

- 1 Consider the inequality

$$x \leq -1.$$

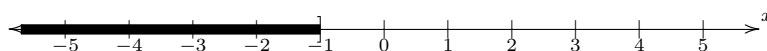
- a Write its solution set in interval notation.

Since there is no lower bound on the solution set, we begin at $-\infty$; we end at -1 . Since -1 is allowed, we use a square bracket there; as always, we use a round bracket at $-\infty$. Therefore, the solution set is

$$(-\infty, -1].$$

- b Draw a number line, label it, and graph this inequality on it.

The graph follows the same shape as the solution set above:



- 2 Solve the following equations. (Show at least one intermediate step for each.)

- a
- $8y + 3 = 15$

Both sides are simplified, and there is no variable term on the right-hand side. Thus, my first step is to subtract the constant term on the left-hand side from both sides:

$$\begin{array}{r} 8y + 3 = 15; \\ -3 \quad -3 \\ \hline 8y \quad = 12. \end{array}$$

Then my next step is to divide both sides by the coefficient on the left-hand side:

$$\begin{array}{r} \underline{8y = 12}; \\ 8 \quad 8 \\ \hline y = \frac{3}{2}. \end{array}$$

Now I am done!

- b
- $2(2x + 3) = 3(x - 4)$

First, I simplify each side:

$$\begin{array}{r} 2(2x + 3) = 3(x - 4); \\ 4x + 6 = 3x - 12. \end{array}$$

Next, I subtract the variable term on the right-hand side from both sides:

$$\begin{array}{r} 4x + 6 = 3x - 12; \\ -3x \quad -3x \\ \hline x + 6 = \quad -12. \end{array}$$

Next, I subtract the constant term on the left-hand side from both sides:

$$\begin{array}{r} x + 6 = -12; \\ -6 \quad -6 \\ \hline x \quad = -18. \end{array}$$

There is no coefficient on the left-hand side, so now I am done:

$$x = -18.$$