

# ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit

1

2 - Practice

1-10,15,16,:

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1. A translation 4 units left is a horizontal translation that subtracts  $-4$  from each input value.

$$\begin{aligned}g(x) &= f(x + 4) \\ &= (x + 4) - 5 \\ &= x - 1\end{aligned}$$

The transformed function is  $g(x) = x - 1$ .

2. A translation 2 units right is a horizontal translation that subtracts 2 from each input value.

$$\begin{aligned}g(x) &= f(x - 2) \\ &= (x - 2) + 2 \\ &= x\end{aligned}$$

The transformed function is  $g(x) = x$ .

3. A translation 2 units down is a vertical translation that adds  $-2$  to each output value.

$$\begin{aligned}g(x) &= f(x) - 2 \\ &= (|4x + 3| + 2) - 2 \\ &= |4x + 3|\end{aligned}$$

The transformed function is  $g(x) = |4x + 3|$ .

4. A translation 6 units up is a vertical translation that adds 6 to each output value.

$$\begin{aligned}g(x) &= f(x) + 6 \\ &= (2|x| - 9) + 6 \\ &= 2|x| - 3\end{aligned}$$

The transformed function is  $g(x) = 2|x| - 3$ .

5. A translation 3 units right is a horizontal translation that subtracts 3 from each input value.

$$\begin{aligned}g(x) &= f(x - 3) \\ &= 4 - |(x - 3) + 1| \\ &= 4 - |x - 2|\end{aligned}$$

The transformed function is  $g(x) = 4 - |x - 2|$ .

6. A translation 1 unit up is a vertical translation that adds 1 to each output value.

$$\begin{aligned}g(x) &= f(x) + 1 \\ &= (|4x| + 5) + 1 \\ &= |4x| + 6\end{aligned}$$

The transformed function is  $g(x) = |4x| + 6$ .

7. A horizontal translation 3 units right or a vertical translation 3 units up will produce the function  $g$  from the function  $f$ .

8. The transformation needed to model the situation using the function  $f$  is a vertical translation. The new model for the net income is  $g(x) = 4000x - 12,000$ . To find how many weeks it will take to pay off the extra expenses, set  $g$  equal to 0 and solve for  $x$ .

$$4000x - 12,000 = 0$$

$$4000x = 12,000$$

$$x = 3$$

It will take 3 weeks to pay off the extra expenses.

9. A reflection in the  $x$ -axis changes the sign of each output value.

$$g(x) = -f(x)$$

$$= -(-5x + 2)$$

$$= 5x - 2$$

The transformed function is  $g(x) = 5x - 2$ .

10. A reflection in the  $x$ -axis changes the sign of each output value.

$$g(x) = -f(x)$$

$$= -\left(\frac{1}{2}x - 3\right)$$

$$= -\frac{1}{2}x + 3$$

The transformed function is  $g(x) = -\frac{1}{2}x + 3$ .

- 15.** A vertical stretch by a factor of 5 multiplies each output value by 5.

$$\begin{aligned}g(x) &= 5f(x) \\ &= 5(x + 2) \\ &= 5x + 10\end{aligned}$$

The transformed function is  $g(x) = 5x + 10$ .

- 16.** A vertical shrink by a factor of  $\frac{1}{2}$  multiplies each output value by  $\frac{1}{2}$ .

$$\begin{aligned}g(x) &= \frac{1}{2}f(x) \\ &= \frac{1}{2}(2x + 6) \\ &= x + 3\end{aligned}$$

The transformed function is  $g(x) = x + 3$ .

- 27.** A vertical stretch by a factor of 2 multiplies each output value by 2 and a translation 1 unit is a vertical translation that adds 1 to each output value.

$$\begin{aligned}g(x) &= 2f(x) + 1 \\ &= 2(x) + 1 \\ &= 2x + 1\end{aligned}$$

The transformed function is  $g(x) = 2x + 1$ .

- 28.** A translation 3 units down is a vertical translation that adds  $-3$  to each output value and a vertical shrink by a factor of  $\frac{1}{3}$  multiplies each output value by  $\frac{1}{3}$ .

$$\begin{aligned}g(x) &= \frac{1}{3}(f(x) - 3) \\ &= \frac{1}{3}(x - 3) \\ &= \frac{1}{3}x - 1\end{aligned}$$

The transformed function is  $g(x) = \frac{1}{3}x - 1$ .

- 33.** The error is that 3 was added rather than subtracted to represent the translation 3 units right. The correct function is  $g(x) = |x - 3| + 2$ .

- 34.** A vertical stretch is given by  $y = af(x)$ , not  $y = f(ax)$ . The correct expression for the function is  $g(x) = 5(x - 6) = 5x - 30$ .

