

Solving equations and inequalities from a graph

Suppose that f defines y as a function of x and that C is a real number. Then every value of x in the domain of f is a solution to **exactly one of the following**.

$$f(x) = C \text{ or } f(x) < C \text{ or } f(x) > C$$

Example 1

Complete Table 1 with the corresponding function values (they are all integers). Then indicate which of the three options the x -coordinate satisfies.

Table 1

x	$f(x)$	$f(x) > -4$	$f(x) = -4$	$f(x) < -4$
-8				
-6				
-4				
-2				
0				
2				
4				
6				
8				

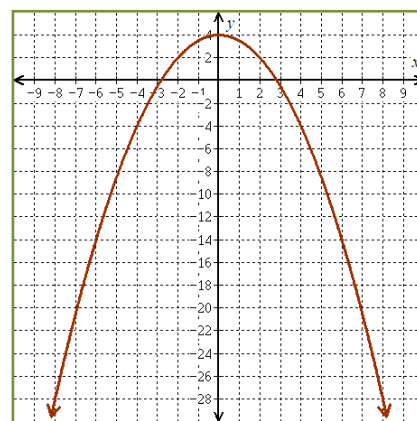


Figure 1: $y = f(x)$

Plot the points in Table 1 that correspond to solutions to the equation $f(x) = -4$. Where do these points lie relative to the line $y = -4$?

Plot the points in Table 1 that correspond to solutions to the inequality $f(x) > -4$. Where do these points lie relative to the line $y = -4$?

Plot the points in Table 1 that correspond to solutions to the inequality $f(x) < -4$. Where do these points lie relative to the line $y = -4$?

State the solution set to each of $f(x) = -4$, $f(x) > -4$, and $f(x) < -4$.

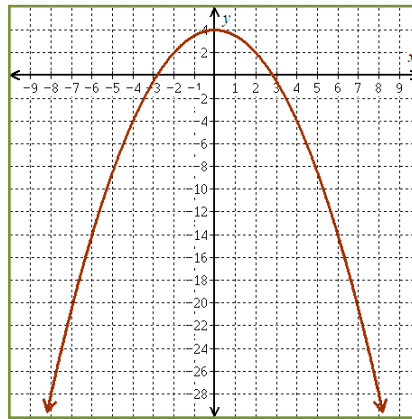


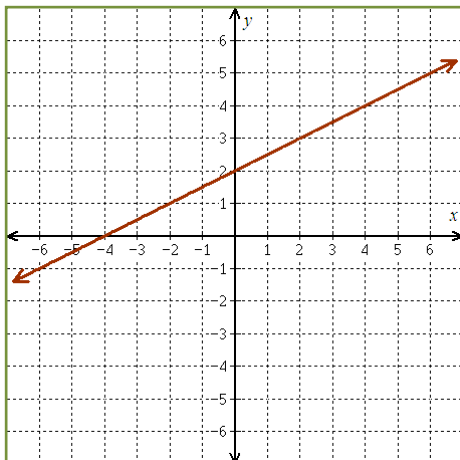
Figure 1: $y = f(x)$

$f(x) = -4$ _____ $f(x) > -4$ _____

$f(x) < -4$ _____

Example 2

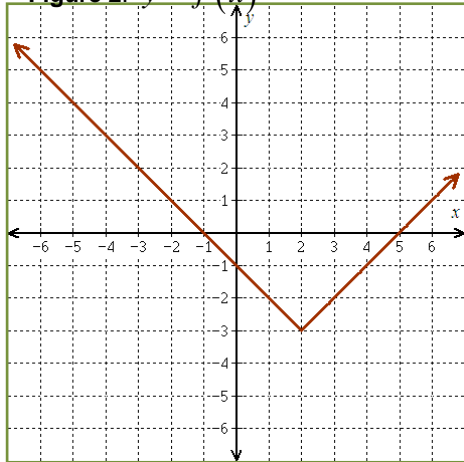
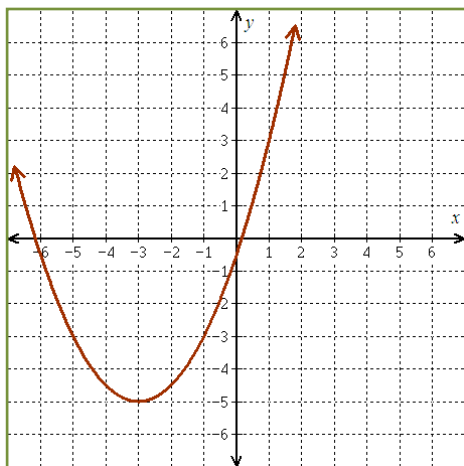
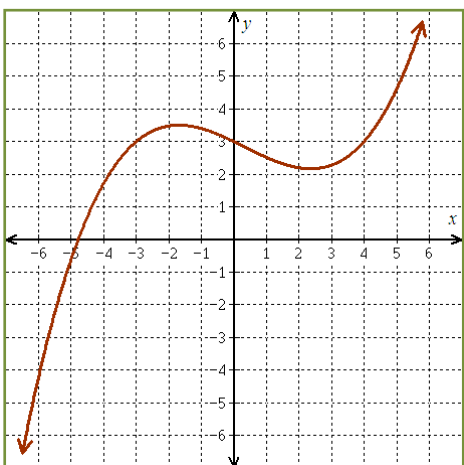
For each graph state the solution sets for the given equation and inequalities.



$f(x) = 1$ _____

$f(x) < 1$ _____

$f(x) \geq 1$ _____

Figure 2: $y = f(x)$ **Figure 3:** $y = h(x)$ **Figure 4:** $y = k(x)$ **Figure 5:** $y = z(x)$

$$h(x) = -1$$

$$h(x) \leq -1$$

$$h(x) > -1$$

$$k(x) = -5$$

$$k(x) \leq -5$$

$$k(x) \geq -5$$

$$z(x) = 3$$

$$z(x) < 3$$

$$z(x) \geq 3$$

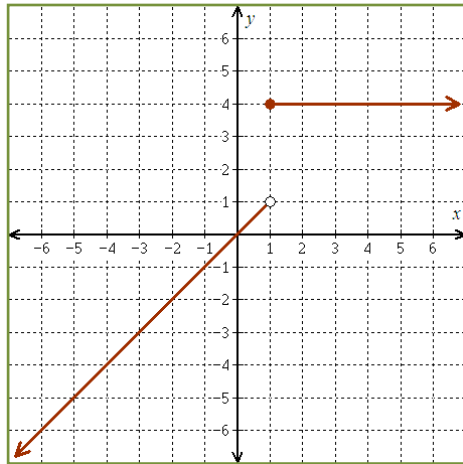


Figure 6: $y = g(x)$

$$g(x) = 4$$

$$g(x) < 4$$

$$g(x) > 4$$

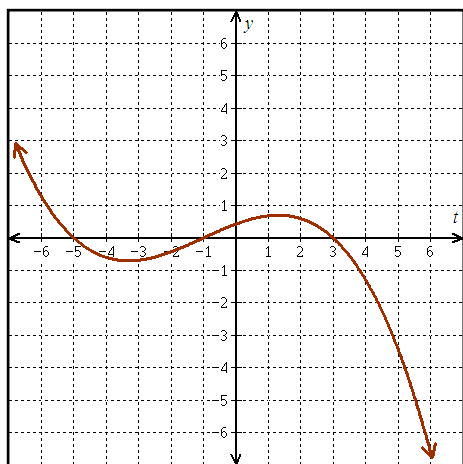


Figure 7: $y = w(t)$

$$w(t) = 0$$

$$w(t) \leq 0$$

$$w(t) > 0$$

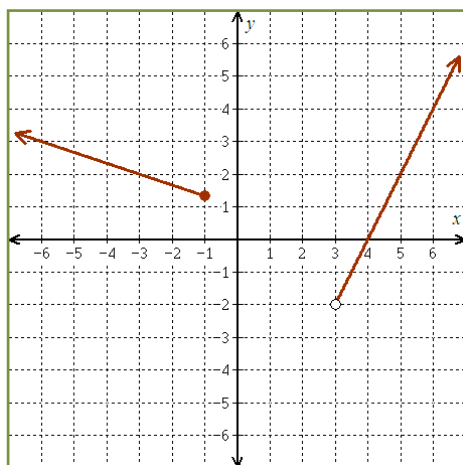


Figure 8: $y = T(x)$

$$T(x) = -4$$

$$T(x) < -4$$

$$T(x) \geq -4$$