## U1 L7A Transformations: Shifts & Reflections — Practice

Name: _____ HR: _____

**Skills:** Read function notation to find h, k, and reflections; write equations from descriptions and graphs; and sketch transformed parent functions.

### Review & Prerequisites

| | | |
|---|---|---|
| **1.** *Review (1.6)* Evaluate [[−2.5]]. | **2.** *Review (1.6)* State the domain and range of $f(x) = \sqrt{x}$. | **3.** *Review (1.6)* Write the linear function with $f(0) = 2$ and $f(3) = 8$. |

### Group A — Describe Transformation

*Find h, k, and any reflection, then describe how g compares to f. Outside → vertical (does what it says). Inside → horizontal (does the opposite).*

| | |
|---|---|
| **4.** $g(x) = f(x) + 7$<br>h = k = reflection? | **5.** $g(x) = f(x - 4)$<br>h = k = reflection? |
| **6.** $g(x) = f(x + 1) - 6$<br>h = k = reflection? | **7.** $g(x) = -f(x)$<br>h = k = reflection? |
| **8.** $g(x) = f(-x) + 2$<br>h = k = reflection? | **9.** $g(x) = -f(x - 5)$<br>h = k = reflection? |
| **10.** $g(x) = -f(x) - 3$<br>h = k = reflection? | **11.** $g(x) = f(x + 8) + 1$<br>h = k = reflection? |

### Group B — Write an Equation from a Description

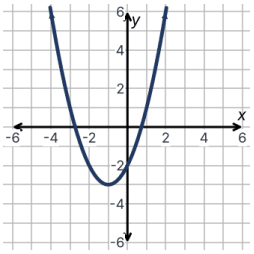
*(Textbook #39–46)*

| | | |
|---|---|---|
| **12.** The shape of $f(x) = x^2$, but shifted three units to the right and seven units down. *(#39)* | **13.** The shape of $f(x) = x^3$, but shifted 13 units to the right. *(#41)* | **14.** The shape of $f(x) = \lvert x \rvert$, but shifted four units to the left and eight units down. *(#44)* |
| **15.** The shape of $f(x) = \sqrt{x}$, but shifted three units to the right and one unit up. | **16.** The shape of $f(x) = \lvert x \rvert$, but reflected in the x-axis and then shifted five units up. | **17.** The shape of $f(x) = x^3$, but shifted four units to the left and two units down. |

## Group C — Write an Equation from a Graph

*Each graph is a transformation of the given parent. The vertex or starting point is* $(h,\ k)$.

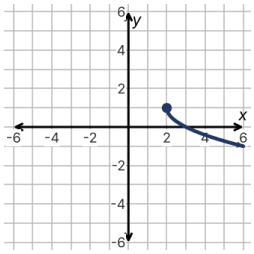
**18.** Parent: $x^2$



h = k =

$g(x)$ =

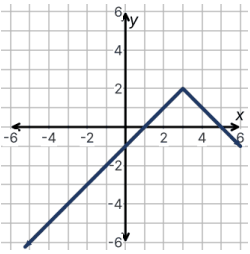
**19.** Parent: $\sqrt{x}$



h = k =

$g(x)$ =

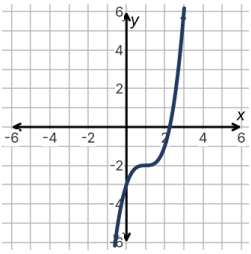
**20.** Parent: $|x|$



h = k =

$g(x)$ =

**21.** Parent: $x^3$



h = k =

$g(x)$ =

## Group D — Identify, Describe, Rewrite, and Sketch

*g is related to one of the parent functions from Section 1.6. (Textbook #21–28)*

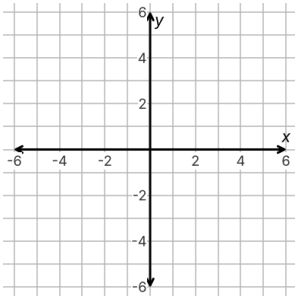
**22.** $g(x) = x^2 - 2$ *(#22)*

(a) Parent f:

(b) h = k =

reflection?

(c) f-notation: $g(x)$ =



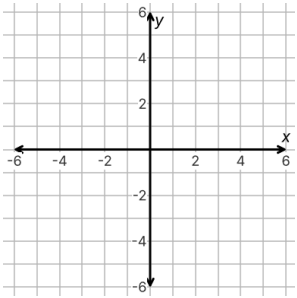
**23.** $g(x) = -(x-2)^3$ *(#23)*

(a) Parent f:

(b) h = k =

reflection?

(c) f-notation: $g(x)$ =



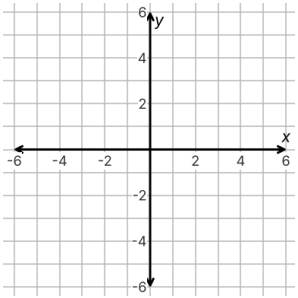
**24.** $g(x) = -3 - (x+1)^2$ *(#25)*

(a) Parent f:

(b) h = k =

reflection?

(c) f-notation: $g(x)$ =



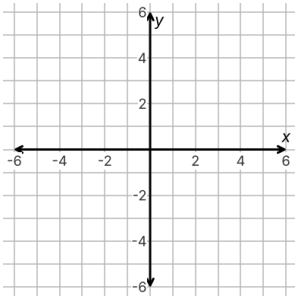
**25.** $g(x) = 4 - (x-2)^2$ *(#26)*

(a) Parent f:

(b) h = k =

reflection?

(c) f-notation: $g(x)$ =



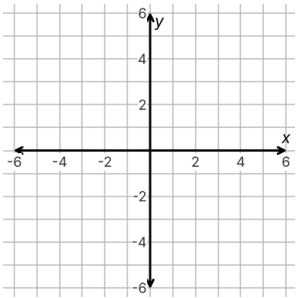
**26.** $g(x) = |x-1| + 2$ *(#27)*

(a) Parent f:

(b) h = k =

reflection?

(c) f-notation: $g(x)$ =



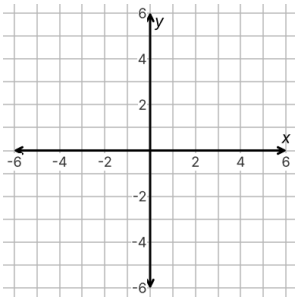
**27.** $g(x) = |x+3| - 2$ *(#28)*

(a) Parent f:

(b) h = k =

reflection?

(c) f-notation: $g(x)$ =



## Group E — Think About It

**28. True or False?** The graph of $y = f(-x)$ is a reflection of the graph of $y = f(x)$ in the x-axis. Justify. *(#63)*

**29. True or False?** The graph of $y = -f(x)$ is a reflection of the graph of $y = f(x)$ in the y-axis. Justify. *(#64)*

**30. Error Analysis** A student says the graph of g is a right shift of one unit of $f(x) = x^3$, so $g(x) = (x+1)^3$. Describe the error. *(#69)*