

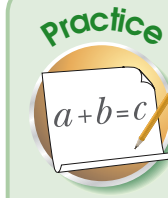
# Graph an Inequality with One Variable

Some people learn better visually. If you are one of those people, you are going to love number lines. Number lines can be used to graph inequalities, visually indicating all the possible solutions.

Basic inequalities, such as  $x > 5$ , have an infinite number of solutions. When graphing basic inequalities, you use a line that begins with a circle and ends with an arrow which indicates that the solution does not have an upper or a

lower boundary. A compound inequality, such as  $-1 \leq x < 3$ , has a limited range of possible values. When graphing compound inequalities, you use a line with circles on both ends to show the upper and lower boundaries for the range of values.

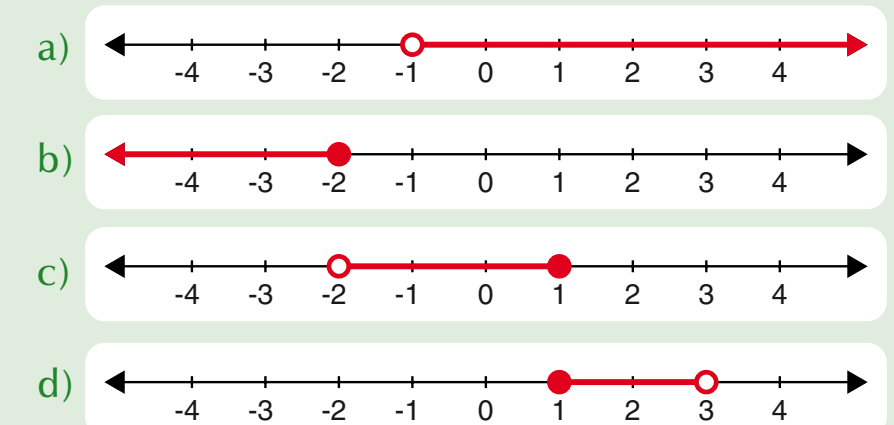
You can adjust the numbers shown on a number line to best suit the inequality you are graphing. For example, to graph the inequality  $x > 25$ , you can draw a number line that is numbered from 20 to 30.



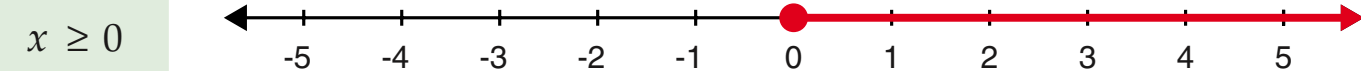
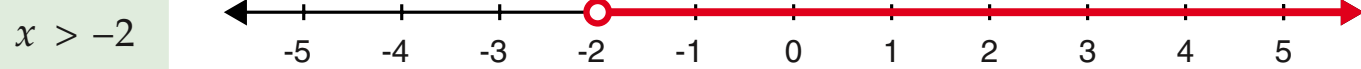
Graph the following inequalities. You can check your answers on page 257.

- 1)  $x > -4$
- 2)  $x \geq -3$
- 3)  $x \leq 1$
- 4)  $-2 < x < 1$
- 5)  $1 \leq x \leq 5$
- 6)  $-3 < x \leq 0$

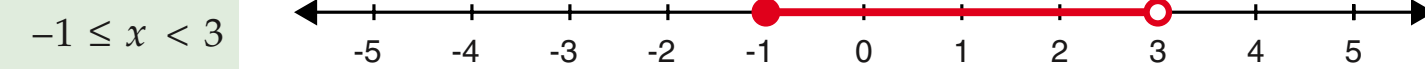
Use inequalities to describe the following graphs. You can check your answers on page 257.



## Graphing Basic Inequalities



## Graphing Compound Inequalities



You can use a number line to graph basic inequalities, such as  $x < 2$ .

1 To graph a basic inequality, locate the number in the inequality on the number line. For example, in the inequality  $x < 2$ , locate 2 on the number line.

2 If the inequality symbol is  $<$  or  $>$ , draw a hollow circle ( $\circ$ ) at the location of the number on the number line. If the inequality symbol is  $\leq$  or  $\geq$ , draw a filled-in circle ( $\bullet$ ) at the location of the number on the number line.

A hollow circle ( $\circ$ ) on the number line indicates the number is not a solution. A filled-in circle ( $\bullet$ ) indicates the number is a solution.

3 If the inequality symbol is  $<$  or  $\leq$ , draw an arrow on the number line from the circle to the left end of the number line. If the inequality symbol is  $>$  or  $\geq$ , draw an arrow on the number line from the circle to the right end of the number line.

The line you draw indicates all the possible solutions to the inequality.

You can use a number line to graph compound inequalities, such as  $-2 < x < 4$ .

1 To graph a compound inequality, locate the first number in the inequality on the number line. For example, in the inequality  $-2 < x < 4$ , locate  $-2$  on the number line.

2 If the inequality symbol is  $<$  or  $>$ , draw a hollow circle ( $\circ$ ) at the location of the number on the number line. If the inequality symbol is  $\leq$  or  $\geq$ , draw a filled-in circle ( $\bullet$ ) at the location of the number on the number line.

3 Repeat steps 1 and 2 for the second number in the inequality. For example, in the inequality  $-2 < x < 4$ , mark 4 on the number line.

4 Draw a line on the number line from one circle to the other circle.

The line you draw indicates all the possible solutions to the inequality.

Note: A compound inequality such as  $-2 < x < 4$  can also be written as  $x > -2$  and  $x < 4$ .