Talk to your Guidance Counselor TODAY to sign up for A Computer Science Principles Class Next Year!

Introductory Class
No Computer Science experience necessary

Prerequisite: Algebra I

Students do not need to have prior knowledge of any programming language.

https://www.youtube.com/watch?v=jQm0z894CG0

Jan 23-7:26 PM

Today: Do Review #1 today at end of notes packet. Test tomorrow.
Extra Review #2 also at end of notes packet. Keys online.
There's also a Castle Learning Unit 8 Review available.

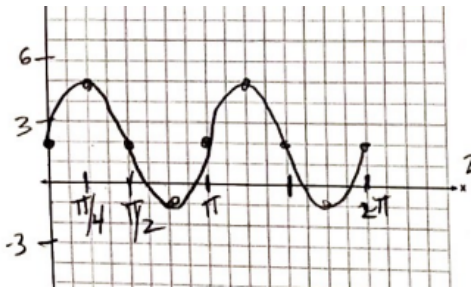
HOMEWORK 8-9

1. 1
2. ~~3~~ 2
3. 1
4. 3
5. 4

6. 2700; A person's lung can hold a maximum of 2700mL of air.

7. 1

8.



Feb 6-7:07 PM

Name: Key

Period :

Algebra 2 Homework 8-9

1. Which function's graph has a period of 8 and reaches a maximum height of 1 if at least one full period is graphed?

1) $y = -4\cos\left(\frac{\pi}{4}x\right) - 3$ max $-4-3=-1$

3) $y = -4\cos(8x) - 3$ $W = \frac{2\pi}{8} = \frac{\pi}{4}$

2) $y = -4\cos\left(\frac{\pi}{4}x\right) + 5$ $4+5=9$

4) $y = -4\cos(8x) + 5$

2. The height above ground for a person riding a Ferris wheel after t seconds is modeled by $h(t) = 150\sin\left(\frac{\pi}{45}t + 67.5\right) + 160$ feet. How many seconds does it take to go from the bottom of the wheel to the top of the wheel?

min to max is $\frac{1}{2}$ of a cycle

1) 10 2) 45 3) 90 4) 150

$per = \frac{2\pi}{\pi/45} = 2\pi \cdot \frac{45}{\pi} = 90$ sec

$90 \div 2 = 45$

3. Tides are a periodic rise and fall of ocean water. On a typical day at a seaport, to predict the time of the next high tide, the most important value to have would be the

1) time between consecutive low tides
2) time when the tide height is 20 feet
3) average depth of water over a 24-hour period
4) difference between the water heights at low and high tide

4. The temperature, in degrees Fahrenheit, in Times Square during a day in August can be predicted by the function $T(x) = 8\sin(0.3x - 3) + 74$, where x is the number of hours after midnight. According to this model, the predicted temperature, to the nearest degree Fahrenheit, at 7 P.M. is

1) 68 2) 74 3) 77 4) 81

7 PM → x = 19

use Radians $T(19) = 8\sin(.3(19) - 3) + 74$

$= 77.419$

5. The average monthly temperature of a city can be modeled by a cosine graph. Melissa has been living in Phoenix, Arizona, where the average annual temperature is 75°F. She would like to move, and live in a location where the average annual temperature is 62°F. When examining the graphs of the average monthly temperatures for various locations, Melissa should focus on the

1) Amplitude
2) horizontal shift
3) Period
4) Midline

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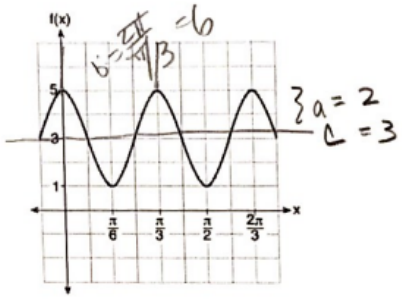
6. A person's lung capacity can be modeled by the function $C(t) = 250\sin\left(\frac{2\pi}{5}t\right) + 2450$, where $C(t)$ represents the volume in mL present in the lungs after t seconds. State the maximum value of this function over one full cycle, and explain what this value represents.

max = 250 + 2450 = 2700 mL

A person's lung can hold a max. of 2700 mL of air.

7. The function $f(x) = a\cos bx + c$ is plotted on the graph shown below.



$b = \frac{2\pi}{\pi/3} = 6$

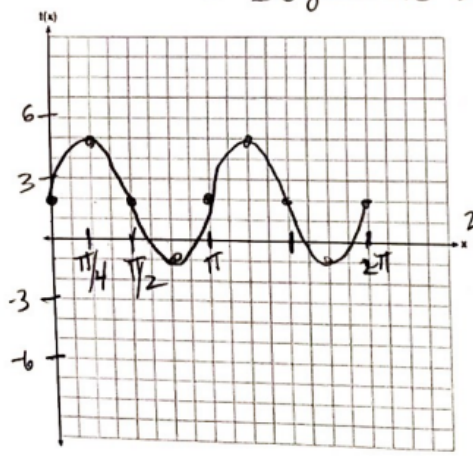
$a = 2$, $c = 3$

What are the values of a, b, and c?

1) $a = 2, b = 6, c = 3$
2) $a = 2, b = 3, c = 1$
3) $a = 4, b = 6, c = 5$
4) $a = 4, b = \frac{\pi}{3}, c = 3$

8. Graph $t(x) = 3\sin(2x) + 2$ over the domain $[0, 2\pi]$ on the set of axes below.

2 cycles in 2π



20 squares

amplitude = 3
Range = [-1,5]
$w = 2/2\pi$
$Per = 2\pi/2 = \pi$
Pattern: 3(0,1,0,-1,0)
0, 3, 0, -3, 0
+2 +2 +2 +2 +2
2, 5, 2, -1, 2
Xscl = $\pi/4$

In-Class Review ANSWERS:

1. 2
2. [-1, 3]
3. 2 in 2π
4. π
5. $\pi/4$
6. See graph
7. [-8,8]
8. 7.3 inches
9. -2
10. 3
11. $f(x) = 3\cos(\frac{1}{2}x)$
12. $\pi/2$ seconds
13. $f(x) = 3\cos(\frac{\pi}{4}x) + 4$
14.
    a. 15
    b. -35
    c. -5
    d. [-35,-5]
    e. $2\pi/2\pi = 1$
    f. 1
    g. 8 right
    h. 20 down
15.
    a. 10 ft.
    b. 6 ft.
    c. 2
    d. 8 up
    e. 12 hrs.
    f. 1/12
    g. $\pi/6$
    h. $f(t) = -2\cos(\frac{\pi}{6}t) + 8$
    i. 6.1 ft.

Review Key

$S(x) = A\sin(\omega x) + k$

Change function!

For questions 1 to 6, use the equation $f(x) = -2\sin(2x) + 1$

1) Find the amplitude. 1) 2

2) Find the range. 2) $[-1, 3]$

3) Find the frequency. 3) $\frac{1}{\pi}$

4) Find the period. 4) π

5) Find the x-scale. 5) $\frac{\pi}{4}$

max +2 / 1 / -2 min

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6) Graph the equation in the interval $-\pi \le x \le \pi$.

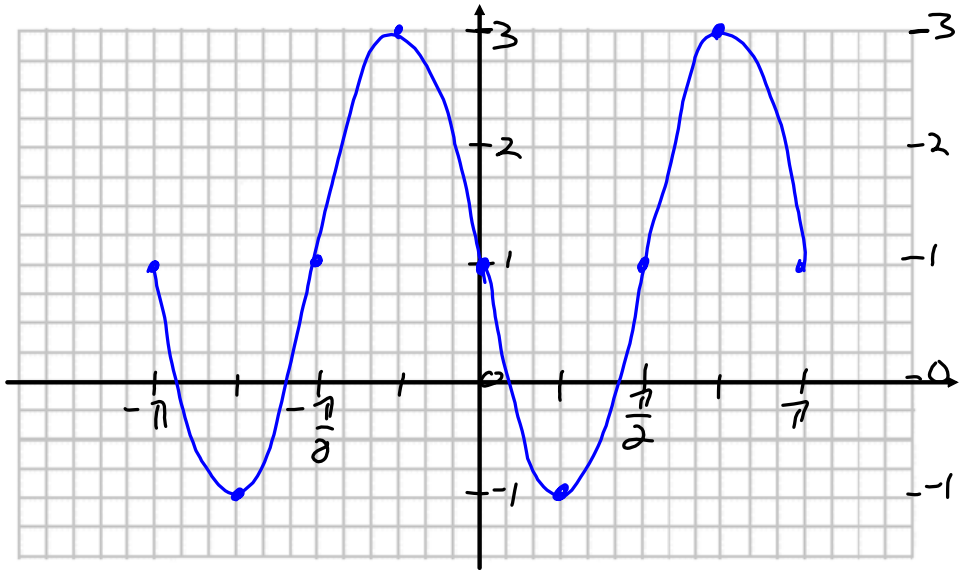
Sine $A(0,1,0,-1,0)+k$

$-2(0,1,0,-1,0)+1 = (1,-1,1,3,1)$

Cosine 1, 0, -1, 0, 1

Sine 0, 1, 0, -1, 0

$[-1, 3]$



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14) Describe the graph for $f(x) = 15\cos(2\pi(x-8)) - 20$.

a) amplitude = 15

b) minimum = -35

c) maximum = -5

d) range = [-35, -5]

e) frequency = 1 or $\frac{2\pi}{2\pi}$

f) period = 1

g) phase shift = 8 right

h) vertical shift = 20 down

-5
+15
-20
-15
-35
[min, max]

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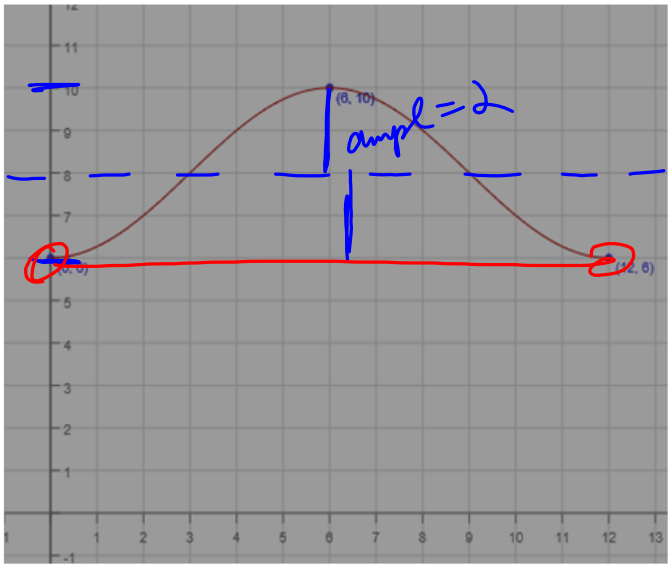
15) The tide at a boat dock can be modelled by the following graph. Let t= the number of hours past noon and y is the height of the tide in feet.

12pm



+cos
-cos

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a. What is the maximum water depth? 10 ft

b. What is the minimum water depth? 6 ft

c. What is the amplitude? $= |A|$ 2 $\rightarrow A = -2$

d. What is the vertical shift (midline)? 8 up $\rightarrow k = +8$

e. What is the period? 12

f. What is the frequency? $\frac{1}{12}$

g. What is $|\omega|$? Per $= 12$ $\rightarrow \frac{2\pi}{\omega} = 12 \rightarrow 2\pi = 12\omega$ $\omega = \frac{2\pi}{12} = \frac{\pi}{6}$ $\pi/6 = \omega$

h. What is the function of the height of the tide, f(t), as shown in the diagram above?

$f(t) = -2\cos\left(\frac{\pi}{6}t\right) + 8$

i. What would be the height of the tide, to the nearest tenth, at 11:30 PM?

12pm $\rightarrow$ 1, 2, 3 11:30 pm

$t = 11.5$

$f(11.5) \approx 6.1$ feet

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7) What is the range for f(x) = 8 sin(x) ? 7) $[-8, 8]$

8) The motion of an object can be modeled by the equation f(x) = 2.3 sin (πx) + 5, where x represents the number of seconds the object is oscillating and x is the distance, in inches, of the height of the object. What is the maximum height of the object? 8) 7.3

$+2.3 \quad +5 = 7.3$

9) If f(x) = 5 + 7 sin(x), what is the minimum value of the function? 9) -2

$5 - 7 = -2$

10) Which graph has an amplitude of 5 and a period of π ? 10) 3

1) $y = \frac{1}{5}\cos(4x)$ 2) $y = 5\sin(4x)$ $|\omega| = \frac{2\pi}{\pi} = 2$

3) $y = 5\sin(2x)$ 4) $y = 5\cos\left(\frac{1}{4}x\right)$

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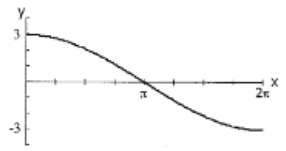
11) Write the equation of the function represented by the graph below:



11) $f(x) = 3\cos(\frac{1}{2}x)$

amp = 3, a = 3

$|\omega| = 1/2 / 2\pi$

12) The voltage E of an alternating current electrical circuit can be represented by the function E(t) = 660 cos (4t), where E is measured in volts and t is measured in seconds. How long does it take the alternating current to complete one full cycle?

12) $\pi/2$ sec.

per = $2\pi/4 = \pi/2$ sec.

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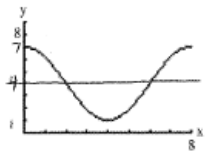
13) The following graph represents the vertical translation of a basic trigonometric curve. Write an equation of the translated graph. Show all work.



amp = 3 cosine

per = 8

$|\omega| = 2\pi/8 = \pi/4$

K = 4

$f(x) = 3\cos(\frac{\pi}{4}x) + 4$

14) Describe the graph for $f(x) = 15\cos[2\pi(x-8)] - 20$.

a) amplitude = 15

b) minimum = $-15-20 = -35$

c) maximum = $15-20 = -5$

d) range = $[-35, -5]$

e) frequency = 2π in $2\pi = 1$ $|\omega| = 2\pi$

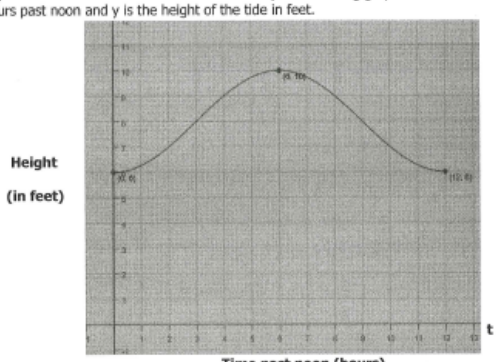
f) period = 1

g) phase shift = 8 to Rt.

h) vertical shift = Down 20

Feb 6-7:33 PM

15) The tide at a boat dock can be modelled by the following graph. Let t= the number of hours past noon and y is the height of the tide in feet.



a. What is the maximum water depth? 10 ft.

b. What is the minimum water depth? 6 ft.

c. What is the amplitude? 2

d. What is the vertical shift (midline)? 8 (up)

e. What is the period? 12 hrs.

f. What is the frequency? 1/12

g. What is the $|\omega|$? $2\pi/12 = \pi/6$

h. What is the function of the height of the tide, f(t), as shown in the diagram above?

$f(t) = -2\cos(\frac{\pi}{6}t) + 8$

i. What would be the height of the tide, to the nearest tenth, at 11:30 PM?

$t = 11.5$

$f(11.5) = -2\cos(\frac{\pi}{6}(11.5)) + 8 = 6.1$ ft.

(Radian mode)

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Feb 6-7:36 PM