Linear Transformation Worksheet #1

Name_________________________ Date__________ Period______

Describe the change in terms of $f(x)$ (write the rule) for the transformation described.

1. vertical translation 3 units down

2. vertical compression by a factor of $\frac{1}{4}$

3. horizontal translation 5 units left

4. reflection across the $x$-axis

5. $f(x) = x + 3$
   
   Translate $f(x)$ down 5 units.
   Write the transformed function in terms of $g(x)$ and then graph both on the right.

6. $f(x) = 4x - 3$
   
   Translate the graph 2 up and then 2 to the right.
   Write the transformed function in terms of $g(x)$ and then graph both on the right.

7. $f(x) = 2x - 3$
   
   Transform $f(x)$ with a vertical stretch of 2 and then reflect over the $x$-axis.
   Write the transformed function in terms of $g(x)$ and then graph both on the right.
8. (a) Use the graph to determine the function rule for \( f(x) \).
(b) Let \( g(x) \) be a vertical translation 2 units down of \( f(x) \).
(c) Write the function rule for \( g(x) \).
(d) Graph \( g(x) \)

\[
\begin{align*}
\text{(a) } f(x) &= \underline{\quad} x + \underline{\quad} \\
\text{(b) Rule: } &\underline{\quad} \\
\text{(c) } g(x) &= \underline{\quad}
\end{align*}
\]

9. (a) Use the table to determine the function rule for \( f(x) \).
(b) Let \( g(x) \) be a vertical stretch of \( f(x) \) by a factor of 2.

\[
\begin{array}{|c|c|c|c|}
\hline
x & 0 & 3 & 6 \\
\hline
f(x) & 5 & 11 & 17 \\
\hline
\end{array}
\]

\[
\begin{align*}
\text{(a) } f(x) &= \underline{\quad} x + \underline{\quad} \\
\text{(b) Rule: } &\underline{\quad} \\
\text{(c) } g(x) &= \underline{\quad}
\end{align*}
\]

10. Let \( f(x) = 3x - 2 \). Use the given function to describe the listed transformations. Then, write the equation of the transformed function.

a. \( 2f(x) \)

b. \( f(x) - 7 \)

c. \( f(x + 2) \)

d. \( -3f(x) \)