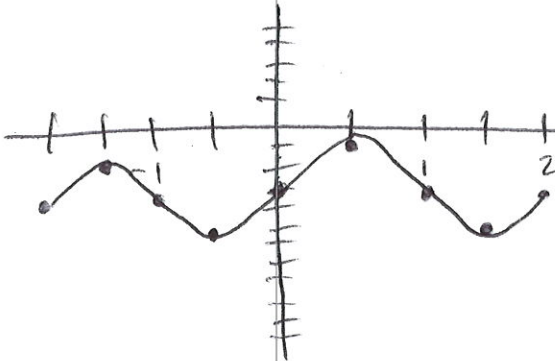


Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Sketch the graph of $f(x) = 2 \sin(\pi x) - 3$ using key points.

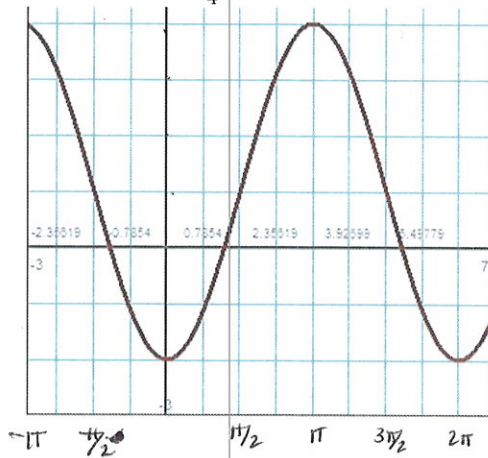


$$T = \frac{2\pi}{\pi} = 2$$

x	0	$\frac{1}{2}$	π	$3\frac{1}{2}$	2π
	0	$\frac{1}{2}$	1	$\frac{3}{2}$	2

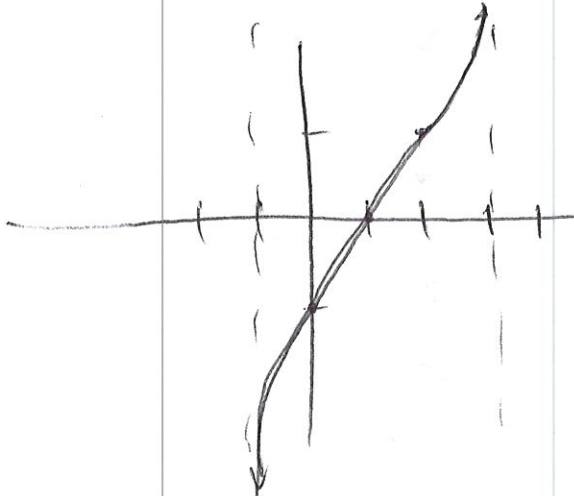
	0	1	0	-1	0
	0	2	0	-2	0
	-3	-1	-3	-5	-3

2. Find an expression for the function shown in the graph below. Grids on the horizontal axis are in multiples of $\frac{\pi}{4}$, and on the vertical axis in ones.



$$-3 \cos(x) + 1 = y$$

3. Sketch the graph of $g(x) = \tan\left(x - \frac{\pi}{4}\right)$ using key points. State the domain and range. Then give an equation of its inverse. What the domain and range of the inverse?



Domain $x \neq \left\{ \dots, -\frac{\pi}{4}, \frac{3\pi}{4}, \frac{7\pi}{4}, \frac{11\pi}{4}, \dots \right\}$
 or $\frac{(4x+3)\pi}{4} \neq x$

Range: $(-\infty, \infty)$