

A factory produces small bottles of natural spring water. Two different machines,  $X$  and  $Y$ , are used to fill empty bottles with the water. A quality control engineer checks the volumes of water in the bottles filled by each of the machines. He chooses a random sample of 60 bottles filled by machine  $X$  and a random sample of 75 bottles filled by machine  $Y$ . The volumes of water,  $x$  and  $y$  respectively, in millilitres, are summarised as follows.

$$\sum x = 6345 \quad \sum (x - \bar{x})^2 = 243.8 \quad \sum y = 7614 \quad \sum (y - \bar{y})^2 = 384.9$$

$\bar{x}$  and  $\bar{y}$  are the sample means of the volume of water in the bottles filled by machines  $X$  and  $Y$  respectively.

Find a 95% confidence interval for the difference between the mean volume of water in bottles filled by machine  $X$  and the mean volume of water in bottles filled by machine  $Y$ . [6]