What's Going On?

Checking In

Minds on sin or cos?

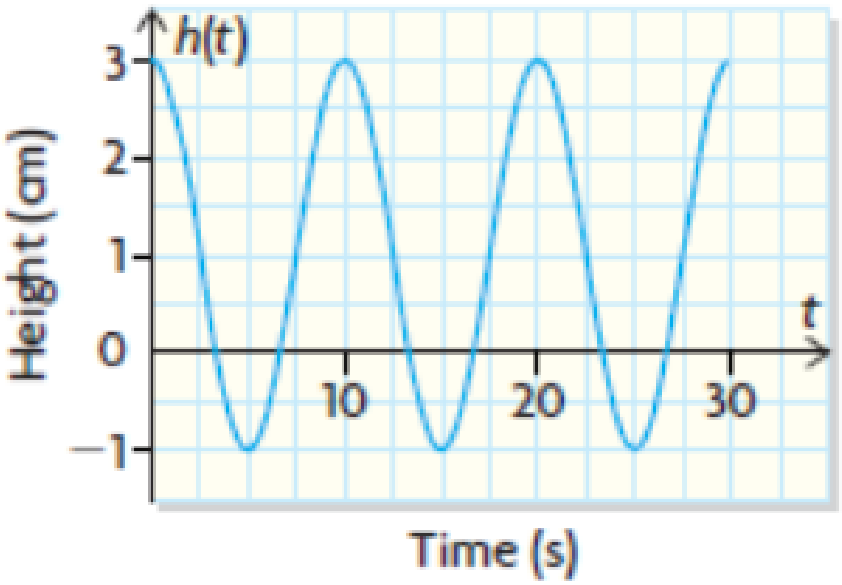
Action! Modelling Sinusoidal Functions

Consolidation Another Ferris Wheel!

Learning Goal - I will be able to model sinusoidal functions.

Minds on

sin or cos?



Action!

Modelling

Determine an equaon for the following graph:

using cos

$a = 2$

$k = 36$

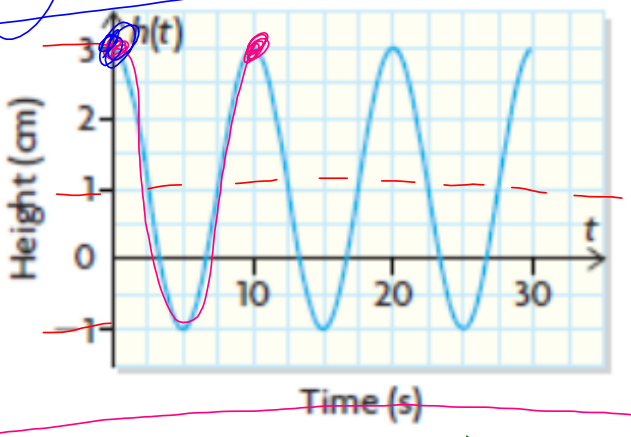
period $= \frac{360}{|k|}$

$10 = \frac{360}{k}$

$k = 36$

$d = 0$

$c = 1$

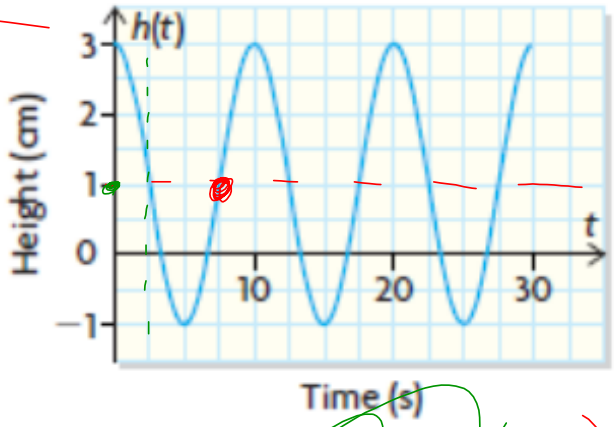


$h = a\_\_(k(t-d)) + c$

$h = 2\cos(36t) + 1$

Is there another equaon that could be used?

Use sin!



$a = 2$

$k = 36$

$d = 7.5$

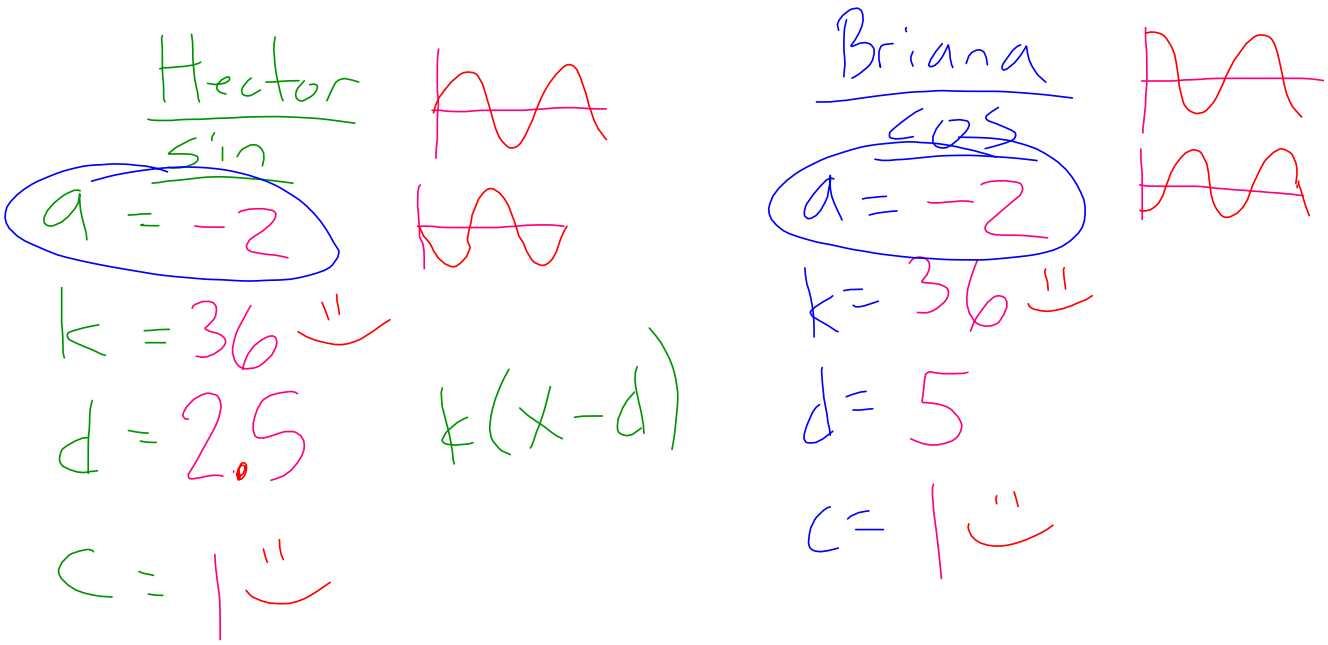
$c = 1$

$h = 2\sin(36(t - 7.5)) + 1$

$h = 2\sin(36t - 270) + 1$

$h = 2\cos(36t) + 1$

Hector says that the equation is actually $h(t) = -2\sin[36t - 90] + 1$, but Briana says that the equation should be $h(t) = -2\cos[36(t - 5)] + 1$. Who is correct? ***Explain.***



We can always change the sign of our a-value (flip about x-axis) and then change the d value (horizontal shift) to end up with equivalent curves in terms of sin and/or cos.

A sinusoidal funcon has an amplitude of 2 units, a period of 180°, and a maximum at (0, 3). Represent the funcon with an equaon in two different ways.

cos

$a = 2$

$k = 2$

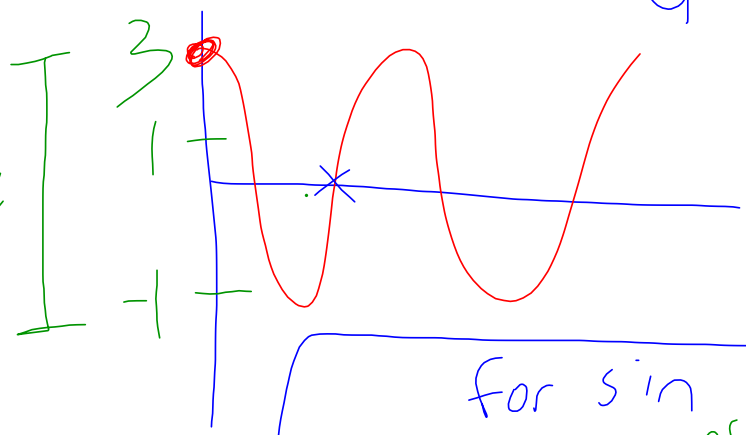
$d = 0$

$c = 1$

$y = 2\cos(2x) + 1$

↳ one sin

↳ one cos

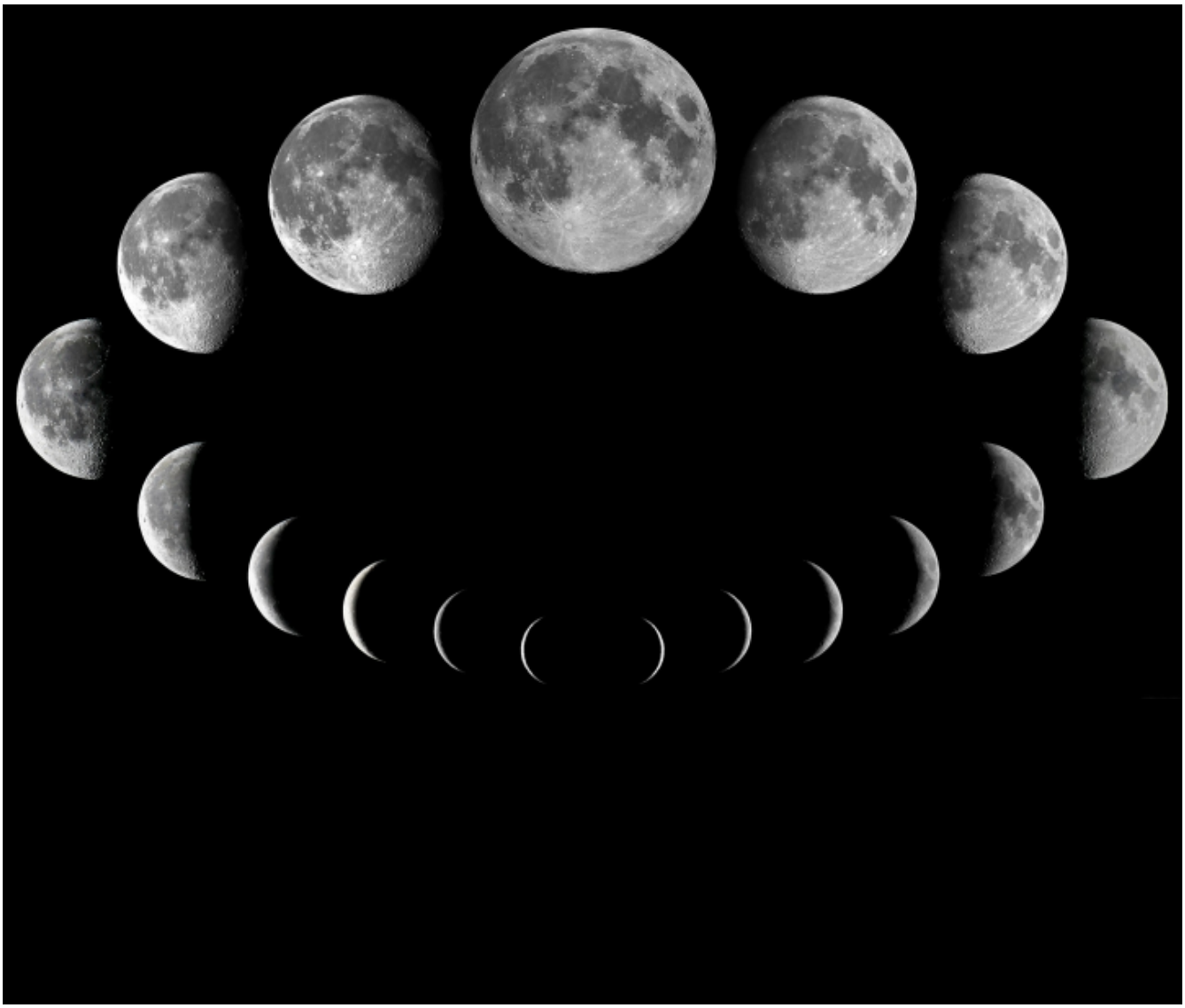


for sin

* or -270

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

$y = 2\sin(2(x + 45)) + 1$



Phases of the Moon

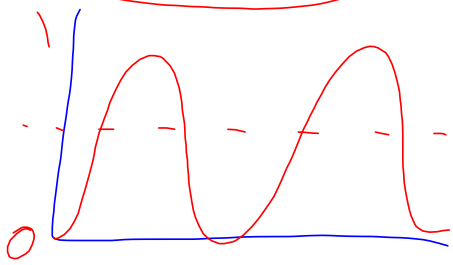
1. Create a function to model the phases of the moon for an entire year.

use cos

$a = -0.5$ $d = 0$

$k = 12\left(\frac{360}{30}\right)$

$c = 0.5$



$P = -0.5\cos(12d) + 0.5$

2. What is the period of your function?

   What significance does it have in terms of our calendar?

$\frac{360}{12} = 30$ days in a month

3. List the **dates** when the moon is full.

Consolidation

Another Ferris Wheel!

Mahew is riding a Ferris wheel at a constant speed of 10 km/h. The boarding height for the wheel is 1 m, and the wheel has a radius of 7 m. What is the equaon of the funcon that describes Mahew's height in terms of me, assuming Mahew starts at the highest point on the wheel?