Example 4

A *system* of linear equations is a set of linear equations for which we are trying to find a solution that satisfies all of the equations in the set.

A solution (x, y) to a system of linear equations will be a point of intersection that all of the lines pass through.

Question

Find the solution to this system of linear equations:

$$y = 3x - 5 \quad (1),$$
$$y = -x + 3 \quad (2).$$

Answer The solution will have the same y value for both equations, so we can put the equations equal to each other:

$$3x - 5 = -x + 3$$
$$4x = 8$$
$$x = 2$$

We can substitute the value $x = 2$ into one of the equations to find the y value.

$$y = 3x - 5$$
$$y = 3(2) - 5$$
$$y = 6 - 5$$
$$y = 1$$

The solution to this system is $(2, 1)$, which represents the point of intersection of the two lines.