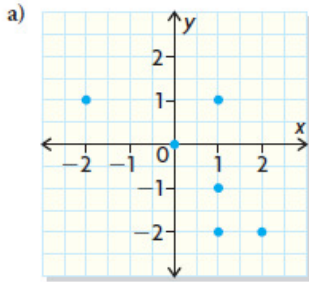


ReviewSol

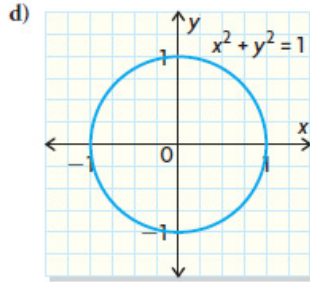
May 8, 2015 12:21 PM

1. a) domain = $\{-3, -1, 0, 4\}$, range = $\{0, 1, 5, 6\}$; not a function, because two y -values are assigned to $x = 0$
- b) domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R}\}$; function, because each x -value has only one y -value assigned
- c) domain = $\{x \in \mathbf{R} \mid x \geq -4\}$, range = $\{y \in \mathbf{R}\}$; not a function, because each $x > -4$ has two y -values assigned
- d) domain = $\{x \in \mathbf{R} \mid -4 \leq x \leq 4\}$, range = $\{y \in \mathbf{R} \mid -4 \leq y \leq 4\}$; not a function, because each x except ± 4 has two y -values assigned

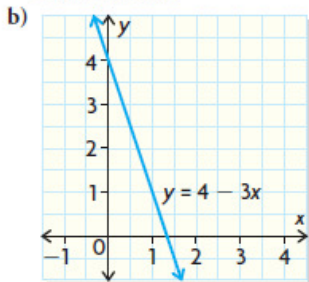
2. Vertical-line test



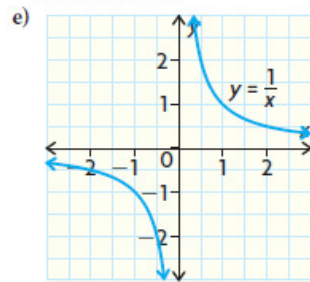
Not a function



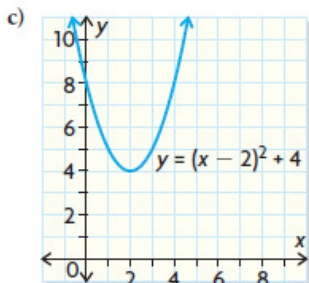
Not a function



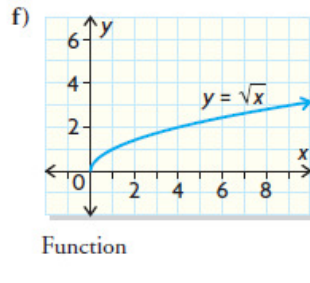
Function



Function

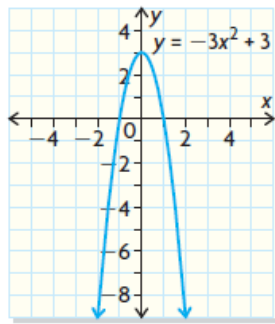


Function



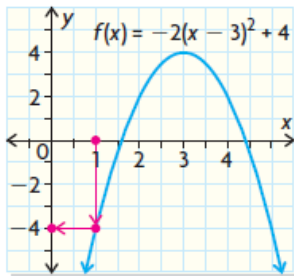
Function

3. Answers may vary; for example:



4. a) -7 d) $4b^2 + 6b - 5$
 b) -5 e) $-8a - 1$
 c) -2 f) 1 or -2

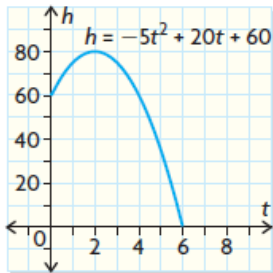
5. a), b)



- a) domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R} \mid y \leq 4\}$
 b) $f(1)$ represents the y -coordinate corresponding to $x = 1$.
 c) i) 2 ii) -1 iii) $-2(-x - 2)^2 + 4$

6. $5, -1$

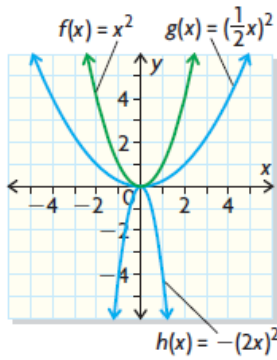
7. a)



- b) domain = $\{t \in \mathbf{R} \mid 0 \leq t \leq 6\}$,
 range = $\{h \in \mathbf{R} \mid 0 \leq h \leq 80\}$
 c) $h = -5t^2 + 20t + 60$
8. a) domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R} \mid y \geq 3\}$
 b) domain = $\{x \in \mathbf{R} \mid x \geq -2\}$, range = $\{y \in \mathbf{R} \mid y \geq 0\}$

9. a) $y = \sqrt{4x}$
 b) $y = \frac{1}{-\frac{1}{5}x}$

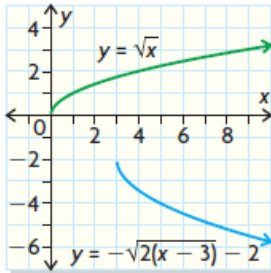
10. a)



$f(x)$: domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R} \mid y \geq 0\}$;
 $g(x)$: domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R} \mid y \geq 0\}$;
 $h(x)$: domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R} \mid y \leq 0\}$

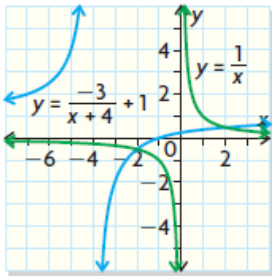
11. $(-\frac{5}{4}, 10)$

12. a) $y = -\sqrt{2(x-3)} - 2$



domain = $\{x \in \mathbf{R} \mid x \geq 3\}$, range = $\{y \in \mathbf{R} \mid y \leq -2\}$

b) $y = \frac{-3}{x+4} + 1$



domain = $\{x \in \mathbf{R} \mid x \neq -4\}$, range = $\{y \in \mathbf{R} \mid y \neq 1\}$

13. a) 4, -3 b) 4, -3 c) -8, 6 d) -5, 2

14. a) domain = $\{x \in \mathbf{R} \mid x \geq -4\}$, range = $\{y \in \mathbf{R} \mid y < -2\}$

b) domain = $\{x \in \mathbf{R} \mid x \leq 4\}$, range = $\{y \in \mathbf{R} \mid y < -1\}$

c) domain = $\{x \in \mathbf{R} \mid x \geq -5\}$, range = $\{y \in \mathbf{R} \mid y < 1\}$

d) domain = $\{x \in \mathbf{R} \mid x \leq 9\}$, range = $\{y \in \mathbf{R} \mid y > 3\}$

15. a) domain = $\{x \in \mathbf{R} \mid x \neq 2\}$, range = $\{y \in \mathbf{R} \mid y \neq 0\}$

b) domain = $\{x \in \mathbf{R} \mid x \leq 3\}$, range = $\{y \in \mathbf{R} \mid y \geq -4\}$

c) domain = $\{x \in \mathbf{R}\}$, range = $\{y \in \mathbf{R} \mid y \leq 3\}$

1b.

a). $j(x) = (x+4)^2 + 9$, when $x \leq -4$

orig: $y = (x+4)^2 + 9$



inverse: $x = (y+4)^2 + 9$

$x - 9 = (y+4)^2$

$\pm \sqrt{x-9} = y+4$

$-4 \pm \sqrt{x-9} = y$

$\therefore j^{-1}(x) = -\sqrt{x-9} - 4, x \geq 9$



b)

$f(x) = 3\sqrt{4-x}$

orig: $y = 3\sqrt{4-x}$

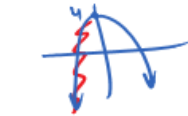


inverse: $x = 3\sqrt{4-y}$

$\frac{x}{3} = \sqrt{4-y}$

$(\frac{x}{3})^2 = 4-y$

$y = 4 - (\frac{x}{3})^2$



$\therefore f^{-1}(x) = -\frac{x^2}{9} + 4, x \geq 0$

c).

$h(x) = \frac{4x}{x-6}$

12

orig: $y = \frac{4x}{x-6}$

inverse: $x = \frac{4y}{y-6}$

$x(y-6) = 4y$

$xy - 6x = 4y$

$xy - 4y = 6x$

$y(x-4) = 6x$

$y = \frac{6x}{x-4}$

$\therefore h^{-1}(x) = \frac{6x}{x-4}$

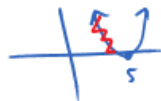
$x \neq 4$

14

d).

$g(x) = x^2 - 10x + 25$, when $x \geq 5$

orig: $y = x^2 - 10x + 25$
 $y = (x-5)^2$ complete sq.



inverse: $x = (y-5)^2$

$\pm \sqrt{x} = y-5$

$\pm \sqrt{x} + 5 = y$



$\therefore g^{-1}(x) = +\sqrt{x} + 5, x \geq 0$