Adam's Coffee

Adam wants to buy some coffee from a local supplier. The company has coffee from Colombia, Ecuador and Kenya, which they sell by the kilogram. Colombian coffee costs $12 per kilogram, Ecuadorian coffee costs $18 per kilogram and Kenyan coffee costs $25 per kilogram.

Adam wants to buy 20kg of coffee.

Adam wants to spend $400 on coffee.

Adam wants to buy twice as much Kenyan coffee as Colombian coffee.

How much of each type of coffee should Adam buy?

ANSWERS

Let x, y and z be the weights (in kilograms) of coffee purchased from Colombia, Ecuador and Kenya respectively.

For the total weight

$$1x + 1y + 1z = 20$$

For the total cost

$$12x + 18y + 25z = 400$$

For the ratio of Kenyan and Colombian coffee

$$2x = z$$

Notice that this equation can be written in general form as

$$2x + 0y - 1z = 0$$

Putting these equations into a graphics calculator, we get the output

$$(x,y,z) = (5,5,10)$$

Putting this in context, Adam should by 5kg of Colombian coffee, 5kg of Ecuadorian coffee and 10kg of Kenya coffee to satisfy his conditions.

One of the most common mistakes made in problems like this one is to write the wrong third equation for the ratio: that is, to use x = 2z.

If you're not sure if you've got it right, try checking to see if a specific situation fits the equation. In this example, twice as much Kenyan as Colombian coffee could be z=4 and x=2. This fits with the equation 2x = z.