

1 Suppose that -5 is an x -intercept of the graph of $y = f(x)$; so in other words, $(-5, 0)$ is an intercept of that graph. For each of the following equations, state what must be an x -intercept of its graph.

a $y = f(x + 2)$

Since $(-5, 0)$ is on the original graph, $0 = f(-5)$. Now, $x + 2 = -5$ if $x = -7$, so $0 = f(-7 + 2)$. Therefore,

$$(-7, 0)$$

must be on this graph; that is, -7 is an x -intercept.

b $y = 4f(x)$

Since $(-5, 0)$ is on the original graph, $0 = f(-5)$. Multiplying both sides by 4, $0 = 4f(-5)$. Therefore,

$$(-5, 0)$$

must be on this graph too; that is, -5 is still an x -intercept.

2 On the number plane below, draw the graphs of these three equations. (Be sure to label which is which.)

a $y = x^2$

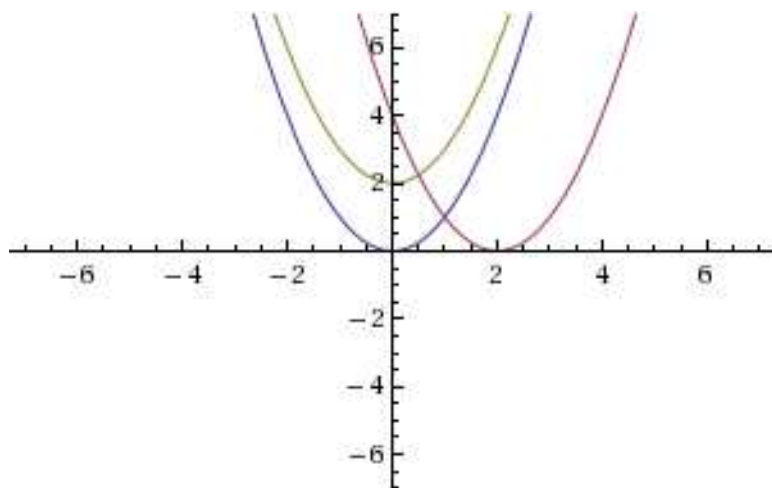
You should be familiar with this graph; the key points are $(0, 0)$, $(1, 1)$, $(-1, 1)$, $(2, 4)$, and $(-2, 4)$. The graph appears below in blue.

b $y = x^2 + 2$

This is shifted up by 2; in other words, add 2 to the second coordinate of each point. The key points become $(0, 2)$, $(1, 3)$, $(-1, 3)$, $(2, 6)$, and $(-2, 6)$. The graph appears below in brown.

c $y = (x - 2)^2$

This graph is shifted to the right by 2; in other words, add 2 to the first coordinate of each point. The key points become $(2, 0)$, $(3, 1)$, $(1, 1)$, $(4, 4)$, and $(0, 4)$. The graph appears below in purple.



(These graphs were produced by Wolfram Alpha.)