Linear Combination - Quiz 2

Let's think about the following question:

Will a set of two linear equations with two unknowns always have a solution? And if so, will it always be a single solution?

Consider the following set of equations:

$$\begin{cases} 2a & + & 3b & = & -1 \\ 10a & + & 15b & = & -5 \end{cases}$$

Quiz Question

What is the solution for a and b?

- a = 0, b = 2
- a = 2, b = 0
- there are no solutions
- there are infinite number of solutions

Answer:

There are infinite number of solutions

Explain:

The two equations here are **linearly dependent**.

Try to sketch them graphically. What do you see? How may points of intersection are there?

Since the two equations are linearly dependent, graphically they define the same line. Hence there are infinite number of solutions to the set of these equations. Basically, each point on the line (depicted by the blue x) satisfies the equation.