

Quiz 5

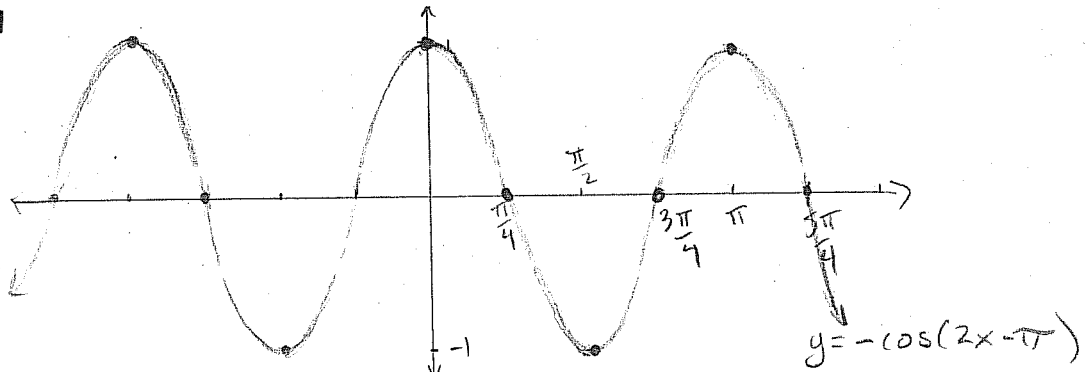
Question 1. (4 marks) Find $\cos 2x$ if $\cos x = -\frac{12}{13}$ and x is in the third quadrant.

$$\begin{aligned} \cos 2x &= 2\cos^2 x - 1 = 2\left(-\frac{12}{13}\right)^2 - 1 \\ &= 2\left(\frac{144}{169}\right) - 1 = \frac{288}{169} - 1 = \frac{119}{169} \end{aligned}$$

Question 2. (3 marks) Graph

$y = -\cos(2x - \pi)$ AMPLITUDE: 1 PERIOD: $\frac{2\pi}{2} = \pi$ SHIFT: $-\frac{\pi}{2}$

x	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
y	1	0	-1	0	1



Question 3. (4 marks.) Solve the following system:

$$\begin{aligned} 2x + 3y + z &= 2 & \textcircled{1} \\ -x + 2y + 3z &= -1 & \textcircled{2} \times 2 \\ -3x - 3y + z &= 0 & \textcircled{3} \end{aligned}$$

$$\begin{aligned} 2x + 3y + z &= 2 \\ -2x + 4y + 6z &= -2 \\ \hline 7y + 7z &= 0 \end{aligned}$$

STEP 1

$$\begin{aligned} \textcircled{1} \times 3 & \quad -3x + 6y + 9z = -3 \\ \textcircled{3} & \quad -(-3x - 3y + z = 0) \\ \hline & \quad 9y + 8z = -3 \end{aligned}$$

STEP 2

$$\begin{aligned} 7y + 7z = 0 & \Rightarrow 7z = -7y \\ 9y + 8z = -3 & \Rightarrow z = -y \end{aligned}$$

SUBSTITUTION

$$\begin{aligned} 9y + 8(-y) &= -3 \\ 9y - 8y &= -3 \\ y &= -3 \end{aligned}$$

STEP 3

plug into $7y + 7z = 0$

$$\begin{aligned} 7(-3) + 7z &= 0 \\ 7z &= 21 \\ z &= 3 \end{aligned}$$

$$\begin{aligned} -x + 2(-3) + 3(3) &= -1 \\ -x - 6 + 9 &= -1 \\ -x + 3 &= -1 \\ -x &= -4 \\ x &= 4 \end{aligned}$$

$\therefore x = 4, y = -3, z = 3$