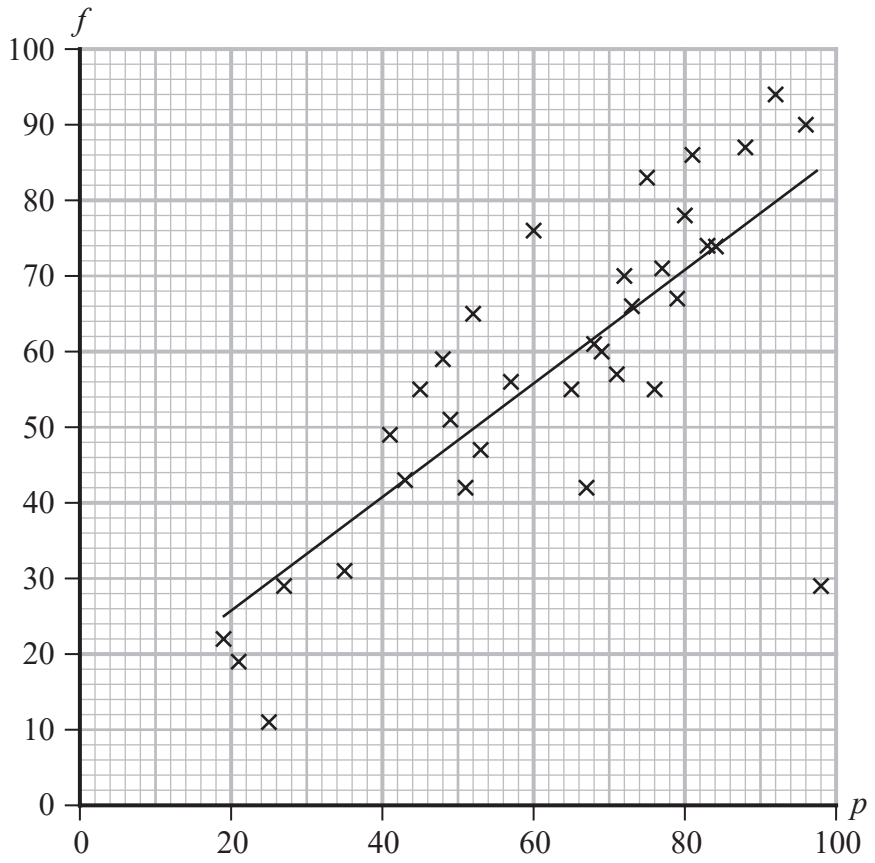
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6. Students on a psychology course were given a pre-test at the start of the course and a final exam at the end of the course. The teacher recorded the number of marks achieved on the pre-test, p, and the number of marks achieved on the final exam, f, for 34 students and displayed them on the scatter diagram.



The equation of the least squares regression line for these data is found to be

$$f = 10.8 + 0.748p$$

For these students, the mean number of marks on the pre-test is 62.4

(a) Use the regression model to find the mean number of marks on the final exam.

(2)

(b) Give an interpretation of the gradient of the regression line.

(1)

Considering the equation of the regression line, Priya says that she would expect someone who scored 0 marks on the pre-test to score 10.8 marks on the final exam.

(c) Comment on the reliability of Priya's statement.

(1)

(d) Write down the number of marks achieved on the final exam for the student who exceeded the expectation of the regression model by the largest number of marks.

(1)

Question 6 continues on page 24.

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Question 6 continued

Question 6 continues on page 24.

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Question 6 continued

(e) Find the range of values of p for which this regression model, $f = 10.8 + 0.748p$, predicts a greater number of marks on the final exam than on the pre-test.

(3)

Later the teacher discovers an error in the recorded data. The student who achieved a score of 98 on the pre-test, scored 92 not 29 on the final exam.

The summary statistics used for the model $f = 10.8 + 0.748p$ are corrected to include this information and a new least squares regression line is found.

Given the **original** summary statistics were,

$$n = 34 \quad \sum p = 2120 \quad \sum pf = 133\,486 \quad S_{pp} = 15\,573.76 \quad S_{pf} = 11\,648.35$$

(f) calculate the gradient of the new regression line. Show your working clearly.

(5)

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Question 6 continued

(Total 13 marks)

Q6