

COSINE FUNCTIONS

Goal:

- to become familiar with the basic and transformed cosine function

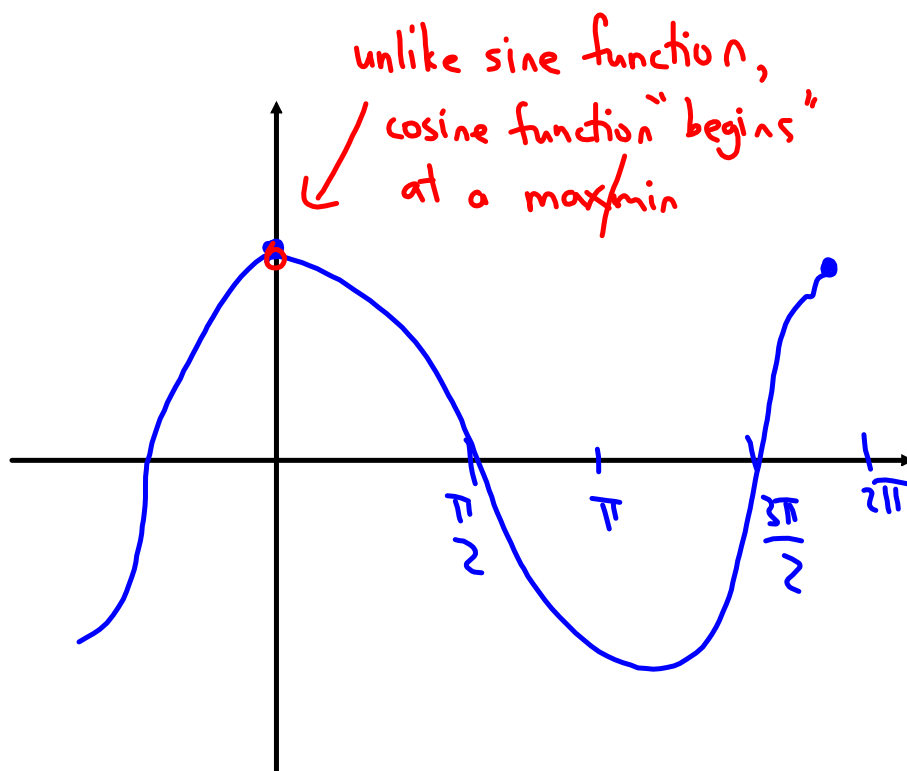
Like the sine function the cosine function is based on the unit circle.

the cosine function has the x-coord of a trig. point as the output.

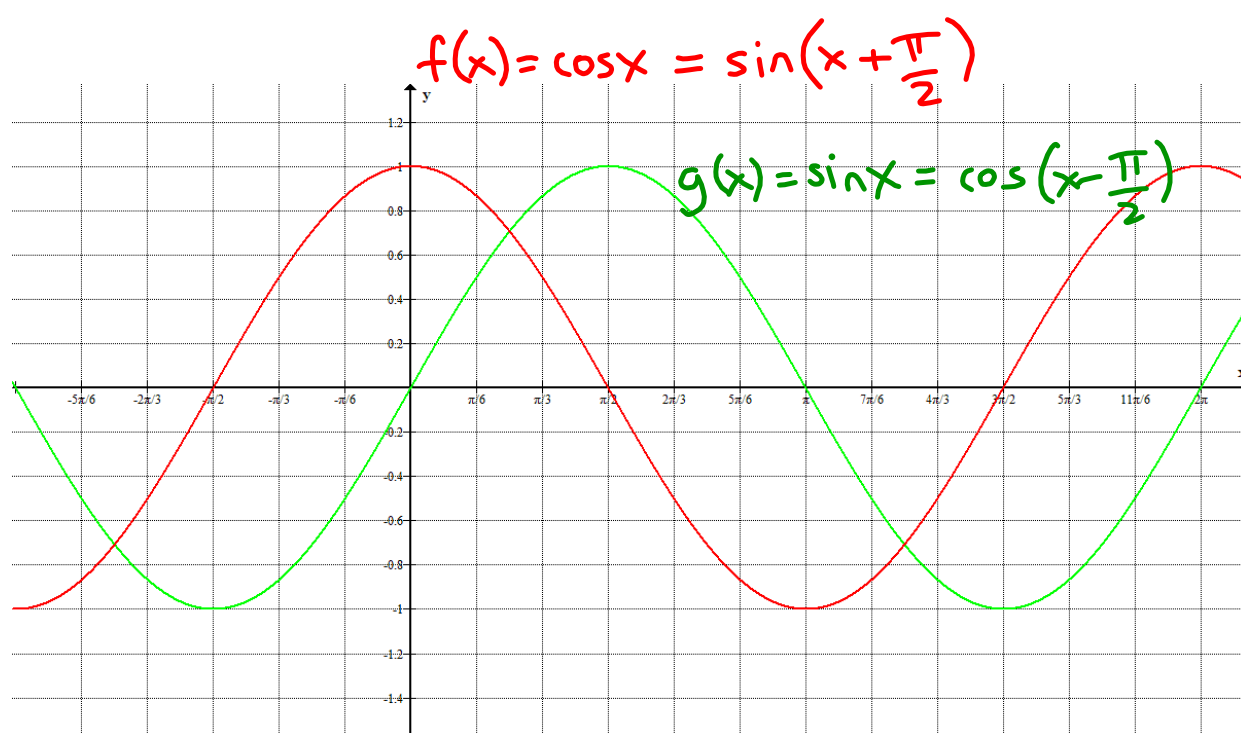
$$f(\theta) = \cos \theta$$



θ	$f(\theta)$
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1



If we look at both functions on the same graph:



The basic sine and cosine function are
"out of phase" by $\frac{\pi}{2}$

The parameters have the same effect on both sine and cosine functions:

$$|a| = A = \text{amplitude} = \frac{\text{max} - \text{min}}{2}$$

$$\text{period} = p = \frac{2\pi}{|b|} \quad |b| = \frac{2\pi}{p}$$

$$k = \text{mean y-value or midline} = \frac{\text{max} + \text{min}}{2}$$

$$h = \text{x-coord of min or max}$$

a - at

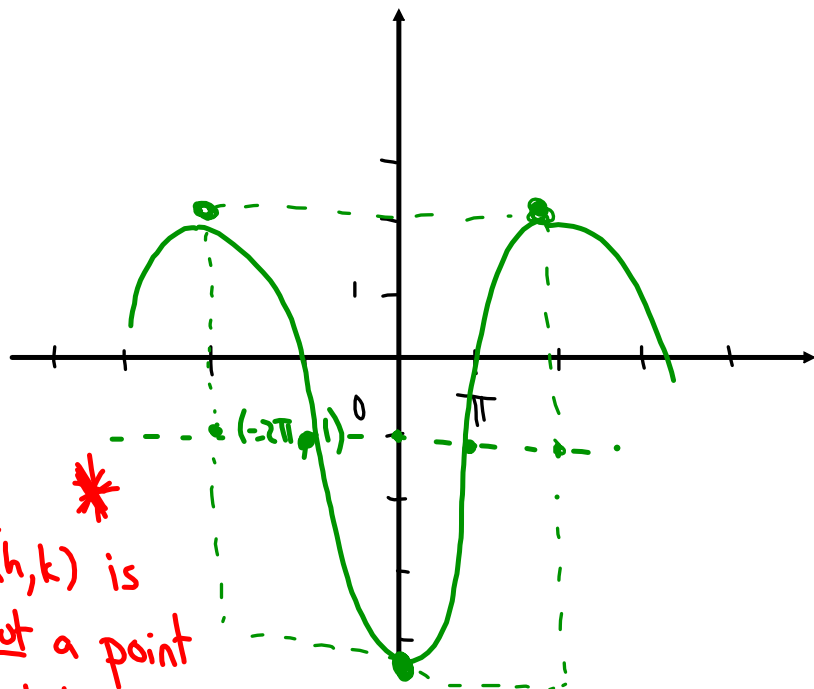
$$f(x) = 3 \cos\left(\frac{1}{2}x + \pi\right) - 1 = 3 \cos\frac{1}{2}(x + 2\pi) - 1$$

$$A = 3$$

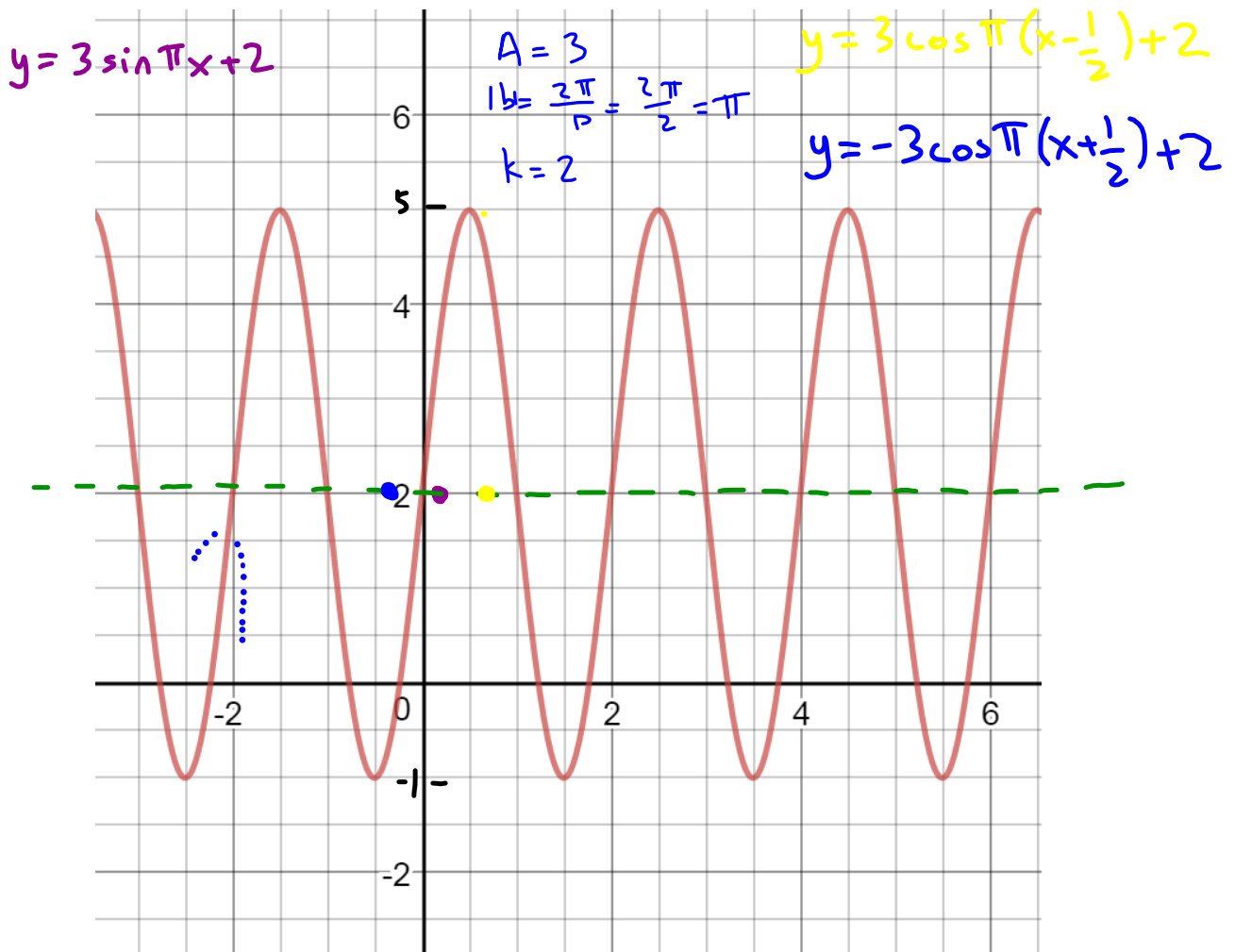
$$p = \frac{2\pi}{\frac{1}{2}} = 4\pi$$

$$k = -1$$

$$h = -2\pi$$



*
(h, k) is
not a point
that belongs to the
function



$h = x$ -coord of max $a +$
 x -coord of min $a -$

p. 109
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