

A company has two different machines,  $X$  and  $Y$ , each of which fills empty cups with coffee. The manager is investigating the volumes of coffee,  $x$  and  $y$ , measured in appropriate units, in the cups filled by machines  $X$  and  $Y$  respectively. She chooses a random sample of 50 cups filled by machine  $X$  and a random sample of 40 cups filled by machine  $Y$ . The volumes are summarised as follows.

$$\Sigma x = 15.2 \quad \Sigma x^2 = 5.1 \quad \Sigma y = 13.4 \quad \Sigma y^2 = 4.8$$

The manager claims that there is no difference between the mean volume of coffee in cups filled by machine  $X$  and the mean volume of coffee in cups filled by machine  $Y$ .

Test the manager's claim at the 10% significance level.

[9]