

An inspector is checking the lengths of metal rods produced by two machines, X and Y . These rods should be of the same length, but the inspector suspects that those made by machine X are shorter, on average, than those made by machine Y . The inspector chooses a random sample of 80 rods made by machine X and a random sample of 60 rods made by machine Y . The lengths of these rods are x cm and y cm respectively. Her results are summarised as follows.

$$\sum x = 164.0 \quad \sum x^2 = 338.1 \quad \sum y = 124.8 \quad \sum y^2 = 261.1$$

- (a)** Test at the 10% significance level whether the data supports the inspector's suspicion. [8]
- (b)** Give a reason why it is not necessary to make any assumption about the distributions of the lengths of the rods. [1]