

Using Horizontal and Vertical Stretches or Shrinks

Answers

1. $y = 2(x^2)$ or $y = 2x^2$.

2. $y = (1/2)(x^2)$ or $y = \frac{x^2}{2}$

3. $y = 6((x/2)^2 - 3(x/2))$ or $y = \frac{3x^2}{2} - \frac{3x}{2}$

4. $y = 2\left[\left(\frac{x}{6}\right)^2 - 3\left(\frac{x}{6}\right)\right] = \frac{x^2}{18} - x$

5. The new equation is $y = \frac{1}{3}|x|$ which is composed of parts of the lines $y = \frac{x}{3}$ and $y = -\frac{x}{3}$. The slopes are $\pm\frac{1}{3}$.

6. a) Since x is doubled, this is a horizontal shrinking by a factor of $1/2$.

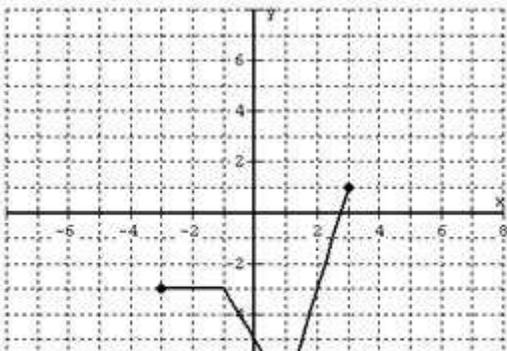
b) $y = x - \frac{x^2}{4} = 2\left(\frac{x}{2}\right) - \left(\frac{x}{2}\right)^2$ so this is a horizontal stretching by a factor of 2.

c) $y = 6x - 9x^2 = 2(3x) - (3x)^2$ so this is a horizontal compression by a factor of $1/3$.

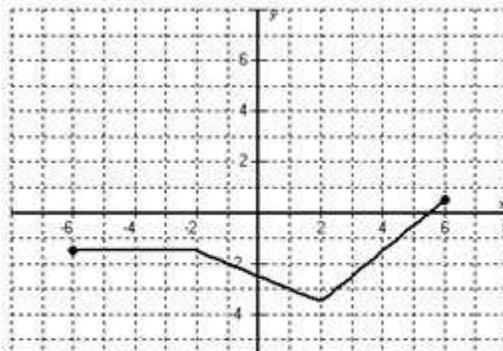
7. a) $y = 2f(x)$ b) $y = f(2x)/2$

c) $y = 2f(x/4)$ d) b) $y = f(4x)/4$

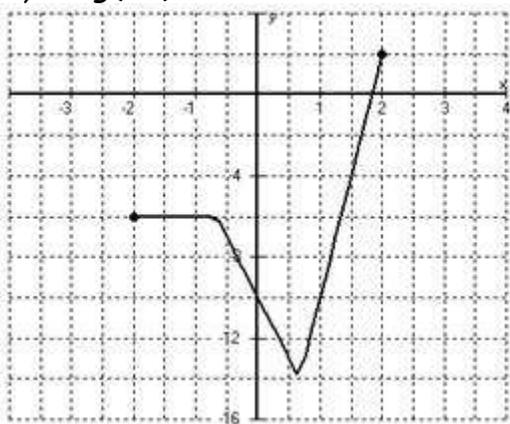
8a) $y = g(2x)$



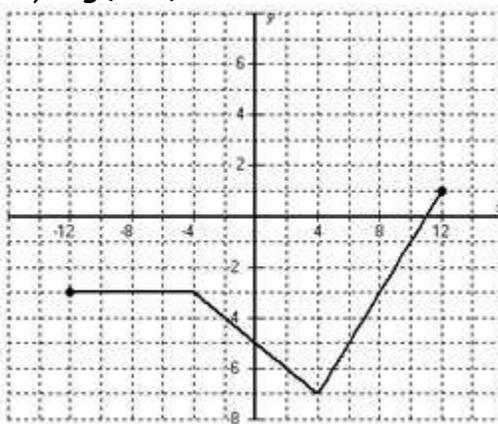
b) $y = g(x)/2$



c) $y = 2g(3x)$



d) $y = g(x/2)$



9. $y = 5(xe^{-x} + 2) = 5xe^{-x} + 10$

10. $y = (3x)e^{-(3x)} + 2 = 3xe^{-3x} + 2$