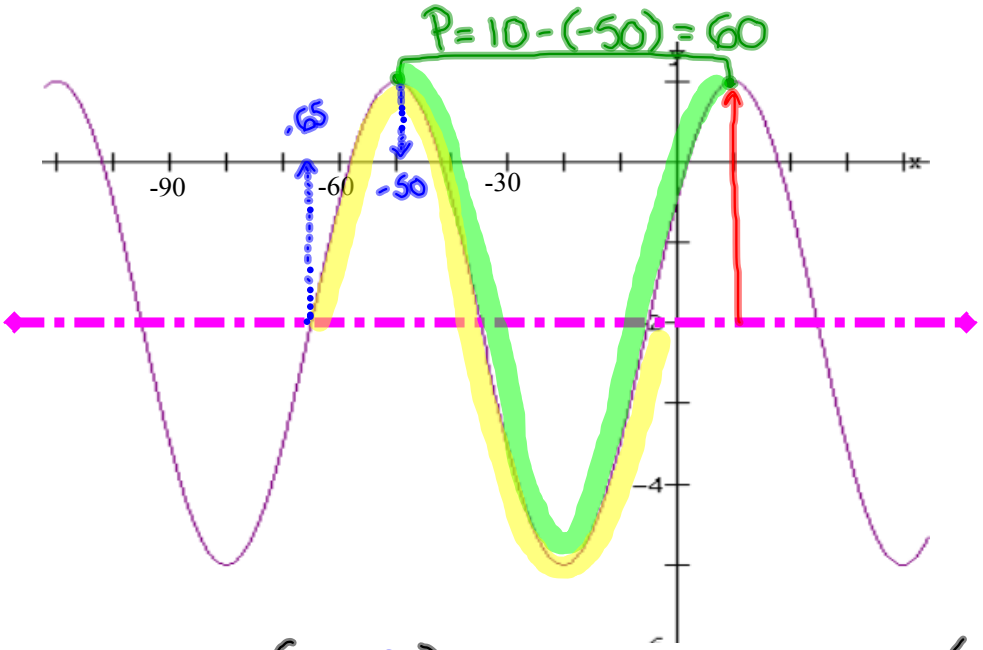
Warm Up

Determine both a sine and a cosine equation to describe the graph:



$A = 3$

$P = 60$

$k = \frac{360}{60} = 6$

$D = -2$

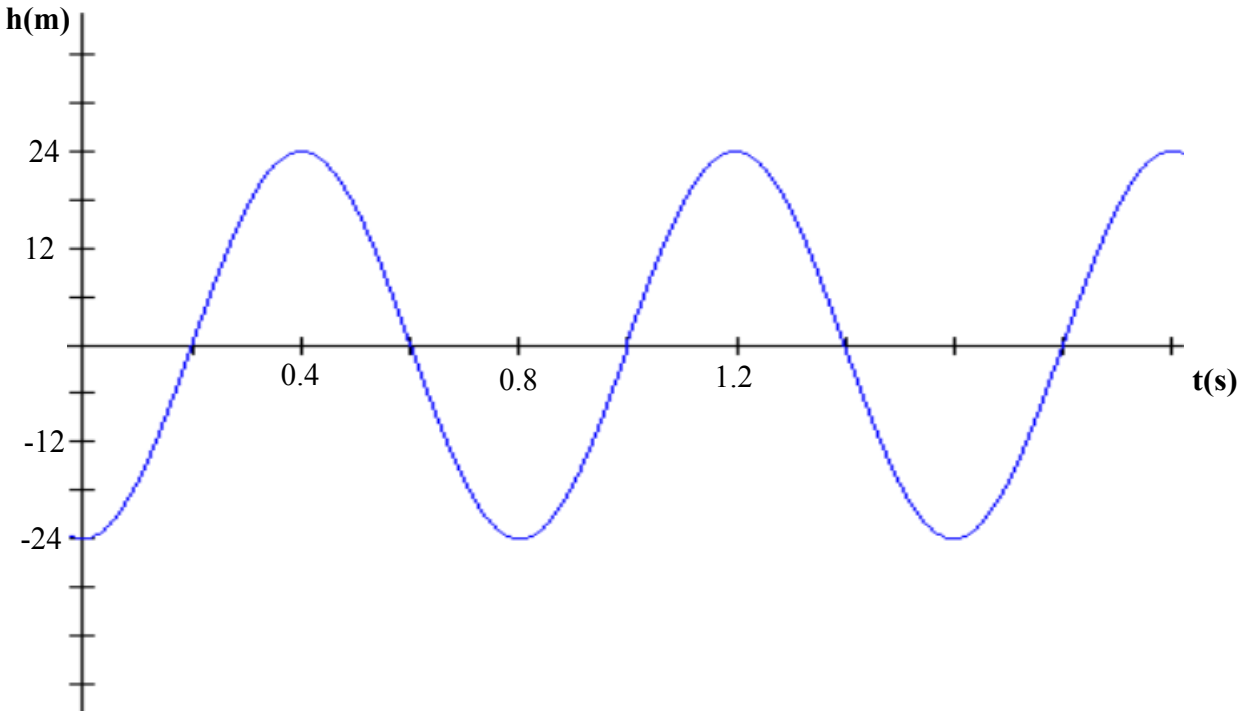
(+) $\sin(C = -65)$

$y = 3\sin[6(x+65)] - 2$

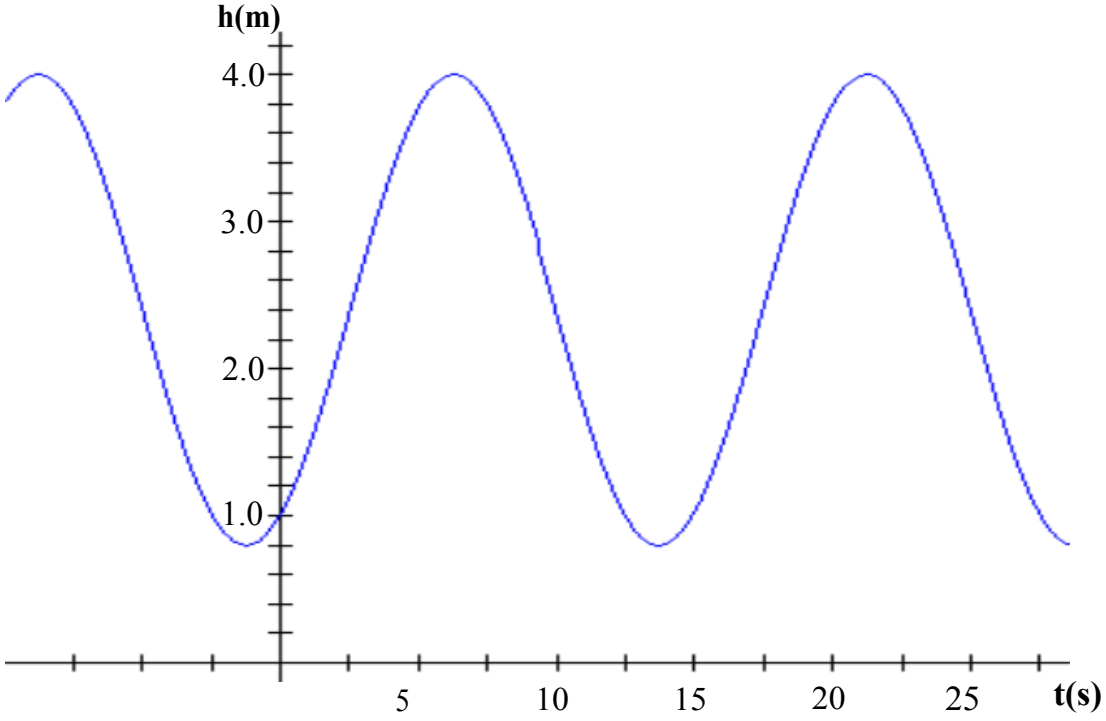
(+) $\cos(C = -50)$

$y = 3\cos[6(x+50)] - 2$

Sinusoidal Functions with Different Axes



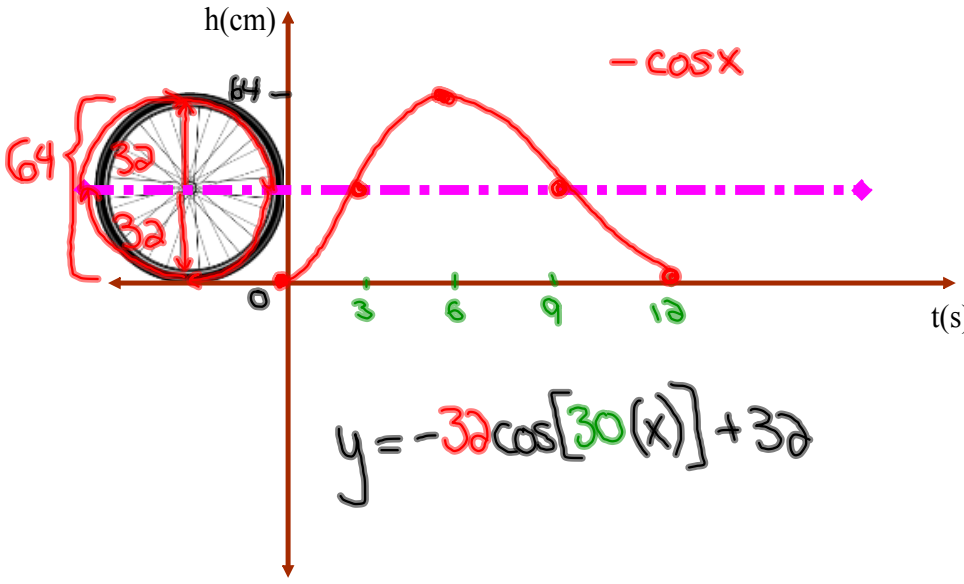
What about those not centered around the x-axis?



Radius = Amp.

Applications of Sinusoidal Functions

Johnny is driving his bike when a tack becomes stuck in his tire. The tire has a radius of 32 cm and makes one complete rotation every 12 s. Sketch the graph that describes the height of the tack in the tire as a function of time. Find an equation to model this problem.



$y = -32\cos[30(x)] + 32$

$A = 32$

$P = 12$

$K = 30$

$max = 64$

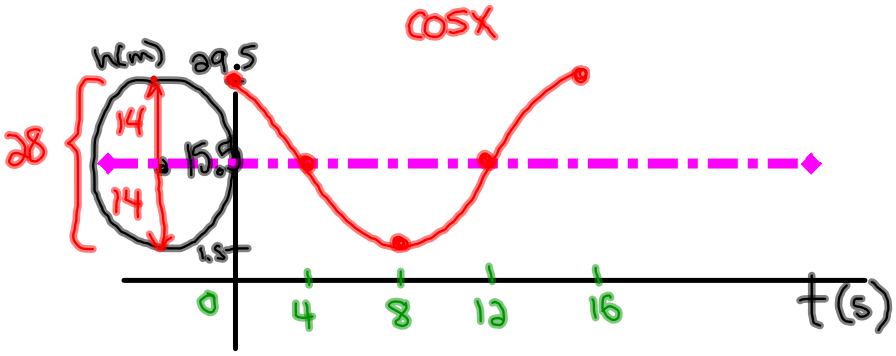
$min = 0$

$D = 32$

$C = 0$

Ferris Wheel

A carnival Ferris wheel with a radius of 14 m makes one complete revolution every 16 seconds. The bottom of the wheel is 1.5 m above the ground. If a person is at the top of the wheel when a stop watch is started, determine how high above the ground that person will be after 1 minute and 7 seconds? Sketch one period of this function.



$A = 14$

$P = 16$

$k = \frac{360}{16} = 22.5$

max = 29.5

min = 1.5

$D = 15.5$

$C = 0$

$y = 14\cos[22.5(x)] + 15.5$

Find y when x = 67s

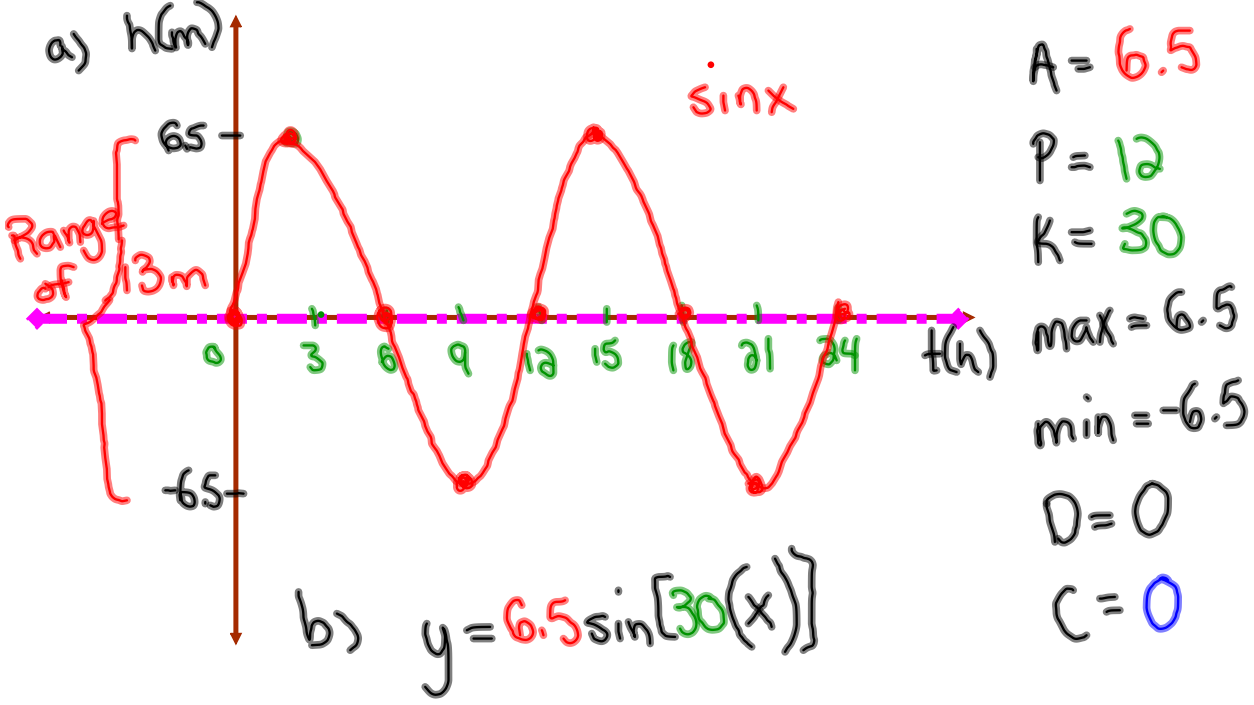
$y = 14\cos[22.5(67)] + 15.5$

$y = 20.86$ m

Ocean Tides

The alternating half-daily cycles of the rise and fall of the ocean are called tides. Tides in one section of the Bay of Fundy caused the water level to rise 6.5m above mean sea-level and to drop 6.5m below. The tide completes one cycle every 12 h. Assuming the height of water with respect to mean sea-level to be modelled by a sine function,

(a) draw the graph for a the motion of the tides for one complete day;
(b) find an equation for the graph in (a).



Homework

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