What's Going On?

Checking In

Minds on Height of a Pebble

Action! Problem Solving

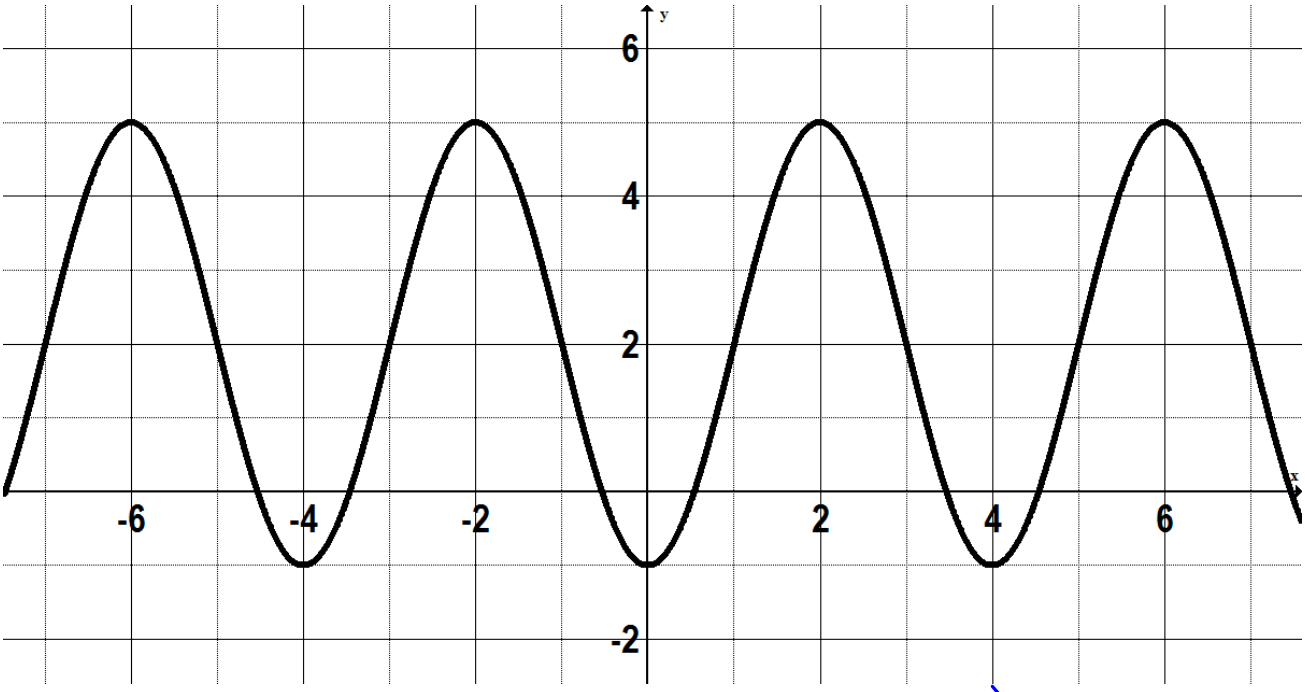
Consolidation Clear / Unclear

Learning Goal - I will be able to problem solve with sinusoidal functions.

LGL

We will take this up after RAFT

Create 4 possible equations for the curve below, use sin for 2 and cos for the other 2.

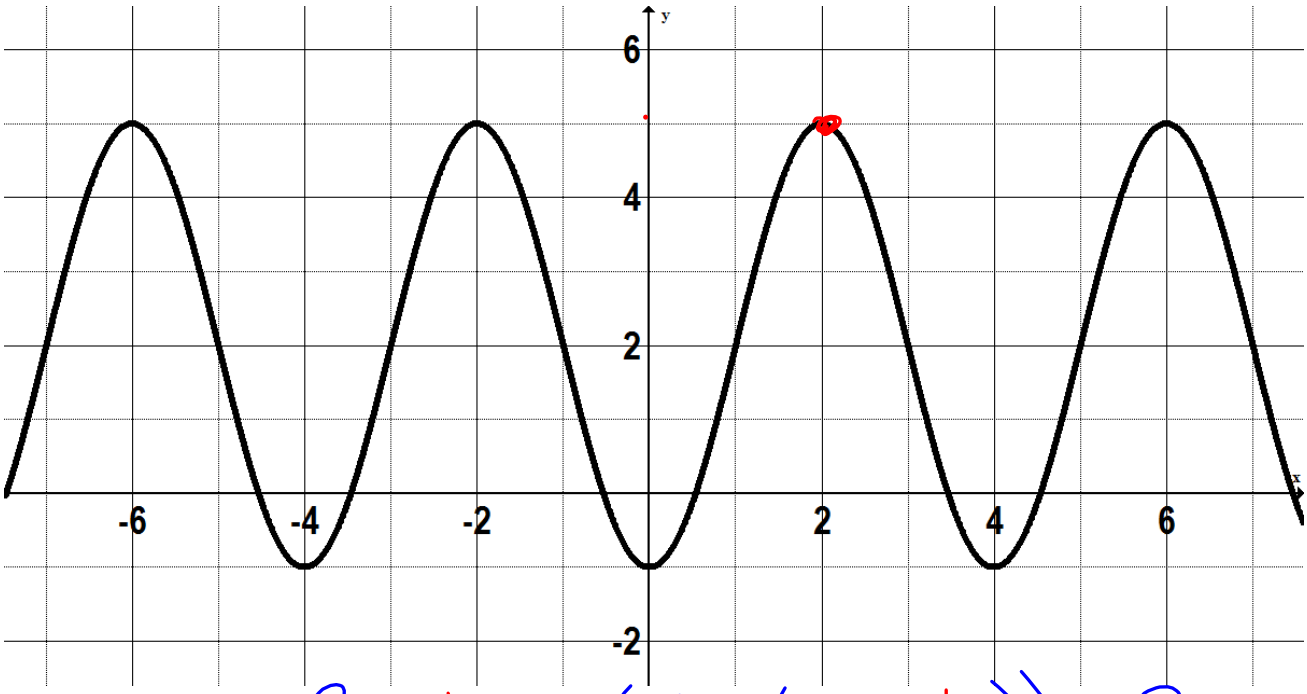


$y = 3 \_\_\_ (90(x \quad)) + 2$

Amplitude = 3

Equation of Axis = $y = 2$

Period = 4 $\frac{360}{4} = 90$



$y = 3 \sin(90(x-1)) + 2$

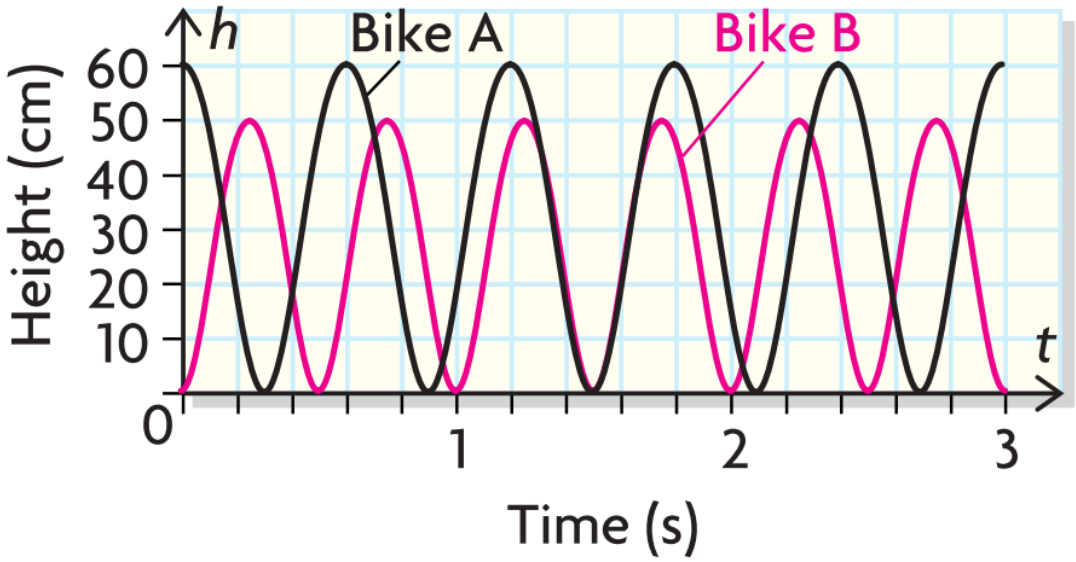
$y = -3 \sin(90(x+1)) + 2$

$y = -3 \cos(90x) + 2$

$y = 3 \cos(90(x-2)) + 2$

Minds on

Height of a Pebble



Create equations to model the height of each pebble over time.

Bike A

$h(t) = 30\cos(600t) + 30$

Period = 0.6 s $\frac{360}{0.6}$

Axis = 30

Amplitude = 30

Bike B

$h(t) = -25\cos(720t) + 25$

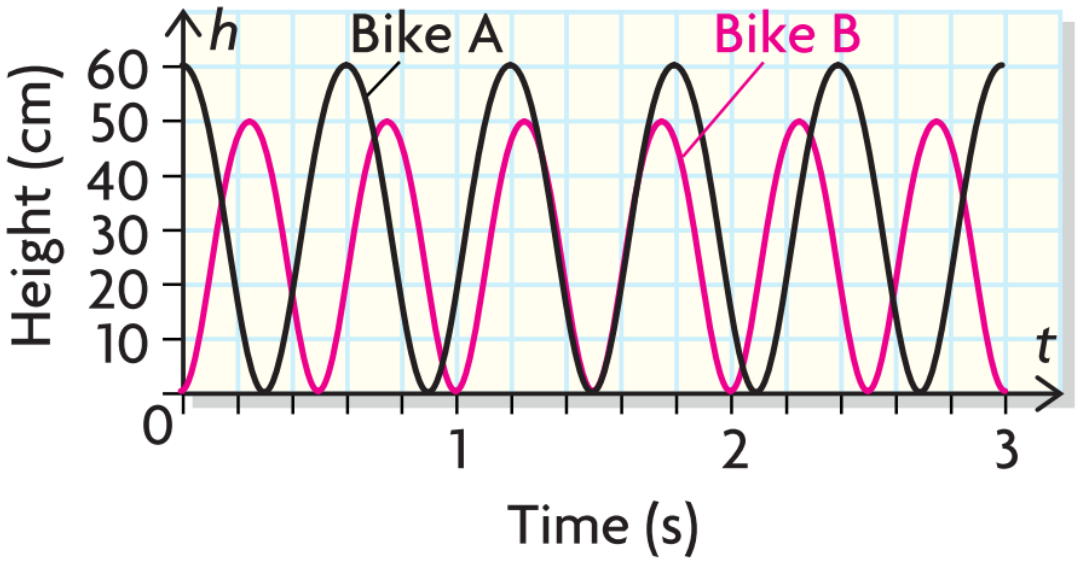
Period = 0.5 s $\frac{360}{0.5}$

Axis = 25

Amplitude = 25

Minds on

Height of a Pebble



Use your equations to determine the height of the pebble in each tire after 7.6 seconds.

$h(t) = 30\cos(600t) + 30$

$h(7.6) = 30\cos(600(7.6)) + 30$

$= 15$ cm

$h(t) = -25\cos(720t) + 25$

$h(7.6) = -25\cos(720(7.6)) + 25$

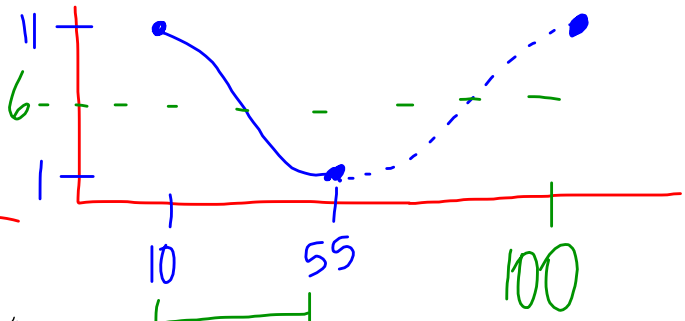
$\doteq 17.3$ cm

Action!

Problem Solving

A group of students is tracking a friend, John, who is riding a Ferris wheel. They know that John reaches the maximum height of 11 metres at 10 seconds and then reaches the minimum height of 1 metre at 55 seconds.

How can you develop the equation of a sinusoidal function that models John's height above the ground to determine his height at 78 s?



$\text{axis} = \frac{11+1}{2} = 6$

$\text{amplitude} = \frac{11-1}{2} = 5$

$\text{Period} = 90 \quad k = \frac{360}{90} = 4$

$h(t) = 5\cos(4(t-10)) + 6$

$h(78) = 5\cos(4(78-10)) + 6$

$= 5\cos(4(68)) + 6$

$= 5\cos(272) + 6$

$= 5(0.0349) + 6$

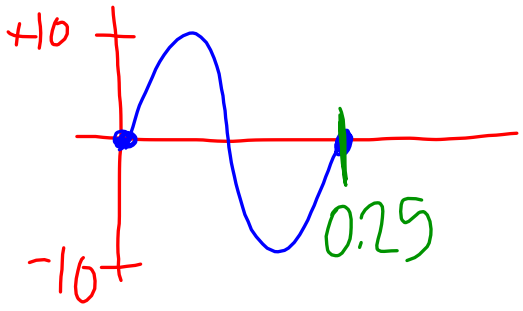
$\doteq 6.2\text{ m}$

Action!

Problem Solving

The top of a flagpole sways back and forth in high winds. The top sways 10 cm to the right (+10 cm) and 10 cm to the left (-10 cm) of its resting position and moves back and forth 240 times every minute. At t = 0, the pole was momentarily at its resting position. Then it started moving to the right.

Determine the equation of a sinusoidal function that describes the distance the top of the pole is from its resting position in terms of time.



$\text{period} = \frac{60}{240} = 0.25s$

$k = \frac{360}{0.25} = 1440°$

$d(t) = 10\sin(1440t)$

Consolidation

Clear / Unclear