

Constructing simultaneous equations

Saturday, 12 January 2019 11:23 am

★ By the end of the lesson I would hope that you have an understanding of the concepts below which you can apply to a number of complex questions:

- Know what a simultaneous equation is
- Know how to construct a set of simultaneous equations and then use a suitable method to solve them

RECAP:

In a previous lesson we looked at what simultaneous equations are and the ways we might be asked to solve them. By far, the easiest way would be to use the CAS!

As I said in a previous lesson, the part of the course which seems to present people with the most problem is extracting information from worded questions and turning them into equations.

This lesson will look at how to take some of the most common questions and solve them.

The questions have been extracted from the Cambridge Essentials Methods 1 and 2 Textbook as this is the book I am currently teaching from.

Let's do some examples

Example 1:

The sum of two numbers is 24 and their difference is 96. Find the two numbers.

x
 y

$$\begin{array}{r} x + y = 24 \\ - x - y = 96 \\ \hline 2y = -72 \\ y = \underline{\underline{-36}} \end{array}$$

$$\begin{array}{r} x + y = 24 \\ x - 36 = 24 \\ x = \underline{\underline{60}} \end{array}$$

$$\begin{array}{r} x - y = 96 \\ 60 - (-36) = \underline{\underline{96}} \end{array}$$

The two numbers are 60 and -36

Example 2:

3 kg of jam and 2 kg of butter cost \$29, and 6 kg of jam and 3 kg of butter cost \$54. Find the cost per kilogram of jam and butter.

$$\begin{array}{r} 3j + 2b = 29 \quad \times 2 \\ 6j + 3b = 54 \\ \hline \cancel{6j} + 4b = 58 \\ - \cancel{6j} + 3b = 54 \\ \hline b = \underline{\underline{4}} \end{array}$$

$$\begin{array}{r} 3j + 2b = 29 \\ 3j + 8 = 29 \\ 3j = 21 \\ j = \underline{\underline{7}} \end{array}$$

$$\begin{array}{r} 6j + 3b \\ 42 + 12 = \underline{\underline{54}} \checkmark \end{array}$$

jam = \$7 / kg butter = \$4 / kg

Example 3:

The sum of the numerator and denominator of a fraction expressed in simplest form is 17. If 3 is added to the numerator, the value of the fraction will be 1. What is the fraction?

$$\frac{x}{y}$$

$$\boxed{x + y = 17}$$

$$x + 3 = \underline{y}$$

$$x + \textcircled{y} = 17$$

$$y = x + 3$$

$$x + (x + 3) = 17$$

$$y = 7 + 3$$

$$x + x + 3 = 17$$

$$y = \underline{\underline{10}}$$

$$2x + 3 = 17$$

$$2x = 14$$

$$x = \underline{\underline{7}}$$