

Graph the function  $f(x) = 3\cos(2x - \pi) + 3$

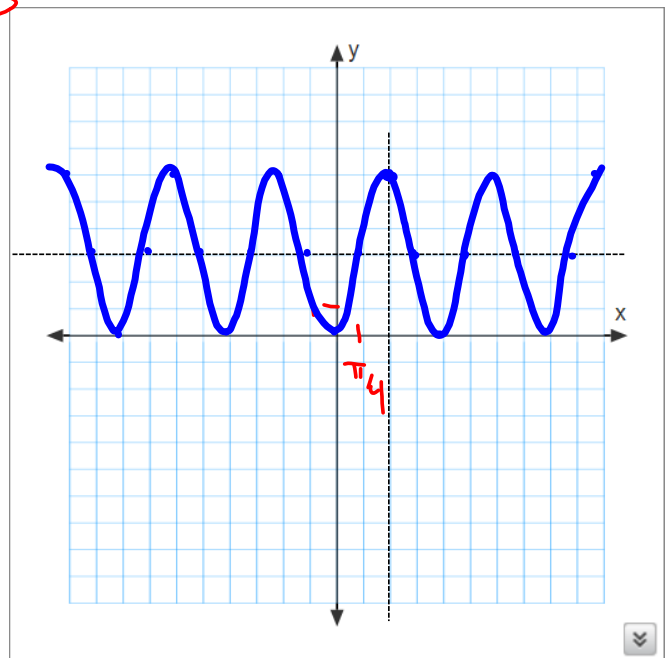
$$f(x) = 3\cos\left(2\left(x - \frac{\pi}{2}\right)\right) + 3$$

$$a = 3 \Rightarrow A = 3$$

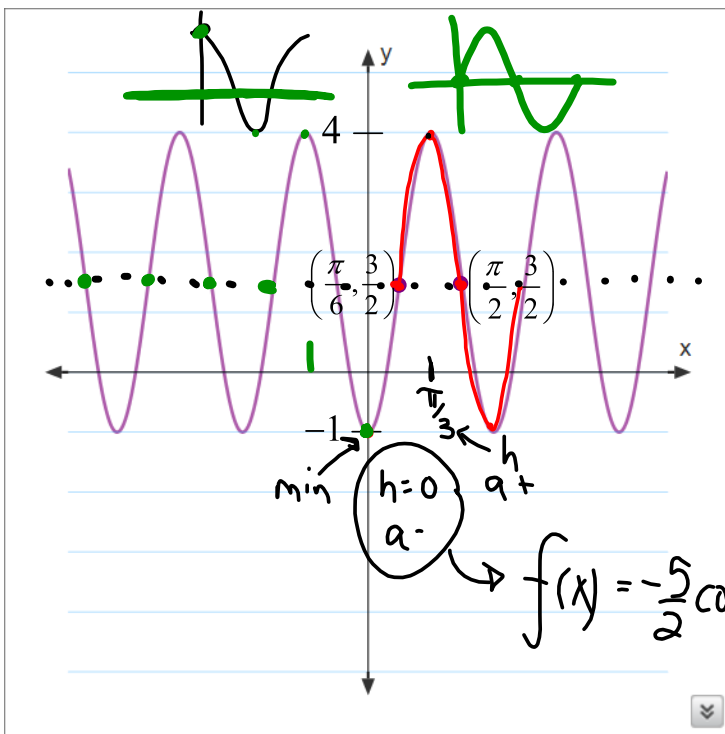
$$k = 3 \Rightarrow \begin{array}{l} \text{max} = 6 \\ \text{min} = 0 \end{array}$$

$$b = 2 \Rightarrow p = \frac{2\pi}{2} = \pi$$

$a^+$



Determine an equation that represents the function below.



$$A = \frac{4 - (-1)}{2} = \frac{5}{2} = 2.5$$

$$a = \pm 2.5$$

$$\frac{1}{2}P = \frac{\pi}{2} - \frac{\pi}{6} = \frac{\pi}{3}$$

or

$$\frac{1}{4}P = \frac{\pi}{6}$$

$$P = \frac{2\pi}{3}$$

$$\therefore b = 2\pi \div \frac{2\pi}{3} = 3$$

$$k = 4 - 2.5 = 1.5 = \frac{3}{2}$$

$$f(x) = -\frac{5}{2} \cos(3x) + \frac{3}{2}$$

## Finding the Zeros

Examples

1)  $f(x) = 2\cos(x-5) - 1$

$$0 = 2\underbrace{\cos(x-5)}_{\text{isolate}} - 1$$

$$1 = 2\cos(x-5)$$

$$\frac{1}{2} = \cos(x-5)$$

$$\frac{\pi}{3} = x-5$$

$$5 + \frac{\pi}{3} = x$$

$$\frac{15 + \pi}{3} = x$$

$$\frac{5\pi}{3} = x-5$$

$$\frac{5\pi}{3} + 5 = x$$

$$\frac{15 + 5\pi}{3} = x$$

$$p = \frac{2\pi}{b} = 2\pi$$

$$\left\{ \frac{15 + \pi}{3} + 2\pi n, \frac{15 + 5\pi}{3} + 2\pi n \right\}$$

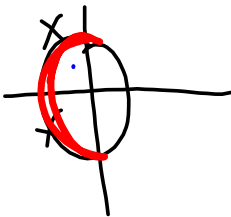
$$n \in \mathbb{Z}$$

$$2) \quad f(x) = 2 \cos(\pi x) + \frac{3}{2}$$

$$0 = 2 \cos(\pi x) + \frac{3}{2}$$

$$-\frac{3}{2} = 2 \cos(\pi x)$$

$$-\frac{3}{4} = \cos(\pi x)$$



$$\cos^{-1}\left(-\frac{3}{4}\right) = \pi x$$

$$\textcircled{1} \quad 2.4189 = \pi x \quad \text{Q}_2$$

$$0.7699 = x$$

$$\textcircled{2} \quad \underline{\underline{2\pi}} - 2.4189 = 3.8643 = \pi x$$

$$1.2301 = x$$

$$P = \frac{2\pi}{\pi} = 2$$

$$x = \left\{ 0.7699 + 2n, 1.2301 + 2n \right\}, n \in \mathbb{Z}$$

**THE FERRIS WHEEL**

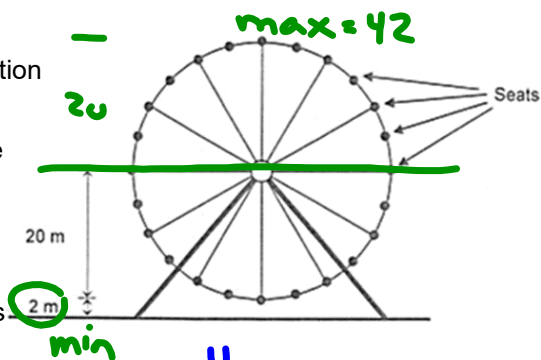
The seats on a Ferris wheel are positioned 20 m from its centre. The bottom of the wheel is located 2 m above the ground.

The wheel turns at a constant speed. It completes one rotation in 16 minutes.

You get on the ride by taking a seat when it is located at the bottom of the wheel.

Karen took a seat on the Ferris wheel; it continued to rotate and then it stopped exactly 10 minutes after she sat down.

How far above the ground was Karen's seat when the Ferris wheel stopped?

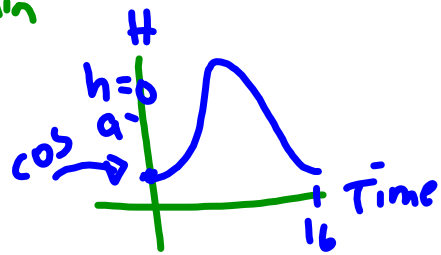


$$A = \frac{42 - 2}{2} = 20 \Rightarrow a = \pm 20$$

$$k = 22$$

$$p = 16 \quad b = \frac{2\pi}{16} = \frac{\pi}{8}$$

$$y = -20\cos\left(\frac{\pi}{8}x\right) + 22$$



$$10 = x$$

$$y = -20\cos\left(\frac{\pi}{8}x\right) + 22$$

$$\text{let } x = 10$$

$$y = -20\cos\left(\frac{10\pi}{8}\right) + 22$$

$$y = -20\cos\left(\frac{5\pi}{4}\right) + 22$$

$$y = \underline{36.1421\text{m}}$$