

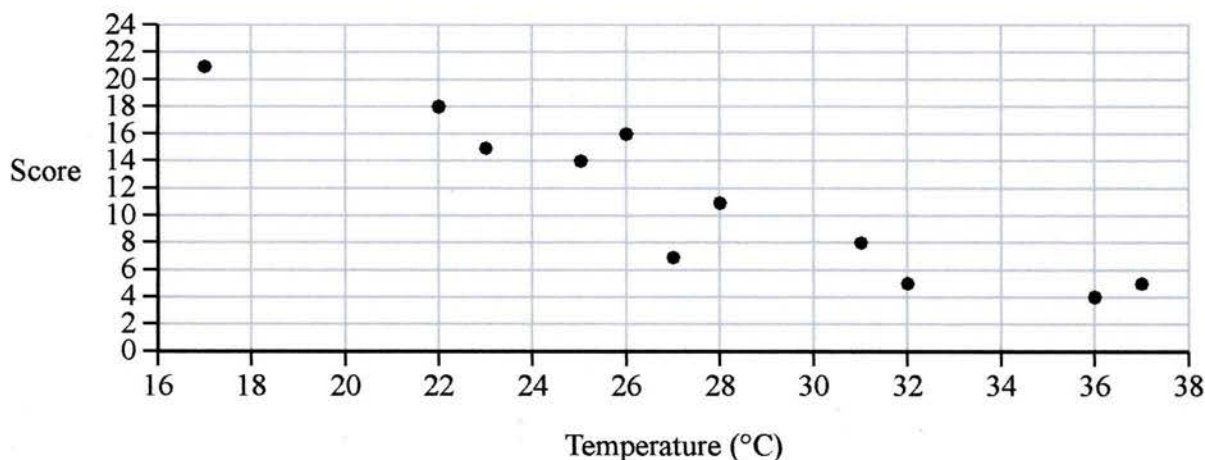
2. Xiang is investigating how room temperature affects a person's score in a task.

She gets Simon to complete the task 11 times at various controlled room temperatures, $x^{\circ}\text{C}$.

FINEVIEW

Xiang records the temperature, x , and Simon's score, y , where y is an integer.

The results are shown in the scatter diagram below.



(a) Use the scatter diagram to find

- (i) the median score (a)(i) Score of 11 is in the middle with 5 scores above & 5 scores below, so median score = 11 (1 mark)
- (ii) the range of the scores. (a)(ii) range of scores = highest score - lowest score = $21 - 4 = 17$ (1 mark) (2)

The temperature was increased each time Simon completed the task.

Xiang believes that as the room temperature increases, Simon's score will decrease.

Xiang calculates the product moment correlation coefficient from her data as -0.9286

(b) Use this calculated value to carry out a suitable hypothesis test to investigate her belief at a 5% level of significance.

State clearly

- (b) $H_0: \rho = 0$ (there is no correlation)
 $H_1: \rho < 0$ (there is negative correlation) (1 mark)
- your hypotheses
 - your critical value "Critical Values for Correlation Coefficients" table in Formula Booklet gives critical value for $\rho > 0$ for sample size 11 at 5% sig. as 0.5214 (3)

Xiang is concerned that because Simon is repeating the same task his scores

may improve. (c) the temperature was increased over time, so scores would increase (1 mark) with temperature if learning, but they decrease, so this is more evidence for $\rho < 0$

(c) Comment on how this concern may affect Xiang's conclusion to the test in part (b).

(1)

(b) contd. by Symmetry, critical value for $\rho < 0 = -0.5214$ (1 mark)
 Observed correlation of $-0.9286 < -0.5214$, so is in critical region.
 There is evidence to reject H_0 (no correlation) in favour of Xiang's belief.
 H_1 (negative correlation) (1 mark)