

Section 2.7: Graphing Techniques

Video 1

A graph is **symmetric about the y-axis** if the graph to the left of the y-axis is a mirror image of the graph to the right of the y-axis.

If you replace x with $-x$ in the equation, you get an equivalent equation.

A graph is **symmetric about the x-axis** if the graph below the x-axis is a mirror image of the graph above the y-axis.

If you replace y with $-y$ in the equation, you get an equivalent equation.

A graph is **symmetric with respect to the origin** if the replacement of x with $-x$ and y with $-y$ at the same time produces an equivalent equation.

1) Test for symmetry with respect to each axis.

a) $y = x^2 - 3$

b) $x = |y| + 5$

c) $y = 3x - 10$

d) $x^2 + y^2 = 4$

2) Determine whether the graph of the equation is symmetric with respect to the origin.

a) $y = 4x^2$

b) $y = 2x^3$

c) $y = x^3 - 7x$

d) $x^2 + y^2 = 81$

Video 2

A function f is an **even function** if $f(-x) = f(x)$ for all x in the domain of the function.

A function f is an **odd function** if $f(-x) = -f(x)$ for all x in the domain of the function.

3) Determine whether the function is even, odd, or neither.

a) $f(x) = x^2 + 8$

b) $f(x) = x^5 - 7x^3 + 11x$

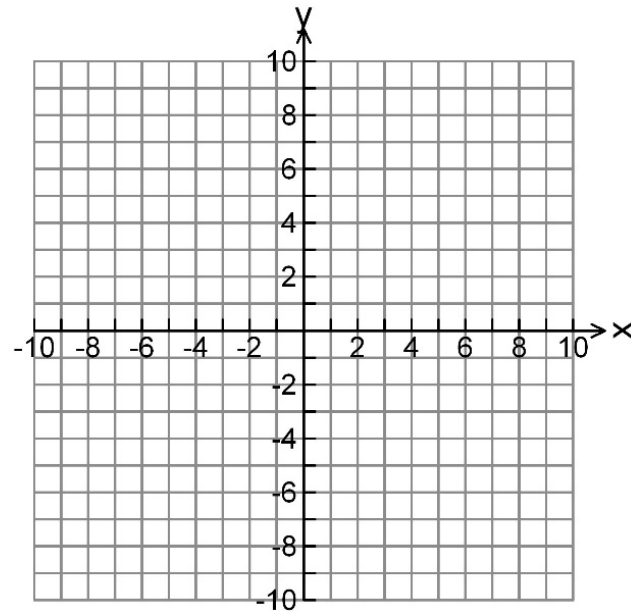
c) $f(x) = x^2 + 6x + 10$

Video 3

For $a > 0$, the graph of $y = a \cdot f(x)$ applies a vertical stretch or shrink to the graph of $y = f(x)$.

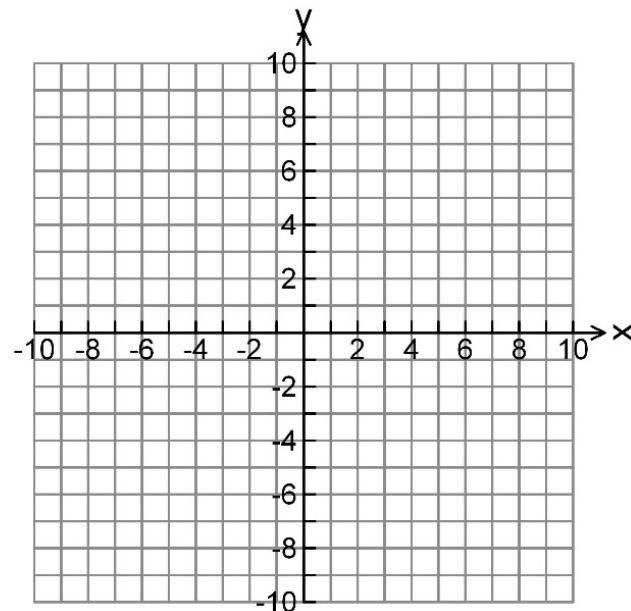
4) On the same set of axes, graph $f(x) = x^2$ and $f(x) = 2x^2$.

x	x^2	$2x^2$
-2		
-1		
0		
1		
2		



5) On the same set of axes, graph $f(x) = |x|$ and $f(x) = \frac{1}{2}|x|$.

x	$ x $	$\frac{1}{2} x $
-2		
-1		
0		
1		
2		

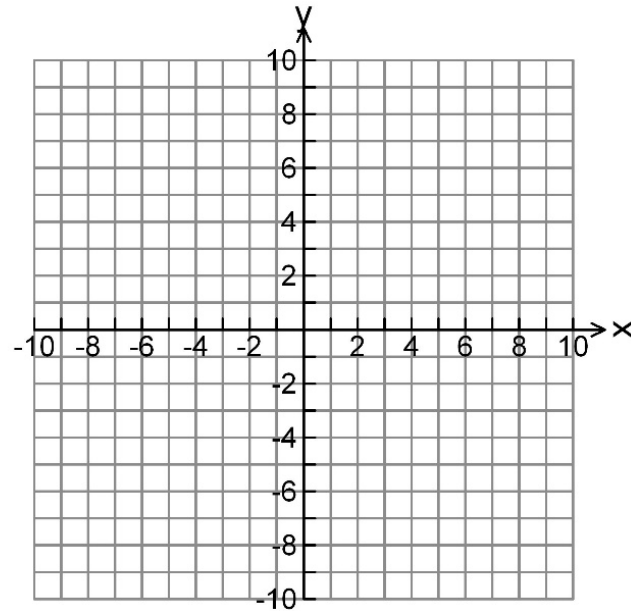


Video 4

For $a > 0$, the graph of $y = f(a \cdot x)$ applies a horizontal stretch or shrink to the graph of $y = f(x)$.

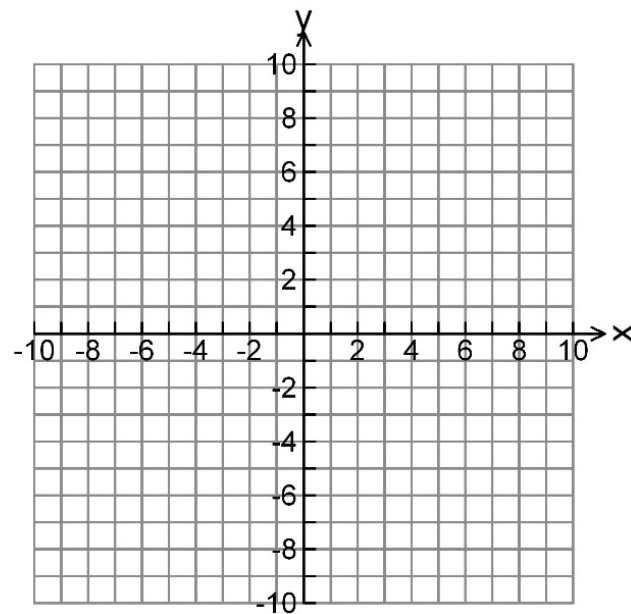
6) On the same set of axes, graph $f(x) = x^2$ and $f(x) = \left(\frac{1}{3}x\right)^2$.

x	x^2	$\left(\frac{1}{3}x\right)^2$
-2		
-1		
0		
1		
2		



7) On the same set of axes, graph $f(x) = |x|$ and $f(x) = |2x|$.

x	$ x $	$ 2x $
-2		
-1		
0		
1		
2		



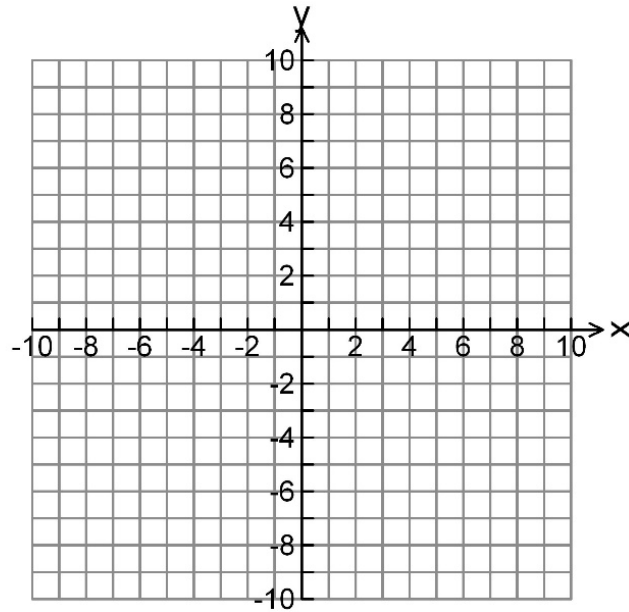
Video 5

The graph of $y = -f(x)$ is the same as the graph of $y = f(x)$, reflected across the x -axis.

The graph of $y = f(-x)$ is the same as the graph of $y = f(x)$, reflected across the y -axis.

8) Use the graph of $f(x) = \sqrt{x}$ to graph $f(x) = -\sqrt{x}$ and $f(x) = \sqrt{-x}$.

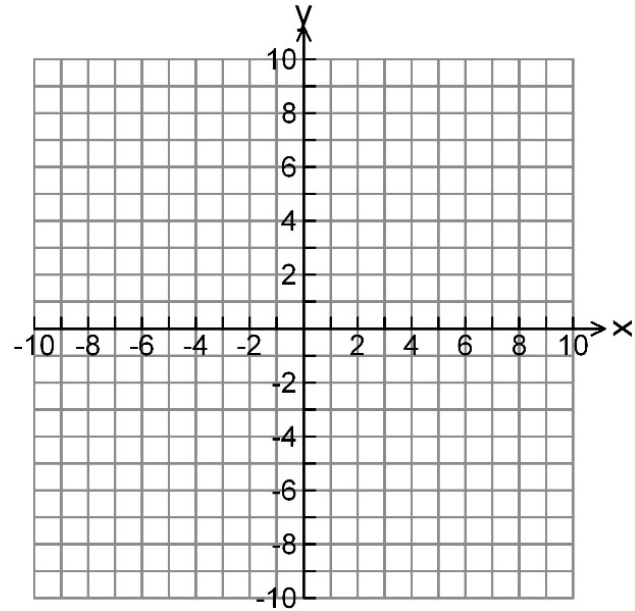
x	\sqrt{x}
0	
1	
4	
9	



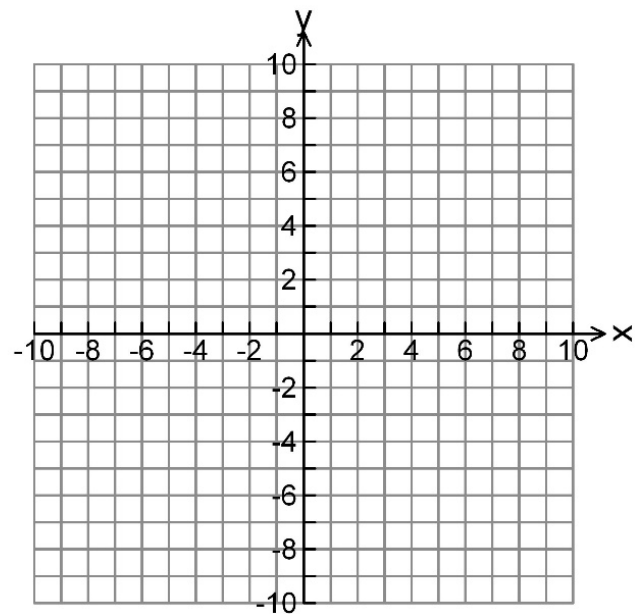
Video 6

The graph of $y = f(x) + k$ applies a vertical shift of k units to the graph of $y = f(x)$.

9) On the same set of axes, graph $f(x) = x^2$ and $f(x) = x^2 + 5$.



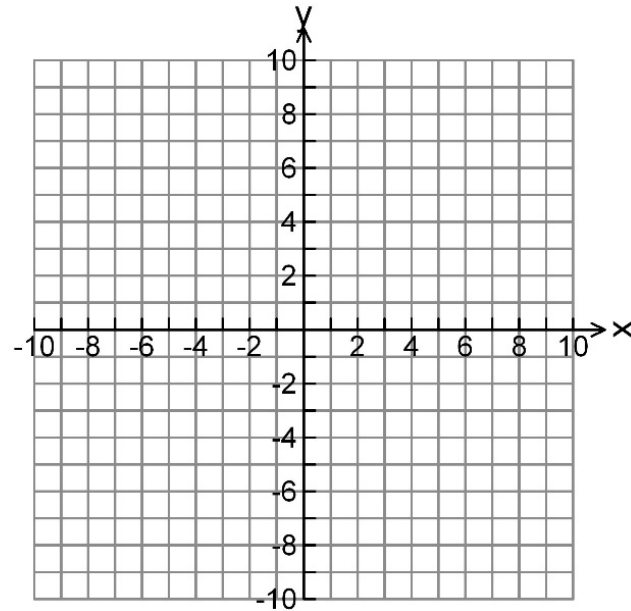
10) On the same set of axes, graph $f(x) = \sqrt{x}$ and $f(x) = \sqrt{x} - 3$.



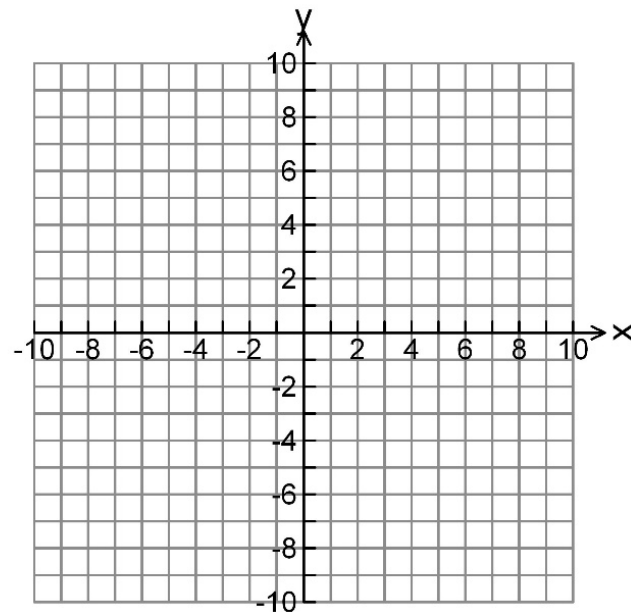
Video 7

The graph of $y = f(x - h)$ applies a horizontal shift of h units to the graph of $y = f(x)$.

11) On the same set of axes, graph $f(x) = |x|$ and $f(x) = |x + 3|$.

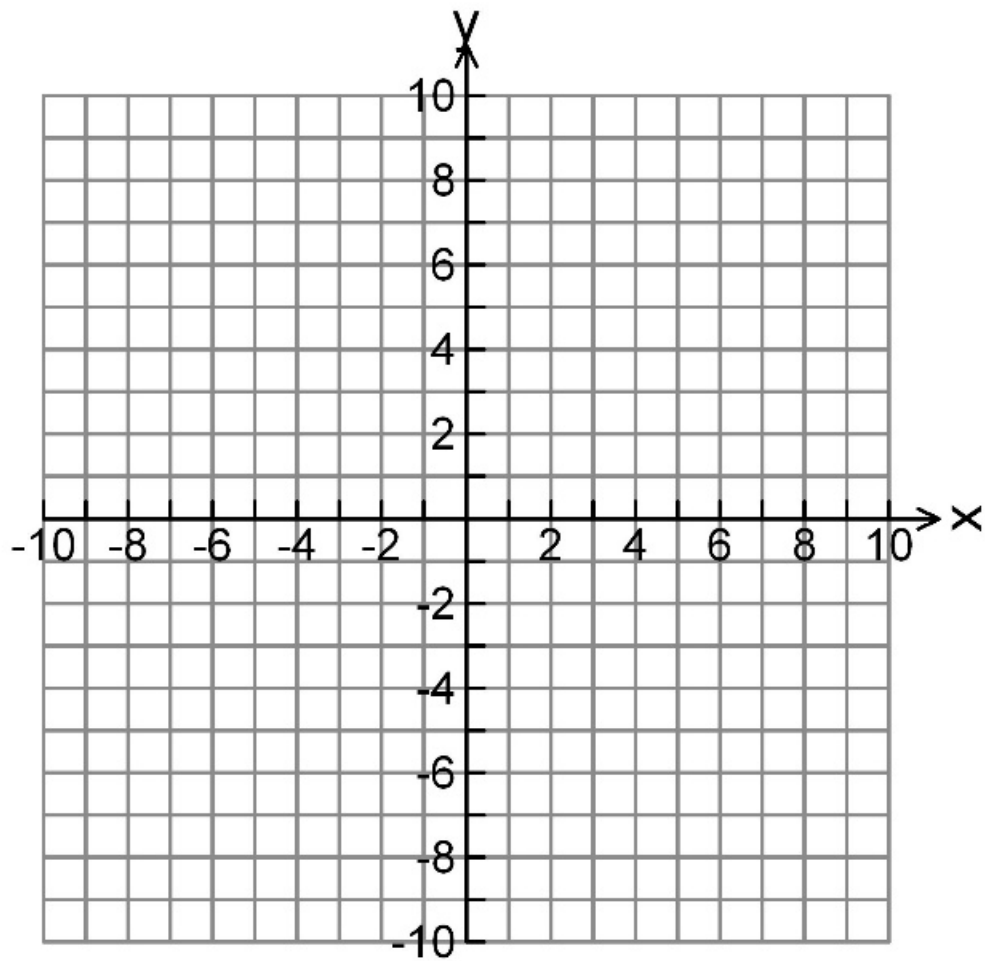


12) On the same set of axes, graph $f(x) = x^3$ and $f(x) = (x - 2)^3$.

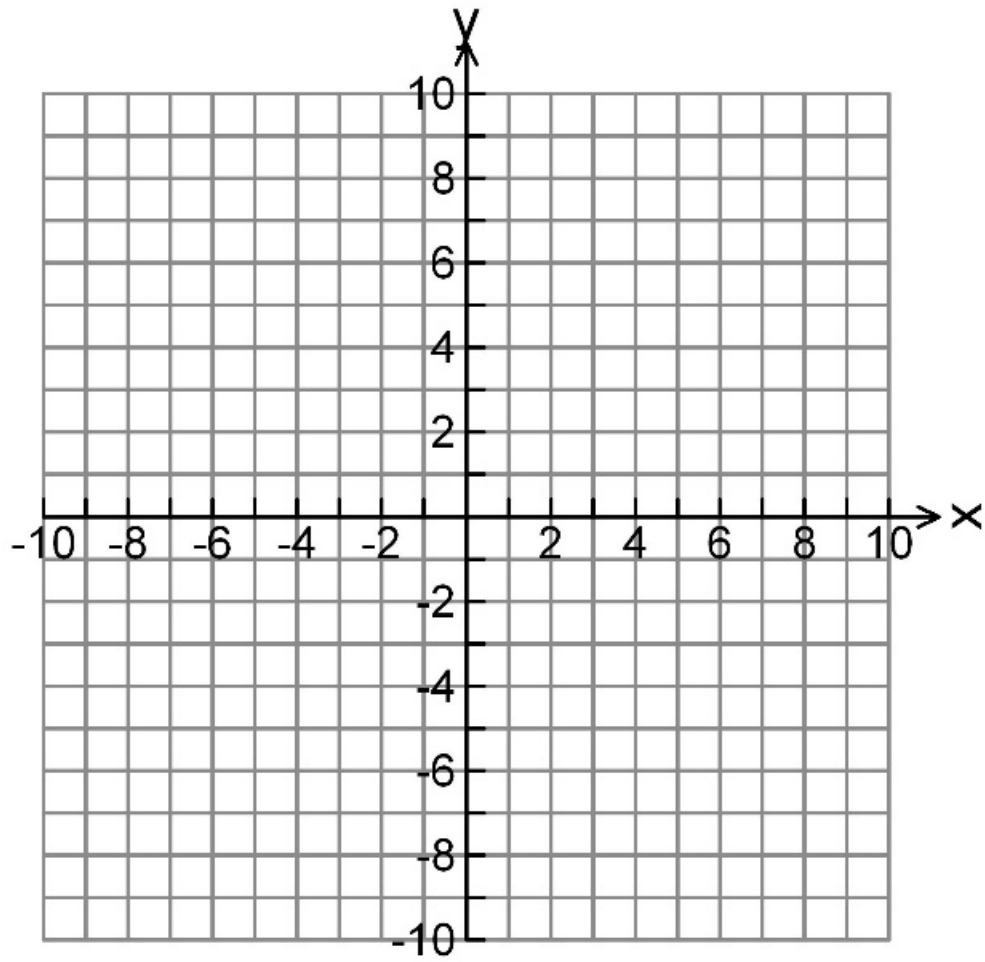


Video 8

13) Graph $f(x) = 2|x - 4| - 3$.



14) Graph $f(x) = -\sqrt{x+2} + 5$.



15) Graph $f(x) = -\frac{1}{2}(x-4)^2 + 6$.

