Problem 1 – $f(x) \rightarrow f(x - h)$

1. The graph of $f(x - 2)$ is just like the graph of $f(x)$ but the graph has been shifted…

   ☐ 2 units up ☐ 2 units left

   ☐ 2 units down ☐ 2 units right

2. Prediction of how $f(x + 5)$ compares to $f(x)$: The graph will shift…

   ☐ 5 units up ☐ 5 units left

   ☐ 5 units down ☐ 5 units right

3. How accurate was your prediction regarding the graph of $f(x - 5)$?

4. In general, the transformation of $f(x) \rightarrow f(x - h)$ shifts the graph…

   ☐ h units horizontally ☐ h units vertically

5. This is because the _____ are affected.

   ☐ x-values/inputs ☐ y–values/outputs

Problem 2 – $f(x) \rightarrow f(x) + k$

6. The graph of $f(x) + 4$ is just like $f(x)$ but the graph has been shifted…

   ☐ 4 units up ☐ 4 units left

   ☐ 4 units down ☐ 4 units right

7. The graph of $f(x) - 3$ is just like $f(x)$ but the graph has been shifted…

   ☐ up 3 units ☐ left 3 units

   ☐ down 3 units ☐ right 3 units

8. In general, the transformation of $f(x) \rightarrow f(x) + k$ shifts the graph...

   ☐ k units horizontally ☐ k units vertically

9. This is because the _____ are affected.

   ☐ x-values/inputs ☐ y–values/outputs

Problem 3 – $f(x) \rightarrow f(x - h) + k$

10. Consider the graph of $f(x - 7) + 6$ as compared to the graph of $f(x)$. This graph will be shifted...

☐ 7 units left, 6 units up ☐ 7 units left, 6 units down

☐ 7 units right, 6 units down ☐ 7 units right, 6 units up

11. How accurate was your prediction for the graph of $f(x - 7) + 6$?

12. In general, the graph of $\boldsymbol{f(x - h) + k}$, h and k are positive, as compared to the parent function graph $f(x)$, is shifted...

☐ h units left and k units up ☐ h units right and k units up

☐ h units left and k units down ☐ h units right and k units down

13. Explain how the graph shifts when (1) h and k are negative, (2) h is positive and k is negative, and (3) h is negative and k is positive.

Problem 4 – $f(x) \rightarrow a \cdot f(x)$

14. The graph of $0.5 \cdot f(x)$ as compared to the parent function, $f(x)$ appears...

☐ wider ☐ narrower

15. The graph of $2 \cdot f(x)$ as compared to $f(x)$ is...

☐ wider/stretched vertically ☐ wider/compressed vertically

☐ narrower/stretched vertically ☐ narrower/compressed vertically

16. When $0 < |a| < 1$, the graph of $\boldsymbol{a \cdot f(x)}$ is…

☐ wider/stretched vertically ☐ wider/compressed vertically

☐ narrower/stretched vertically ☐ narrower/compressed vertically

17. When $|a| > 1$, the graph of $\boldsymbol{a \cdot f(x)}$ is…

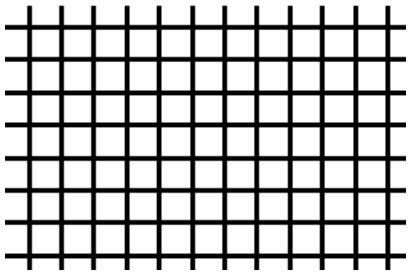
☐ wider/stretched vertically ☐ wider/compressed vertically

☐ narrower/stretched vertically ☐ narrower/compressed vertically

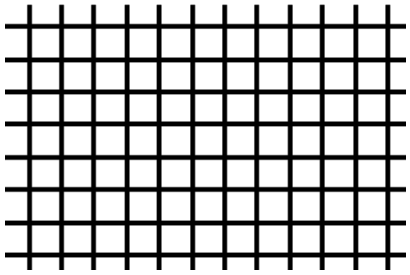
18. Describe the graph of $a \cdot f(x)$ when a is negative as compared to when a is positive.

Additional Exploration and Practice

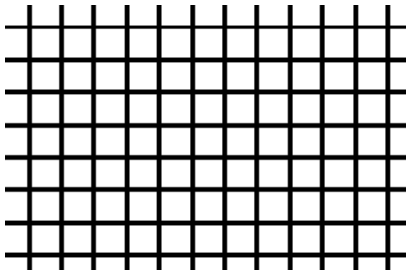
1. Compare the graph of $f(x)=|x-6|$ to the graph of $f(x)=|x|$. What is the effect of the –6 *inside* the absolute value symbol?



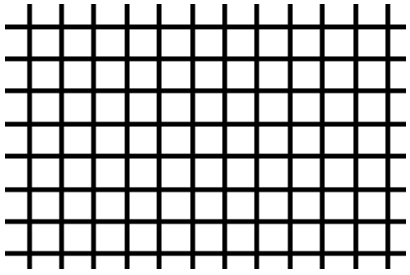
2. Compare the graph of $f(x)=|x|-6$ to the graph of $f(x)=|x|$. What is the effect of the –6 *outside* the absolute value symbol?



3. Compare the graph of $f(x)=-|x|$ to the graph of $f(x)=|x|$. What is the effect of the negative sign *in front of* the absolute value symbol?



4. Compare the graph of $f(x)=5\sin x$ to the graph of $f(x)=\sin x$. What is the effect of the 5 *in front of* sin? What part of the wave is impacted by this value?



5. What happens to the graph when you change the equation by putting a negative sign in front of 5 in $f(x)=5\sin x$?