4.22 Vertical Translation of the Graph of a Function

• Example 1

Define the function h whose graph lies exactly 6 units above the graph of the function $f(x) = -x^2 - 5$.

We have

$$h(x) = f(x) + 6 = -x^2 - 5 + 6$$

$$= -x^2 + 1$$

CHECK YOURSELF 1

Give the function h whose graph lies exactly 3 units above the graph of the function $f(x) = 3x^2 - 9$.

CHECK YOURSELF ANSWER

1. $h(x) = 3x^2 - 6$.

4.22 Exercises

Name

Section Date

ANSWERS

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For each of the following problems, define the function h whose graph results from shifting the graph of the given function by the specified amount.

1. $g(x) = 2x^2 - 7$, down 2 units

2. $f(x) = -x^2 + 4$, down 3 units

3. $k(x) = 14x^2 - 9$, up 7 units

4. $j(x) = -3x^2 - 3$, up 3 units

5. $n(x) = x^2 + 9x + 4$, up 10 units

6. $y(x) = -3x^2 + 2x + 4$, down 5 units

7. $g(x) = 2x^2 - 7x - 10$, down 1 unit

8. $f(x) = (x - 9)^2$, down 10 units

9. $j(x) = (x + 2)^2$, up 6 units

10. $n(x) = 2(x - 3)^2 + 4$, down 4 units

11. $k(x) = -(x + 2)^2 - 1$, up 3 units

12. $m(x) = (x + 3)^2 + 9$, up 7 units