Name: _____ Date: _____

2.4 Reflections of Functions

BLM 2–6

1. For each function, determine the equation under the indicated reflection.

a) $f(x) = 3(x - 4)^2 + 5$, $g(x) = -f(x)$

b) $f(x) = \sqrt{2x - 1}$, $g(x) = f(-x)$

c) $f(x) = \dfrac{2}{x + 3} - 2$, $g(x) = -f(x)$

d) $f(x) = -\sqrt{3x + 4} - 1$, $g(x) = -f(-x)$

2. Determine algebraically whether $f(x)$ and $g(x)$ are reflections of each other. If so, describe the reflection.

a) $f(x) = (x + 1)^2$, $g(x) = -(x + 1)^2$

b) $f(x) = \dfrac{1}{3x - 4}$, $g(x) = -\dfrac{1}{3x + 4}$

c) $f(x) = (x + 2)^2$, $g(x) = (x - 2)^2$

d) $f(x) = \sqrt{3x + 4}$, $g(x) = -\sqrt{4 - 3x}$

3. Graph the functions in question 2 to verify your answers.

4. Architects often use reflections to create symmetry in their designs. On a plan, the left side of a roof line is given by the equation $y = x + 10$ from $x = -4$ to $x = 0$. What equation and restriction on x would allow the architect to model the symmetric right side of the roof?

5. a) Graph the function $f(x) = \sqrt{2x + 9}$ and its reflection in the y-axis.

b) Determine the coordinates of any invariant point on the curve.

c) Suggest a way of finding an invariant point on a curve through a reflection in the y-axis without the need for graphing.

6. Jasmine is creating a logo for her school track-and-field team. She decides to create an area to frame the logo that is formed by the area bounded by the overlap of $y = x^2 - 4$ and its reflection in the x-axis, using the invariant points under the reflection as the endpoints of the interval.

a) What are the values of x that she needs to use to frame the area on the x-axis?

b) Graph the function and its reflection in the x-axis for the area of the frame.

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