A factory produces bottles of an energy juice. Two different machines are used to fill empty bottles with the juice. The manager chooses a random sample of 50 bottles filled by machine X and a random sample of 60 bottles filled by machine Y. The volumes of juice, x and y respectively, measured in appropriate units, are summarised by

$$\Sigma x = 45.5$$
, $\Sigma (x - \bar{x})^2 = 19.56$, $\Sigma y = 72.3$, $\Sigma (y - \bar{y})^2 = 30.25$,

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

(i) Find a 90% confidence interval for the difference between the mean volume of juice in bottles filled by machine X and the mean volume of juice in bottles filled by machine Y. [7]

A test at the $\alpha\%$ significance level does not provide evidence that there is any difference in the means of the volume of juice in bottles filled by machine X and the volume of juice in bottles filled by machine Y.

[6]

(ii) Find the set of possible values of α .