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6. *Ranpose* hospital offers services to a large number of clinics that refer patients to a range of hospitals.

The manager at *Ranpose* hospital took a random sample of 16 clinics and recorded

- the distance, x km, of the clinic from *Ranpose* hospital
- the percentage, y %, of the referrals from the clinic who attend *Ranpose* hospital.

The data are summarised as

$$\bar{x} = 8.1 \qquad \bar{y} = 20.5 \qquad \sum y^2 = 8266 \qquad S_{xx} = 368.16 \qquad S_{xy} = -630.9$$

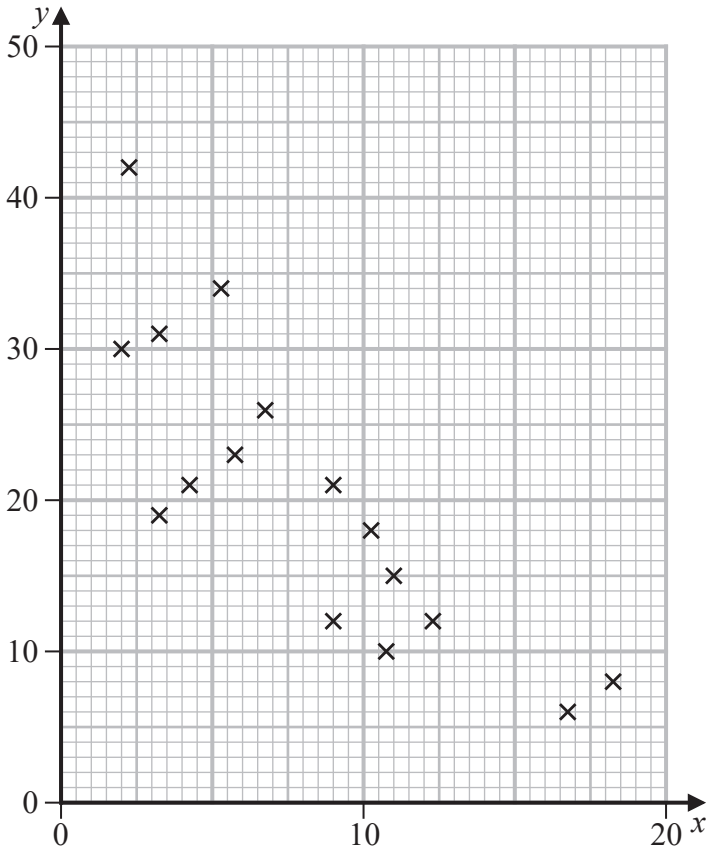
(a) Find the product moment correlation coefficient for these data.

(4)

(b) Give an interpretation of your correlation coefficient.

(1)

The manager at *Ranpose* hospital believes that there may be a linear relationship between the distance of a clinic from the hospital and the percentage of the referrals who attend the hospital. She drew the following scatter diagram for these data.



(c) State, giving a reason, whether or not these data support the manager's belief.

(1)

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Question 6 continued

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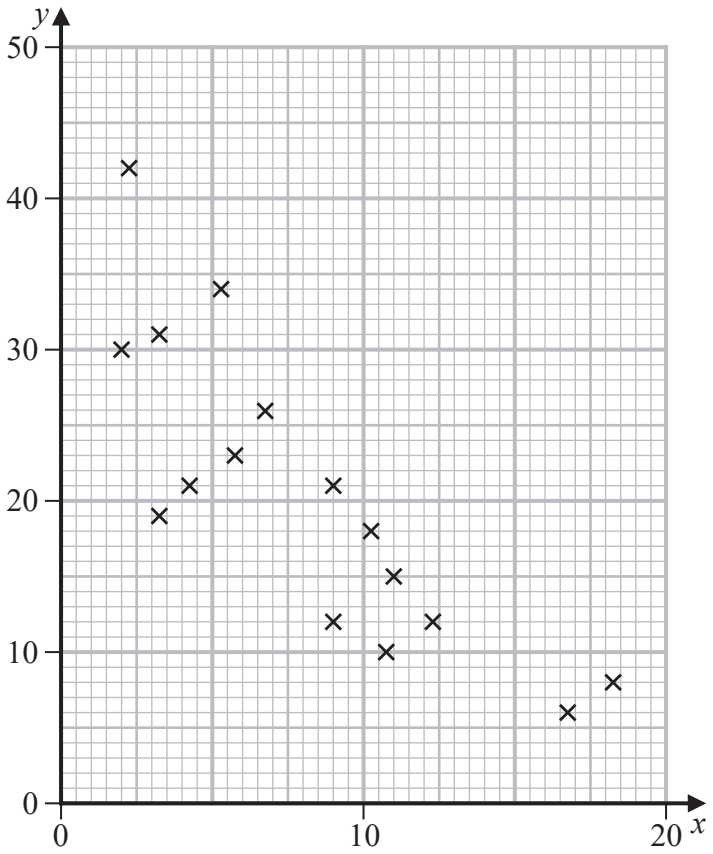
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Question 6 continued

[The summary data and the scatter diagram are repeated below.]

The data are summarised as

$\bar{x} = 8.1$ $\bar{y} = 20.5$ $\sum y^2 = 8266$ $S_{xx} = 368.16$ $S_{xy} = -630.9$



(d) Find the equation of the regression line of y on x, giving your answer in the form $y = a + bx$

(4)

(e) Give an interpretation of the gradient of your regression line.

(1)

(f) Draw your regression line on the scatter diagram.

(1)

The manager believes that *Ranpose* hospital should be attracting an "above average" percentage of referrals from clinics that are less than 5 km from the hospital. She proposes to target one clinic with some extra publicity about the services *Ranpose* offers.

(g) On the scatter diagram circle the point representing the clinic she should target.

(1)

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Q6

(Total 13 marks)

TOTAL FOR PAPER: 75 MARKS

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