

## Assignment #1.1a

Pages 21-22 #5-8, 21, 27, 29

5. Not a function. Does not pass the vertical line test.

6. Yes the graph is a function since it passes the vertical line test.

Domain:  $[-2, 2]$       Range:  $[-1, 2]$

7. Yes the curve is the graph of a function since it passes the vertical line test.

Domain:  $[-3, 2]$       Range:  $[-3, -2) \cup [-1, 3]$

8. Not a function since the curve does not pass the vertical line test.

$$21. f(x) = 3x^2 - x + 2$$

$$f(2) = 3(2)^2 - 2 + 2 = 12$$

$$f(-2) = 3(-2)^2 + 2 + 2 = 16$$

$$f(a) = 3a^2 - a + 2$$

$$f(-a) = 3(-a)^2 - (-a) + 2 = 3a^2 + a + 2$$

$$\begin{aligned} f(a+1) &= 3(a+1)^2 - (a+1) + 2 \\ &= 3(a^2 + 2a + 1) - a - 1 + 2 \\ &= 3a^2 + 6a + 3 - a - 1 + 2 \\ &= 3a^2 + 5a + 4 \end{aligned}$$

$$2f(a) = 2[3a^2 - a + 2] = 6a^2 - 2a + 4$$

$$f(2a) = 3(2a)^2 - 2a + 2 = 3(4a^2) - 2a + 2 = 12a^2 - 2a + 2$$

$$f(a^2) = 3(a^2)^2 - a^2 + 2 = 3a^4 - a^2 + 2$$

$$[f(a)]^2 = [3a^2 - a + 2]^2$$

	$3a^2$	$-a$	$+2$
$3a^2$	$9a^4$	$-3a^3$	$6a^2$
$-a$	$-3a^3$	$a^2$	$-2a$
$+2$	$6a^2$	$-2a$	$4$

$$= 9a^4 - 6a^3 + 13a^2 - 4a + 4$$

$$f(a+h) = 3(a+h)^2 - (a+h) + 2$$

$$= 3(a^2 + 2ah + h^2) - a - h + 2$$

$$= 3a^2 + 6ah + 3h^2 - a - h + 2$$

27.  $f(x) = \frac{x}{3x-1}$

$$3x-1 \neq 0$$
$$x \neq \frac{1}{3}$$

Domain:  $\mathbb{R}$  except  $x = \frac{1}{3}$  or  $(-\infty, \frac{1}{3}) \cup (\frac{1}{3}, \infty)$

29.  $f(t) = \sqrt{t} + \sqrt[3]{t}$

$\swarrow$                        $\downarrow$   
 $t \geq 0$                       no restrictions

Domain:  $[0, \infty)$