**Transformations of Functions ⸱ Form A**

**Example 1**

**Describe each translation as it relates to the graph of the parent function.**

 **1.** *y* = |*x*| – 3 **2.** *y* = *x* + 2 **3.** *y* = |*x* + 6|

**Example 2**

**Use the graph of each translated parent function to write its equation.**

 **4. 5. 6.**

**Examples 3 and 4**

**Describe each dilation and reflection as it relates to the parent function.**

 **7.** *y* = –6*x* **8.** *y* = |–2*x*|

**9.** *y* = $-\frac{1}{2}$*x*2 **10.** *y* = $\left(-\frac{3}{4}x\right)^{2}$

**Example 5**

**Describe each transformation as it relates to the graph of the parent function.**

 **11.** *y* = 3*x* + 11 **12.** *y* = $\frac{1}{2}$|*x* – 1| + 14 **13.** *y* = (1.5*x*)2 + 22

**Example 6**

 **14. SALAD** The cost for a salad depends on its weight, *x*, in ounces, and is described by
*c*(*x*) = 4.5 + 0.32*x*. Describe how *c*(*x*) is related to its parent function and interpret the function
in the context of the situation.

 **15. ARCHERY** The path of an arrow can be modeled by *h*(*x*) = –0.03*x*2 + 6, where *x* is distance and *h*(*x*) is height, both in feet. Describe how *h*(*x*) is related to its parent function and interpret the function in the context of the situation.

**Example 7**

**Write an equation for each function.**

 **16.**

**Write an equation for each function.**

 **17. 18.**

**Mixed Exercises**

**Describe each transformation as it relates to the graph of the parent function. Then graph
the function.**

 **19.** *y* = $(x + 1)^{2}$ **20.** *y* = –|*x*| **21.** *y* = 2*x*2

 **22.** Describe the reflection in *y* = –*x*3 as it relates to the parent function.

** 23. ARCHITECTURE** The cross-section of a roof is shown in the figure. Write an absolute value function that models the shape of the roof.

**24. GRAPHIC DESIGN** Kassie sketches the function, *f*(*x*) = ‒1.25(*x* ‒ 1)2 + 18.75 as part of a new logo design. Describe the transformations she applied to the parent function in creating her function.

**~~25. REASONING~~** ~~Compare the graph of the parent function~~ *~~f~~*~~(~~*~~x~~*~~) = |~~*~~x~~*~~| with the graphs of~~ *~~g~~*~~(~~*~~x~~*~~) = |~~*~~x~~* ~~+ 2| and~~ *~~h~~*~~(~~*~~x~~*~~) = |~~*~~x~~* ~~– 3|. How are the graphs similar? How are they different?~~



 **26. PRESEVERE** Laura ketches the path of a model rocket that she launches.

 **a.** What type of function does the graph show?

 **b.** In which axis has the function been reflected?

 **c.** How has the graph been translated? Assume that the function has not dilated.

 **d.** What is the equation for the curve shown on the graph?

 **27. ANALYZE** Consider the functions *f*(*x*) = |2*x*|, *g*(*x*) = *x* + 2, *h*(*x*) = 2*x*2, and *k*(*x*) = 2*x*3.

 **a.** Graph each function and its reflection in the *y-*axis.

 **b.** Analyze the functions and the graphs. Determine whether each function is *odd*, *even*,
or *neither*.

 **c.** Recall that if for all values of *x*, *f*(*–x*) = *f*(*x*) the function *f*(*x*) is an even function. If for all values of *x*, *f*(*–x*) = –*f*(*x*) the function *f*(*x*) is an odd function. Explain why this is true.

**~~28. CREATE~~** ~~Draw a graph in Quadrant II. Use any of the transformations you learned in this lesson to move your figure to Quadrant IV. Describe your transformation.~~

 **29. WRITE** Explain why the graph of *g*(*x*) = (─*x*)2 appears the same as the graph of *f*(*x*) = *x*2. Is this true for all reflections of quadratic functions? If not, describe a case when it is false.