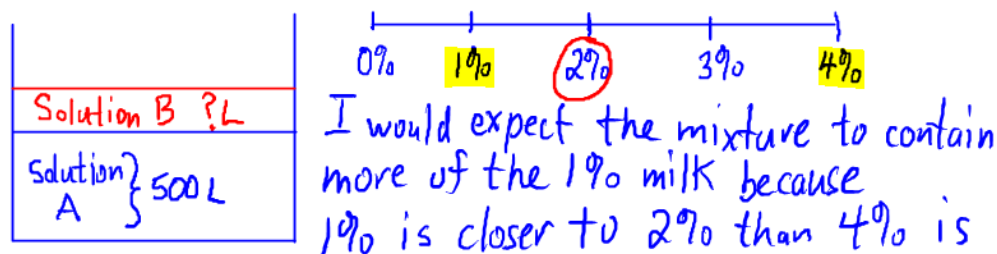


MORE PRACTICE SOLVING PROBLEMS WITH EQUATIONS

1. To make lower-fat chocolate frozen yogurt, chocolate milk containing 2% butterfat is needed. To obtain the required percentage of butterfat, chocolate milk containing 4% butterfat is mixed with 500 litres of chocolate milk containing 1% butterfat.

- (a) Without performing any calculations, predict whether the mixture will contain more of the 1% chocolate milk or more of the 4% chocolate milk. Explain.



- (b) How many litres of the 4% chocolate milk are needed to create the required mixture? What is the total volume of the mixture?

Solution

Let x represent the number of litres of the 4% chocolate milk that must be mixed with 500 L of the 1% chocolate milk to produce a mixture containing 2% butterfat.

Type of Chocolate Milk	Volume (L)	Amount of Butterfat in Given Volume (L)
1% butterfat	500	$0.01(500) = 5$
4% butterfat	x	$0.04x$
2% butterfat mixture	$x + 500$	$0.02(x + 500)$

$$\begin{array}{c}
 \left(\begin{array}{c} \text{Volume of butterfat} \\ \text{in mixture} \\ \text{from 1\% milk} \end{array} \right) + \left(\begin{array}{c} \text{Volume of butterfat} \\ \text{in mixture} \\ \text{from 4\% milk} \end{array} \right) = \left(\begin{array}{c} \text{Total volume of} \\ \text{butterfat in the} \\ \text{mixture} \end{array} \right) \\
 \downarrow \quad \quad \quad \downarrow \quad \quad \quad \downarrow \\
 5 + 0.04x = 0.02(x + 500)
 \end{array}$$

$$\therefore 5 + 0.04x = 0.02x + 10$$

$$\therefore 5 + 0.04x - 0.02x - 5 = 0.02x + 10 - 0.02x - 5$$

$$\therefore 0.02x = 5$$

$$\therefore \frac{0.02x}{0.02} = \frac{5}{0.02}$$

$$\therefore x = 250$$

To create the required mixture, 250 L of 4% chocolate milk must be added to 500 L of 1% chocolate milk, for a total volume of 750 L.

- (c) Does your answer in part (b) agree with the prediction that you made in part (a)? What can you conclude from this?

My answer agrees with the prediction from part (a), which means that it is likely to be correct.