

Topic Y9 Statistics (Post-TT) [34]

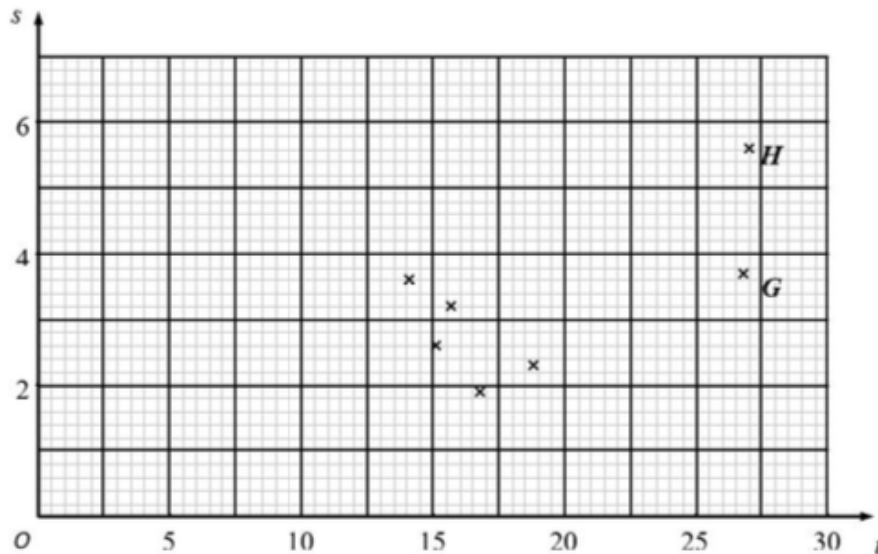
1.

The random variable H has the distribution $N(\mu, 5^2)$. It is given that $P(H < 22) = 0.242$. Find the value of μ . [4]

(Total 4 marks)

2.

2. A researcher believes that there is a linear relationship between daily mean temperature and daily total rainfall. The 7 places in the northern hemisphere from the large data set are used. The mean of the daily mean temperatures, $t^\circ\text{C}$, and the mean of the daily total rainfall, s mm, for the month of July in 2015 are shown on the scatter diagram below.



(a) With reference to the scatter diagram, explain why a linear regression model may not be suitable for the relationship between t and s . (1)

The researcher calculated the product moment correlation coefficient for the 7 places and obtained $r = 0.658$

(b) Stating your hypotheses clearly, test at the 10% level of significance, whether or not the product moment correlation coefficient for the population is greater than zero. (3)

(Total 4 marks)

3.

(a) The random variable G has the distribution $B(n, 0.75)$. Find the set of values of n for which the distribution of G can be well approximated by a normal distribution. [3]

(b) The random variable H has the distribution $B(n, p)$. It is given that, using a normal approximation, $P(H \geq 71) = 0.0401$ and $P(H \leq 46) = 0.0122$.

(i) Find the mean and standard deviation of the approximating normal distribution. [6]

(ii) Hence find the values of n and p . [4]

(Total 13 marks)

4.

The annual salaries of employees in a company have mean £30 000 and standard deviation £12 000.

- (i) Assuming a normal distribution, calculate the probability that the salary of one randomly chosen employee lies between £20 000 and £24 000. [4]
- (ii) The salary structure of the company is such that a small number of employees earn much higher salaries than the others. Explain what this suggests about the use of a normal distribution to model the data. [2]

(Total 6 marks)

5.

Over a long period the number of visitors per week to a stately home was known to have the distribution $N(500, 100^2)$. After higher car parking charges were introduced, a sample of four randomly chosen weeks have a mean number of visitors of 435. You should assume that the number of visitors per week is still normally distributed with variance 100^2 . Test at the 10% significance level, whether there is evidence that the mean number of visitors per week has fallen.

(Total 7 marks)