

Applications of Sinusoidal Functions (5.4)

p276

day 7

waste and cafeterias

new idea

Yorkdale Shopping Centre: 120 bags per day

down to 3 bags

would you make use of it?

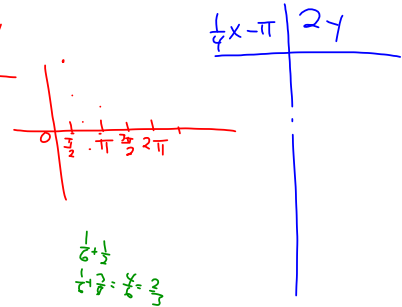
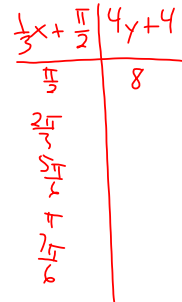
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$$7. y = 4 \cos 3(x - \frac{\pi}{2}) + 4$$

$$8. y = 2 \cos 4(x + \pi)$$

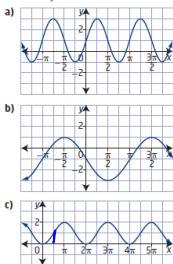


16. For each graph, write an equation in the form $y = a \cos b(x - c) + d$.

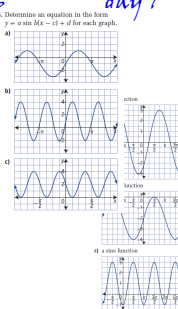
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#14c, 15c, 16c
 $d = 1$
 $a = 1$
 $b = 1$
 $c = 0$



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ex1: The temperature of an air conditioned home on a hot day can be modeled by $T(x) = 23 + 1.5 \cos \frac{\pi x}{12}$ x is the time in minutes and T is the temp in C.

a) What are the max & min temps in the home?

$$\text{max} = 23 + 1.5 = 24.5^\circ\text{C}$$

$$\text{min} = 23 - 1.5 = 21.5^\circ\text{C}$$

b) Find the temp 10 minutes after the AC kicks in.

$$\begin{aligned} x = 10 \quad T(10) &= 1.5 \cos \frac{\pi}{12}(10) + 23 \\ &= 1.5(-0.866) + 23 \\ &= -1.299 + 23 \\ &= 21.7^\circ\text{C} \end{aligned}$$

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ex1: The temperature of an air conditioned home on a hot day can be modeled by $T(x) = 23 + 1.5 \cos \frac{\pi x}{12}$ x is the time in minutes and T is the temp in C.

c) What is the period of the function?

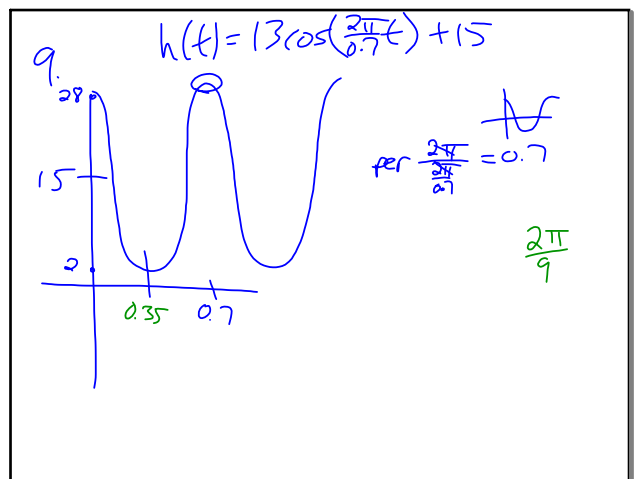
$$\text{per} = \frac{2\pi}{b} = \frac{2\pi}{\frac{\pi}{12}} = 24 \text{ mins}$$

d) At what two times is the home at exactly 22 C?

$$\begin{aligned} T = 22 \quad 22 &= 23 + 1.5 \cos \frac{\pi x}{12} \\ -1 &= 1.5 \cos \frac{\pi x}{12} \\ -0.667 &= \cos \frac{\pi x}{12} \\ \cos^{-1}(-0.667) &= \frac{\pi x}{12} \\ 2.3 &= \frac{\pi x}{12} \\ 8.8 \text{ mins} &= x \end{aligned}$$

2nd time
do later

9abcd



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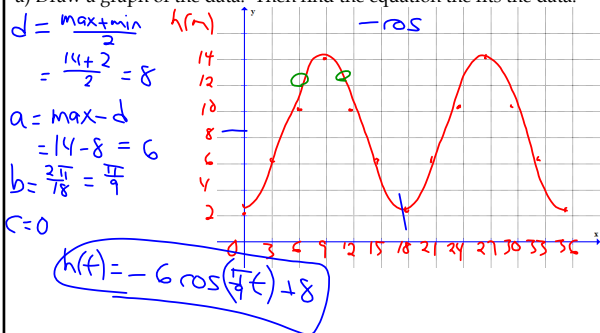
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ex2: Math Man & The Fizz Ed Freak are riding the big wheel at Sandspit. Their height vs time data looks like this:

Time (s)	0	3	6	9	12	15	18	21	24	27	30	33	36
Height (m)	2	6	10	14	10	6	2	6	10	14	10	6	2

a) Draw a graph of the data. Then find the equation that fits the data.



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ex2: Math Man & The Fizz Ed Freak are riding the big wheel at Sandspit. Their height vs time data looks like this:

b) At what times are they 12 m off the ground?

$$h(t) = -6 \cos\left(\frac{\pi}{9}t\right) + 8$$

$$12 = -6 \cos\left(\frac{\pi}{9}t\right) + 8$$

$$-0.667 = \cos\left(\frac{\pi}{9}t\right)$$

$$2.3 = \frac{\pi}{9}t$$

$$6.65 = t$$

2nd angle

$$2\pi - 2.3 \text{ rad}$$

$$= 3.98$$

$$\therefore 3.98 = \frac{\pi}{9}t$$

$$11.4 \text{ sec} = t$$

also

$$18 - 6.6 = 11.4$$

period - first time

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HW: p276 #9, 10, 15