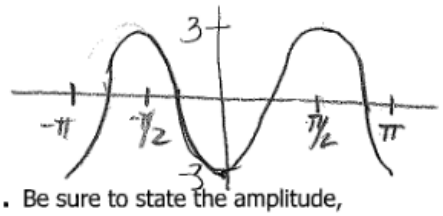
Unit 11 Extra Practice



1) Graph the equation **f(x)=-3cos(2x) from** $-\pi \le x \le \pi$. Be sure to state the amplitude, frequency and period as part of your work.

amp = 3 |ω| = 2 per = 2π/2 = π Xscl = π/4

freq = 2/2π

2) What is the range for y = -3 sin(x) ?

[-3, 3]

3) The motion of a spring can be modeled by the function f(x) =2.4 cos (πx) - 7, where x represents the number of seconds the spring is oscillating and y is the distance, in inches, of the height of the spring. What are the maximum and minimum heights of the spring?

Max: 2.4 - 7 = -4.6 Min = -2.4 - 7 = -9.4

4) If f(x) = -6 + 4 sin(2x), what is the maximum value of the function?

-6 + 4 = -2

5) Give an example of a function that has an amplitude of 4 and a period of π ?

f(x) = 4 sin(2x) |ω| = 2π/π = 2

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6) The voltage E of an alternating current electrical circuit can be represented by the function E(t) = 220 cos (4πt), 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?

|ω| = 4π Per = length of 1 cycle = 2π/|ω| = 2π/4π = 1/2 sec

7) Describe the graph for $y = 15\cos(\pi(x+3)) - 10$.

a) amplitude = 15

b) frequency = π in 2π = 1/2

c) period = 2π/π = 2

d) phase shift = 3 left

e) vertical shift = Down 10

f) minimum = -15 - 10 = -25

g) maximum = 15 - 10 = 5

h) range = [-25, 5]

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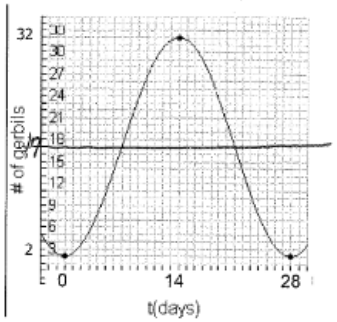
8) A pet store clerk noticed that the population in the gerbil habitat varied sinusoidally with respect to time, in days. He carefully collected data and graphed his resulting equation. From the graph, determine the amplitude, period, horizontal shift and vertical shift. Write the equation of the graph. (regentsprep.org)



a. What is the amplitude? $\frac{32-2}{2} = 15$ 15 $a = -15$

b. What is the period? 28 days

c. What is the frequency? 1 cycle in 28 days

d. What is $|\omega|$? $2\pi/28 = \pi/14$ $\pi/14$

e. What is the vertical shift (midline)? $\frac{32+2}{2}$ 17

f. What is the horizontal shift? 0

g. What is the equation of the gerbil population, P(t), as shown in the diagram above as a cosine function? $P(t) = -15\cos\left(\frac{\pi}{14}t\right) + 17$

h. What would be the population when t = 45 days?

$P(45) = -15\cos\left(\frac{\pi}{14}(45)\right) + 17 = 28.7 \sim 29$ days

calc in radians!

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