

Quiz 1

1. [3 points] Determine whether the following functions are even, odd, or neither.

(a) $f(x) = \sin x$

$$\sin(-x) = -\sin x, \text{ so } \boxed{\text{odd}}$$

(b) $g(x) = 1 - x$

$$g(-x) = 1 + x \leftarrow \text{This is neither } g(x) \text{ nor } -g(x), \text{ so}$$

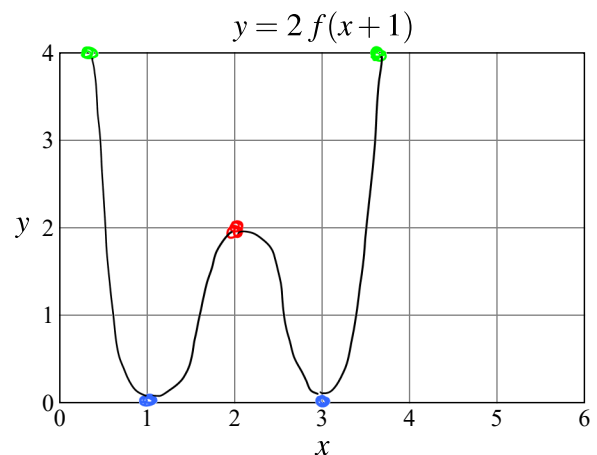
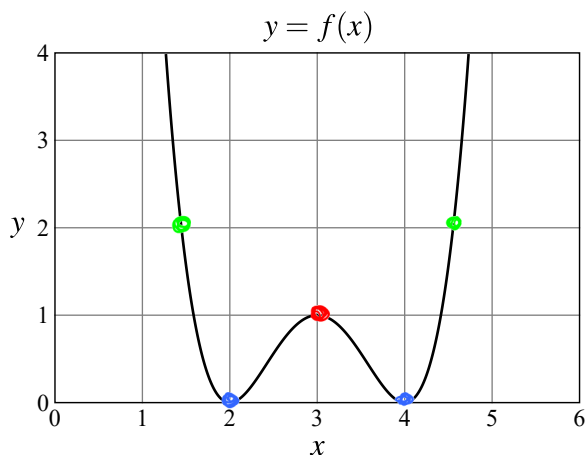
$$\boxed{\text{neither}}$$

(c) $h(x) = 1 + x^2$

$$h(-x) = 1 + (-x)^2 = 1 + x^2 = h(x)$$

$\boxed{\text{even}}$

2. [5 points] The graph of a function $f(x)$ is shown below. Sketch a graph of the function $2f(x+1)$ on the axes to the right.



Scale $\times 2$ vertically, shift -1 horizontally.

3. [4 points] Find a formula for $f^{-1}(x)$ if $f(x) = \frac{1}{x-3}$.

$$x = \frac{1}{y-3}$$

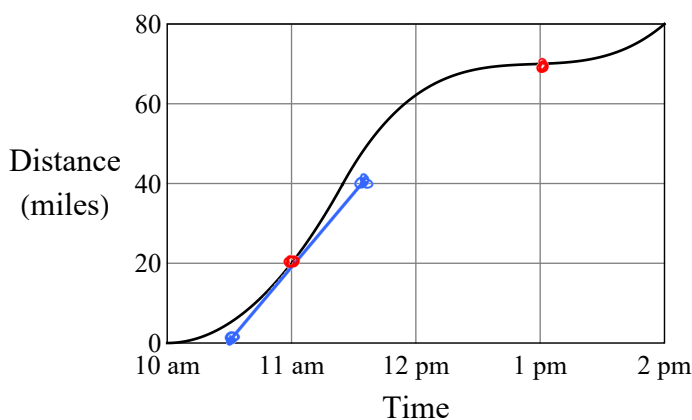
$$x(y-3) = 1$$

$$y-3 = \frac{1}{x}$$

$$y = \frac{1}{x} + 3$$

$$f^{-1}(x) = \frac{1}{x} + 3$$

4. [8 points] The following graph shows the distance traveled by a bicyclist over the course of a four-hour race.



- (a) Estimate the average speed of the bicyclist between 11 am and 1 pm.

$$\frac{70 \text{ mi} - 20 \text{ mi}}{1 \text{ pm} - 11 \text{ am}} = \frac{50 \text{ mi}}{2 \text{ hours}} = 25 \text{ mi/hour}$$

- (b) Estimate the instantaneous speed of the bicyclist at 11 am.

This is the slope of the tangent line.

$$\frac{40 \text{ mi} - 0 \text{ mi}}{11:30 - 10:30} = \frac{40 \text{ mi}}{1 \text{ hour}} = 40 \text{ mi/hour}$$