

QUIZ #3 @ 60 points

Solutions

1. Graph the following functions on graphing paper. In each case, identify the amplitude (when defined) and the period and label the axes accurately. Clearly label the problems. Explain in words what and how you are graphing.

a) $y = 1 + \sin x$ from -2π to 4π

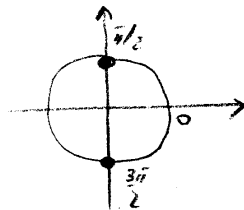
c) $y = 4 \sin \frac{1}{3}x$ over one period

b) $y = -2 \cos x$ over one period

d) $y = \tan 2x$ over one period

2. Find all real numbers x that satisfy each equation. You may show all work on this sheet of paper. Justify your answers.

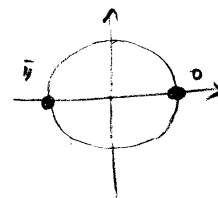
a) $\cos x = 0$



$$x = \pm \frac{\pi}{2}, \pm \frac{3\pi}{2}, \pm \frac{5\pi}{2}, \pm \frac{7\pi}{2}, \text{ etc}$$

$$x \in \left\{ (2k+1)\frac{\pi}{2} \mid k \in \mathbb{Z} \right\}$$

b) $\sin x = 0$



$$x = 0, \pm \pi, \pm 2\pi, \pm 3\pi, \text{ etc}$$

$$x \in \{ k\pi \mid k \in \mathbb{Z} \}$$

c) $\tan x = 0$

 \Leftrightarrow

$$\frac{\sin x}{\cos x} = 0$$

 \Leftrightarrow

$$\sin x = 0$$

 \Leftrightarrow

$$x \in \{ k\pi \mid k \in \mathbb{Z} \}$$

d) $\cot x = 0$

 \Leftrightarrow

$$\frac{\cos x}{\sin x} = 0$$

 \Leftrightarrow

$$\cos x = 0$$

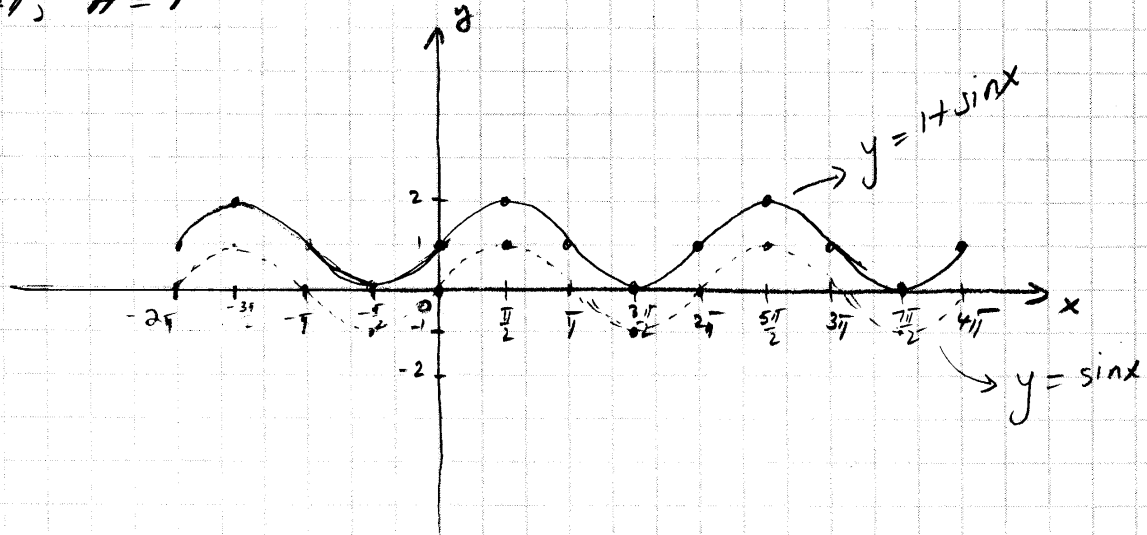
 \Leftrightarrow

$$x \in \left\{ (2k+1)\frac{\pi}{2} \mid k \in \mathbb{Z} \right\}$$

(a) $y = 1 + \sin x$

1st graph $y = \sin x$
 2nd shift the graph of $y = \sin x$ one unit up

$T = 2\pi, A = 1$

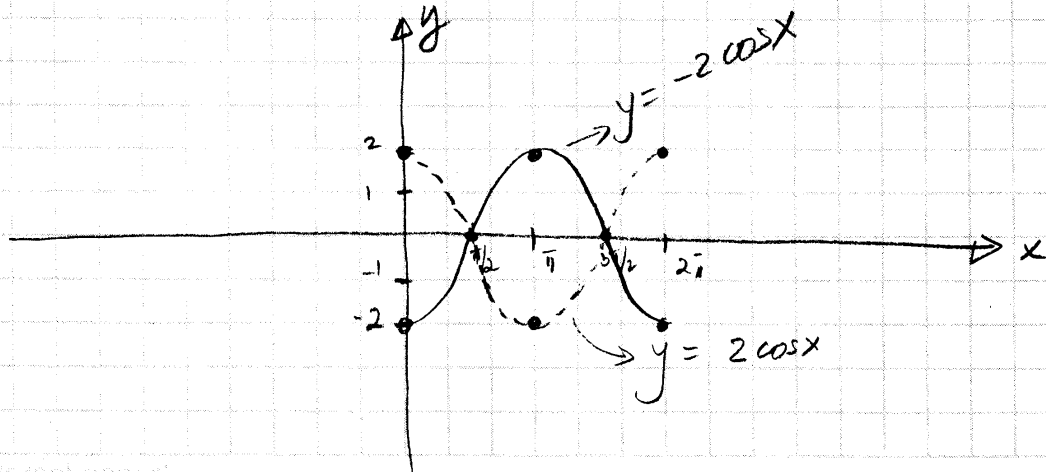


(b) $y = -2 \cos x$

$T = 2\pi$

$A = |-2| = 2$

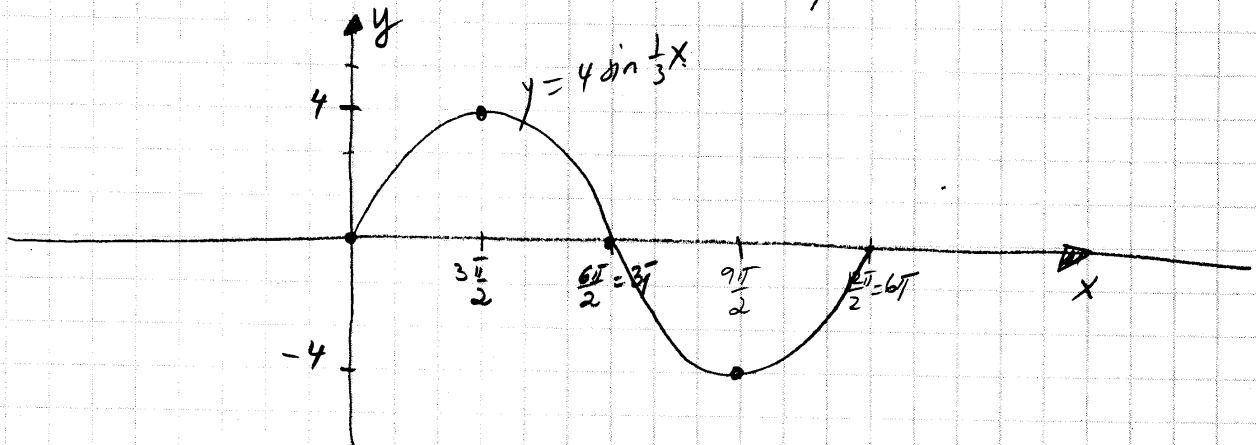
Take $[0, 2\pi]$, divide it into 4 equal intervals (each of length $\pi/2$), sketch a cosine curve of amplitude 2, then reflect about the x-axis



c) $y = 4 \sin \frac{1}{3}x$

$T = \frac{2\pi}{\frac{1}{3}} = 6\pi$, $A = 4$

Take $[0, 6\pi]$, divide it into 4 equal parts (each $\frac{6\pi}{4} = \frac{3\pi}{2}$) and sketch a sine curve of amplitude 4.



d) $y = \tan 2x$

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

Take $(-\frac{\pi}{4}, \frac{\pi}{4})$ and sketch a tangent curve.

$A = \text{not defined}$

