LESSON 49 ···
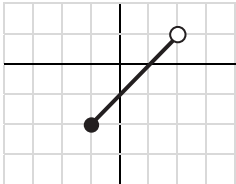
1. Not a function

2. $[-2, 1)$

3. $x^2 - 1$

4. 1

5. A, C, G

6. $g(x) = -2\sqrt{x + 5}$

7. -2

8. Odd

9. $f^{-1}(x) = -\dfrac{2}{x - 1}$

10. $[-1, \infty)$

10.

The range is $y \geq -1$, or $[-1, \infty)$ in interval notation.

Worked-out solutions:

1. Not a function; Input 4 has two outputs.

2.

$f(-1) = -2$
$f(2) = 1$
The range is
$-2 \leq f(x) < 1$, or $[-2, 1)$
in interval notation.

3. $f(x + 1) = (x + 1)^2 - 2(x + 1)$
$\qquad\qquad = x^2 + 2x + 1 - 2x - 2$
$\qquad\qquad = x^2 - 1$

4. $f(2) = 2 + 7 = 9$
$g(2) = 2^2 + 4 = 8$
$(f - g)(2) = f(2) - g(2) = 9 - 8 = 1$

5. See the graphs in Lesson 40.

6. $f(x) = \sqrt{x}$ Parent function
$y = 2\sqrt{x}$ Stretch vertically by 2.
$y = -2\sqrt{x}$ Reflect over the x-axis.
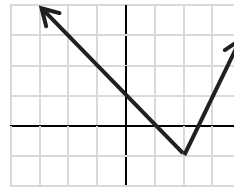$g(x) = -2\sqrt{x + 5}$ Shift left 5 units.

7. $\dfrac{f(1) - f(-1)}{1 - (-1)} = \dfrac{3 - 7}{1 - (-1)} = -2$

8. $f(-x) = \dfrac{-x}{(-x)^2 + 1} = \dfrac{-x}{x^2 + 1} = -\left(\dfrac{x}{x^2 + 1}\right) = -f(x)$

The function is odd because $f(-x) = -f(x)$.

9. $y = \dfrac{x - 2}{x}$ Set y equal to $f(x)$.

$x = \dfrac{y - 2}{y}$ Switch x and y.

$xy = y - 2$ Multiply both sides by y.
$xy - y = -2$ Subtract y from both sides.
$y(x - 1) = -2$ Distributive property

$y = -\dfrac{2}{x - 1}$ Divide both sides by $(x - 1)$.

$f^{-1}(x) = -\dfrac{2}{x - 1}$ Write in function notation.