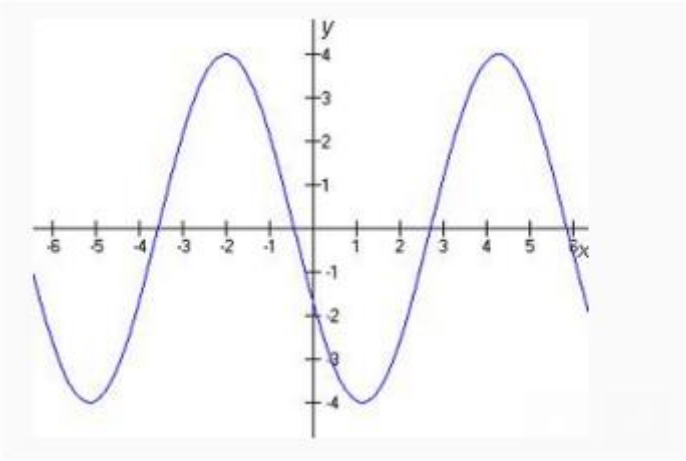
Answer on Question #58376 – Math – Trigonometry

Question

1. Let the function $f(x)$ have the form $f(x) = Acos(x + C)$. To produce a graph that matches the one shown below? What must the value of C be?



2

3

4

1

Solution

Parameter C in such kind of function means a horizontal shift. According to graph, shift value is equal to 2.

Answer: 2.

Question

2. For the function $y = -1 + 6\cos(\frac{2\pi}{7}(x - 5))$, what is the maximum value?

Solution

Function cos(x) has a maximum value of 1, then maximum value of the given function is

$$-1 + 6 \cdot 1 = -1 + 6 = 5$$

Answer: 5.

Question

3. For the function $y = -1 + 6\cos(\frac{2\pi}{7}(x - 5))$, what is the minimum value?

Solution

Function cos(x) has a minimum value of -1, then minimum value of given function is

$$-1 + 6 \cdot (-1) = -1 - 6 = -7$$

Answer: -7.

Question

4. Which of the following are vertical asymptotes of the function $y = 3\cot(2x) - 4$?

Check all that apply.

$x = \pi$

$x = 2\pi$

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

$x = \pm\frac{\pi}{2}$

Answer: $x = \pi,\ x = 2\pi,\ x = \pm\frac{\pi}{2}$, i.e. all except for $x = \frac{\pi}{3}$.

Question

5. Which of the following are equivalent to the function $y = -3\sin x + 2$?

Check all that apply

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

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

$y = -3\sin x - 2$

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

Solution

There are reduction formula in trigonometry. It says Any trigonometric function whose argument is $\frac{\pi}{2} \pm x, \pi \pm x, 2\pi \pm x$ can be written simply in terms of x, in particular $\cos\left(x + \frac{\pi}{2}\right) = -\sin x$, and $\cos\left(x - \frac{\pi}{2}\right) = \sin x$. This means the first and the second options are equivalent to the function $y = -3\sin x + 2$.

Function $sin\ x$ is symmetric with respect to the origin $(0; 0)$, it means $sin\ (-x) = -sin\ x$, so the last option is correct too.

Answer: $y = 3\cos\left(x + \frac{\pi}{2}\right) + 2, y = -3\cos\left(x - \frac{\pi}{2}\right) + 2, y = 3\sin(-x) + 2.$