid line as well as the period.After a refresher some help from tutors i was able to tackle the problems.

I found chapter 6.2 pretty simple as for most of the problem we were working with sins. I'm becoming more comfortable in using sins so it was pretty easy.

I found chapter 6.3 fairly easy as well since i was also working with sin values

as for section 6.4 This was fairly difficult, i had to receive help from tutors to get through these exercises when it came down to the equation i became stuck when trying to figure out the right variables
I found section 6.5 fairly simple, it became a little difficult as i had to be careful with the values in order to get the right input.

I could say i still need more practice in this chapter

2 6.1 Sinusoidal Graphs

2.1 1,2,11,13,21,23

Sketch a graph of f (x)= 3sin(x)

$$Photo$$

Sketch a graph of f (x)= 4sin(x).

$$Photo$$

11 **F**or each of the following equations, find the amplitude, period, horizontal shift, and midline.

$$y = 3sin(8(x + 4)) + 5$$

$$Amplitude - 3$$

Period -$\frac{2\pi}{x}$
$= \frac{\pi}{4}$
$HorizontalShift - 4unitstotheleft$
$Midline - y = 5$

13 *For each of the following equations, find the amplitude, period, horizontal shift, and midline.*

$$y = 2sin(3x - 21) + 4$$

$$Amplitude - 2$$

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

$$HorizontalShift - (3x - 21) = 3(x - 7)$$

$$Shift 7 units to the right$$

$$Midline - y = 4$$

21 *Outside temperature over the course of a day can be modeled as a sinusoidal function. Suppose you know the temperature is 50 degrees at midnight and the high and low temperature during the day are 57 and 43 degrees, respectively. Assuming t is the number of hours since midnight, find a function for the temperature, D, in terms of t.*

$$Amplitude - 7$$

$$Midline - 50$$

$$d(t) = 50 - 7sin(\frac{2\pi}{24}t)$$

$$50 - 7sin(\frac{\pi}{12}t)$$

23 *A Ferris wheel is 25 meters in diameter and boarded from a platform that is 1 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 10 minutes. The function h(t) gives your height in meters above the ground t minutes after the wheel begins to turn. a. Find the amplitude, midline, and period of h(t). b. Find a formula for the height function h(t). c. How high are you off the ground after 5 minutes?*

$$Period = 10$$

$$Midline = 13.5$$

$$Amplitude = 12.5$$

$$f(x) = 12.5cos(\frac{2\pi}{10}) + 13.5$$

$$plugin5tosolve$$

$$x = 26$$

Comments

I had a little trouble with these exercises, i didn't recall of any of the steps or formulas needed to solve these solutions such as finding the mid line and the period.After a refresher some help from tutors i was good to tackle the problems.

3 Section 6.2 Graphs of the Other Trig Functions

3.1 5,7,15,16,21,23,27

5 *Find the period and horizontal shift of each of the following functions.*

$$f(x) = 2tan(4x - 32)$$

$$Period = \frac{\pi}{4}$$

$$HorizontalShift = 8unitstotheright$$

7 *Find the period and horizontal shift of each of the following functions.*

$$h(x) = 2sec(\frac{\pi}{4}(x + 1))$$

$$Period = \frac{2\pi}{\frac{\pi}{4}}$$

$$Horizontalshift = 1unittotheleft$$

15 *Sketch a graph of* $j(x) = tan(\frac{\pi}{2}x)$

$$Photo$$

16 *Sketch a graph of* $p(t) = 2tan(t - \frac{\pi}{2})$

$$Photo$$

21 *If tan x = 1.5, find tan(x)*

$$tan(-x) = -tan(x)$$

$$-(-1.5)$$

$$x = 1.5$$

23 *If sec x = 2, find sec(x).*

$$sec(-x) = -sec(x)$$
$$x = -2$$

27 *Simplify each of the following expressions completely.*

$$cot(x)cos(x) + sin(x)$$

$$cot(-x)cos(-x) + sin(-x)$$
$$(-cot(x))(cos(x)) - sin(x)$$
$$-(\frac{cos(x)}{sin(x)})(cos(x) - sin(x)$$
$$\frac{cos^2(x)}{sin(x)} - sin(x)$$
$$\frac{1}{sin(x)}$$

Comments

This was fairly simple, I'm beginning to feel more comfortable in using sin values

4 Section 6.3 Inverse Trig Functions

4.1 1,5,19,25

1 Evaluate the following expressions, giving the answer in radians.

$$sin^(-1)(\frac{\sqrt{2}}{2})$$
$$\frac{\pi}{4}$$

5 Evaluate the following expressions, giving the answer in radians.

$$cos^(-1)$$
$$cos^(-1)(\frac{1}{2})$$
$$\frac{\pi}{3}$$

19 *Evaluate the following expressions.*

$$sin^(-1)(cos(\frac{\pi}{4})$$
$$sin^(-1)(\frac{\sqrt{2}}{2})$$
$$\frac{\pi}{4}$$

25 *Evaluate the following expressions..*

$$cos(tan^(-1)(4))$$
$$Hypotnuse = 1^2 + 4^2 = \sqrt{17}$$
$$Cow(tan - 1(4)) =$$
$$cos(x) = \frac{adjacent}{Hypotnuse}$$
$$\frac{1}{\sqrt{17}}$$

Comments

This was pretty simple, i found these exercises easy as i am starting to become well versed in evaluating expressing sin values.

5 Section 6.4 Solving Trig Equations

5.1 1,3,9,11,13,15,33,37

1 *Find all solutions on the interval 0 ¡ 2 .*

$$2sin(\theta) = -\sqrt{2}$$

$$sin(\theta) = \frac{-\sqrt{2}}{2}$$

$$\theta + \frac{5\pi}{4} + 2x\pi$$

$$\theta = \frac{5\pi}{4}$$

$$\theta = \frac{7\pi}{4}$$

3 *Find all solutions on the interval 0 ¡ 2 .*

$$2cos\theta = 1$$

$$cos\theta = \frac{1}{2}$$

$$\theta = \frac{\pi}{3} + 2x\pi$$

$$\theta = \frac{\pi}{3}$$

$$\theta = \frac{3\pi}{3}$$

9 Find all solutions.

$$2cos(\theta) = \sqrt{2}$$

$$cos(\theta) = \frac{\sqrt{2}}{2}$$

11 *Find all solutions.*

$$2sin(\theta) = -1$$

$$cos(\theta) = \frac{\sqrt{2}}{2}$$

13 *Find all solutions.*

$$2sin(3\theta) = 1$$
$$sin(3\theta) = \frac{1}{2}$$
$$3\theta = \frac{\pi}{6} + 2x\pi$$

15 *Find all solutions.*

$$2sin(3(\theta)) = -\sqrt{2}$$
$$sin(3(\theta)) = -\frac{\sqrt{2}}{2}$$
$$3(\theta) = \frac{5\pi}{4} + 2x\pi$$

33 *Find the first two positive solutions.*

$$7sin(6x) = 2$$
$$sin(6x) = \frac{2}{7}$$
$$6x = sin^(-1)\frac{2}{7}$$
$$6x = 0.28975$$
$$x = 0.004829$$
$$x = 0.47531$$

37 *Find the first two positive solutions.*

$$3sin(\frac{\pi}{4}x) = 2$$
$$sin(\frac{\pi}{4}x) = \frac{2}{3}$$
$$\frac{\pi}{4}x = sin^(-1)(\frac{2}{3})$$
$$\frac{\pi}{4} = 0.72973$$
$$x = 0.9291$$
$$x = 3.0709$$

Comments

6 Section 6.5 Modeling with Trigonometric Functions

6.1 1,3,17,27

7 *Outside temperature over the course of a day can be modeled as a sinusoidal function. Suppose you know the high temperature for the day is 63 degrees and the low temperature of 37 degrees occurs at 5 AM. Assuming t is the number of hours since midnight, find an equation for the temperature, D, in terms of t.* Amplitude -

$$\frac{63-37}{2} = 13$$

Midline-

$$\frac{63+37}{2} = 50$$

HSF -

$$\frac{2\pi}{24} = \frac{\pi}{12}$$

HS-

$$5$$

$$d(t) = -13cos(\frac{\pi}{12}(t-5)) + 50$$

9 *A population of rabbits oscillates 25 above and below an average of 129 during the year, hitting the lowest value in January (t = 0). a. Find an equation for the population, P, in terms of the months since January, t. b. What if the lowest value of the rabbit population occurred in April instead?* Amplitude -

$$25$$

Midline-

$$129$$

HSF -

$$\frac{2\pi}{12} = \frac{\pi}{6}$$

Period-

$$12$$

$$p(t) = -25cos(\frac{\pi}{6}(t)) + 129$$

B April-

$$-3$$

$$p(t) = -25cos(\frac{\pi}{6}(t - 31)) + 129$$

11 *Outside temperature over the course of a day can be modeled as a sinusoidal function. Suppose you know the high temperature of 105 degrees occurs at 5 PM and the average temperature for the day is 85 degrees. Find the temperature, to the nearest degree, at 9 AM.* Amplitude -

$$25$$

Midline-

$$85$$

HSF -

$$\frac{2\pi}{24} = \frac{\pi}{12}$$

HS-

$$-17$$

$$20cos(\frac{\pi}{12}(t - 17)) + 85$$

$$20cos(\frac{\pi}{12}(9 - 17)) + 785$$

Temp at 9am is

$$75$$

13 *Outside temperature over the course of a day can be modeled as a sinusoidal function. Suppose you know the temperature varies between 47 and 63 degrees during the day and the average daily temperature first occurs at 10 AM. How many hours after midnight does the temperature first reach 51 degrees?* Amplitude -

$$\frac{63 - 47}{2} = 8$$

Midline-

$$\frac{63 + 47}{2} = 55$$

HSF -

$$\frac{2\pi}{24} = \frac{\pi}{12}$$

HS-

$$-10$$

$$d(t) = 8sin(\frac{\pi}{12(t-10)) + 55}$$

solve for t

$$51 = 8sin(\frac{\pi}{12}(t-10)) + 55 =$$

$$sin(\frac{\pi}{12}(t-10)) = -\frac{1}{2}$$

$$\frac{\pi}{12}(t-10) = sin(-1)(-\frac{1}{2}$$

$$t = \frac{-\pi/6}{\pi/12} + 10 = 8$$

8 hrs

Comments

This was fairly simple, it became a little difficult as i had to be careful with the values in order to get the right input.