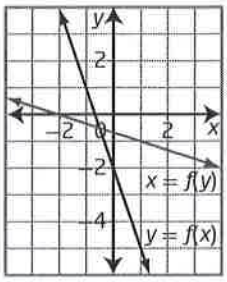
13. a)



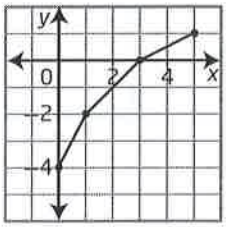

b) $y = x$, $\left(-\frac{1}{2}, -\frac{1}{2}\right)$

c) $f(x)$: domain $\{x \mid x \in R\}$, range $\{y \mid y \in R\}$
$f(y)$: domain $\{x \mid x \in R\}$, range $\{y \mid y \in R\}$

14.

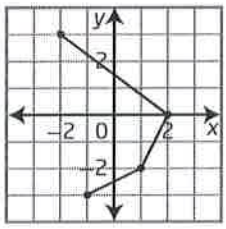
| $y = f(x)$ | | $y = f^{-1}(x)$ | |
|---|---|---|---|
| $x$ | $y$ | $x$ | $y$ |
| −3 | 7 | 7 | −3 |
| 2 | 4 | 4 | 2 |
| 10 | −12 | −12 | 10 |

15. a)




The relation and its inverse are functions.

b)




The relation is a function. The inverse is not a function.

16. $y = \sqrt{x - 1} + 3$, restricted domain $\{x \mid x \geq 3, x \in R\}$

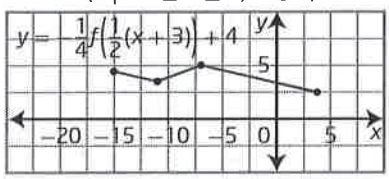
17. a) not inverses b) inverses

## Chapter 1 Practice Test, pages 58 to 59

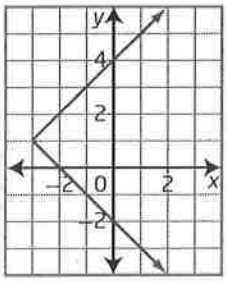
1. D 2. D 3. B 4. B 5. B 6. C 7. C

8. domain $\{x \mid -5 \leq x \leq 2, x \in R\}$

9.




10. a)




b) To transform it point by point, switch the position of the $x$- and the $y$-coordinate.

c) $(-1, -1)$

11. $y = \frac{1}{5}(x - 2)$

12. $y = 3f\left(-\frac{1}{2}(x - 2)\right)$

13. a) It is a translation of 2 units left and 7 units down.
b) $g(x) = |x + 2| - 7$ c) $(-2, -7)$
d) No. Invariant points are points that remain unchanged after a transformation.

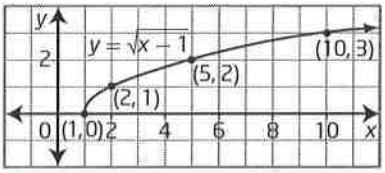
14. a) $f(x) = x^2$
b) $g(x) = \frac{1}{4}f(x)$; a vertical stretch by a factor of $\frac{1}{4}$
c) $g(x) = f\left(\frac{1}{2}x\right)$; a horizontal stretch by a factor of 2
d) $\frac{1}{4}f(x) = \frac{1}{4}x^2$; $f\left(\frac{1}{2}x\right) = \left(\frac{1}{2}x\right)^2 = \frac{1}{4}x^2$

15. a) Using the horizontal line test, if a horizontal line passes through the function more than once the inverse is not a function.
b) $y = \pm\sqrt{-x - 5} - 3$
c) Example: restricted domain $\{x \mid x \geq -3, x \in R\}$

# Chapter 2 Radical Functions

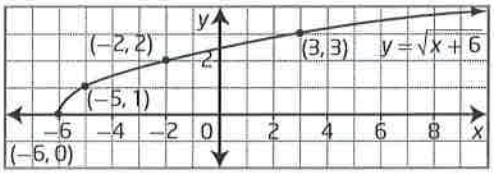
### 2.1 Radical Functions and Transformations, pages 72 to 77

1. a)



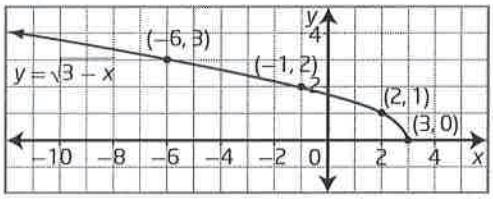

domain $\{x \mid x \geq 1, x \in R\}$, range $\{y \mid y \geq 0, y \in R\}$

b)



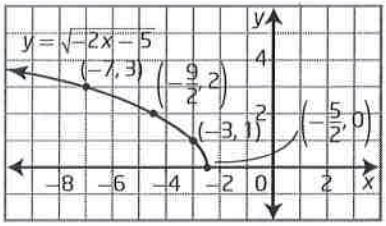

domain $\{x \mid x \geq -6, x \in R\}$, range $\{y \mid y \geq 0, y \in R\}$

c)




domain $\{x \mid x \leq 3, x \in R\}$, range $\{y \mid y \geq 0, y \in R\}$

d)




domain $\left\{x \mid x \leq -\frac{5}{2}, x \in R\right\}$,
range $\{y \mid y \geq 0, y \in R\}$

2. a) $a = 7 \rightarrow$ vertical stretch by a factor of 7
$h = 9 \rightarrow$ horizontal translation 9 units right
domain $\{x \mid x \geq 9, x \in R\}$, range $\{y \mid y \geq 0, y \in R\}$
b) $b = -1 \rightarrow$ reflected in $y$-axis
$k = 8 \rightarrow$ vertical translation up 8 units
domain $\{x \mid x \leq 0, x \in R\}$, range $\{y \mid y \geq 8, y \in R\}$
c) $a = -1 \rightarrow$ reflected in $x$-axis
$b = \frac{1}{5} \rightarrow$ horizontal stretch factor of 5
domain $\{x \mid x \geq 0, x \in R\}$, range $\{y \mid y \leq 0, y \in R\}$
d) $a = \frac{1}{3} \rightarrow$ vertical stretch factor of $\frac{1}{3}$
$h = -6 \rightarrow$ horizontal translation 6 units left
$k = -4 \rightarrow$ vertical translation 4 units down
domain $\{x \mid x \geq -6, x \in R\}$,
range $\{y \mid y \geq -4, y \in R\}$

3. a) B b) A c) D d) C

4. a) $y = 4\sqrt{x + 6}$ b) $y = \sqrt{8x} - 5$