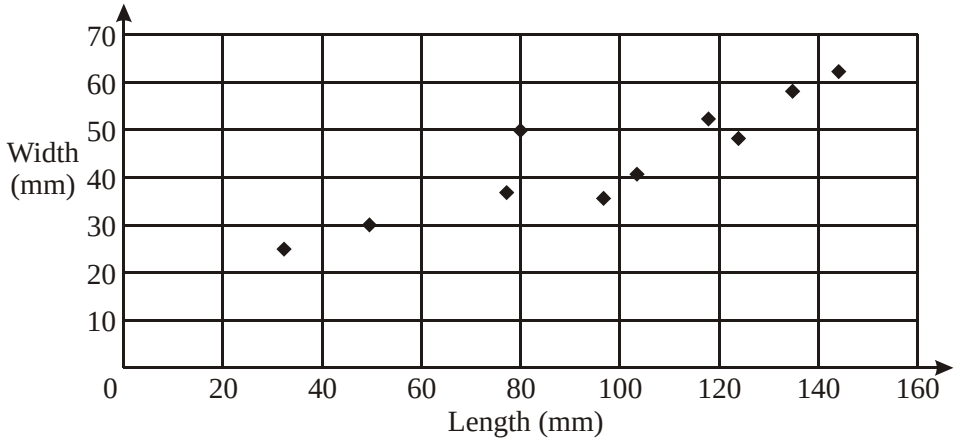
1. The length and width of 10 leaves are shown on the scatter diagram below.

Relationship between leaf length and width



(a) Plot the point $M(97, 43)$ which represents the mean length and the mean width.

(b) Draw a suitable line of best fit.

(c) Write a sentence describing the relationship between leaf length and leaf width for this sample.

Working:

Answer:

(c) ……..

……...

(Total 4 marks)

2. The following table gives the heights and weights of five sixteen-year-old boys.

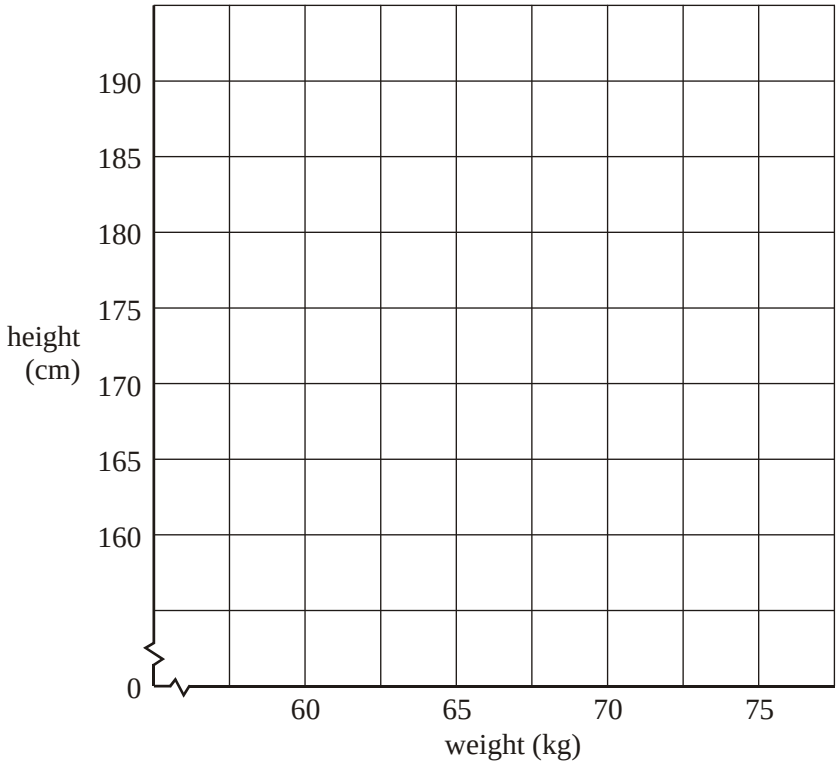
Name	Height	Weight
Blake	182 cm	73 kg
Jorge	173 cm	68 kg
Chin	162 cm	60 kg
Ravi	178 cm	66 kg
Derek	190 cm	75 kg

(a) Find

(i) the mean height;

(ii) the mean weight.

(b) Plot the above data on the grid below and draw the line of best fit.



Working:

Answers:

(a) (i) ……..

(ii) ……..

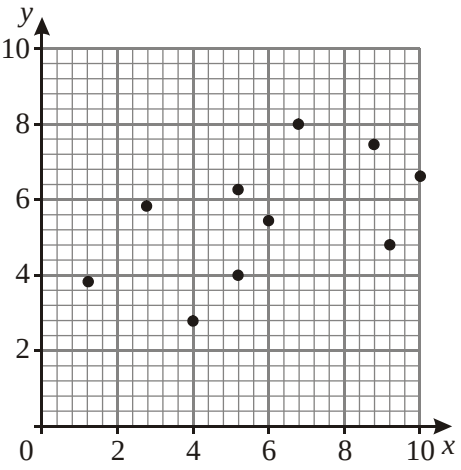
(Total 4 marks)

3. Statements I, II, III, IV and V represent descriptions of the correlation between two variables.

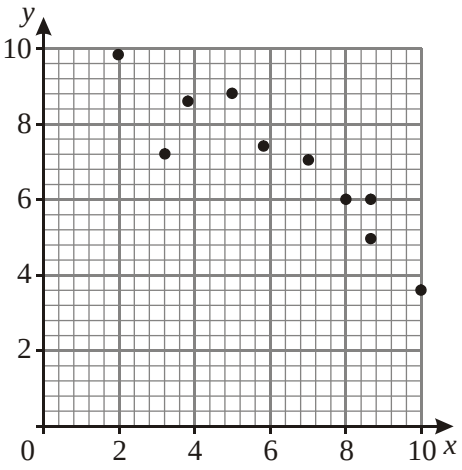
I High positive linear correlation
II Low positive linear correlation
III No correlation
IV Low negative linear correlation
V High negative linear correlation

Which statement **best** represents the relationship between the two variables shown in each of the scatter diagrams below.

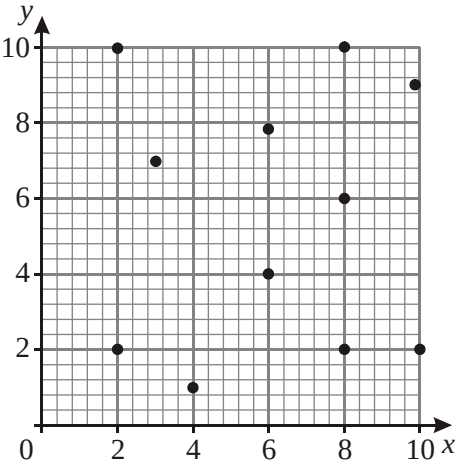
(a)



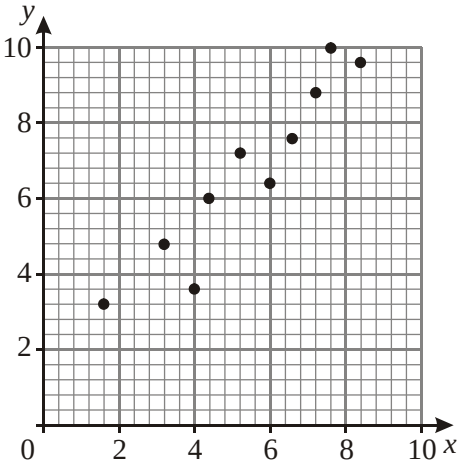
(b)



(c)



(d)



Answers:

(a) ……

(b) ……

(c) ……

(d) ……

(Total 4 marks)

4. Several candy bars were purchased and the following table shows the weight and the cost of each bar.

	Yummy	Chox	Marz	Twin	Chunx	Lite	BigC	Bite
Weight (g)	60	85	80	65	95	50	100	45
Cost (Euros)	1.10	1.50	1.40	1.20	1.80	1.00	1.70	0.90

(a) Given that $s_x = 19.2$, $s_y = 0.307$ and $s_{xy} = 5.81$, find the correlation coefficient, r, giving your answer correct to 3 decimal places.

(2)

(b) Describe the correlation between the weight of a candy bar and its cost.

(1)

(c) Calculate the equation of the regression line for y on x.

(3)

(d) Use your equation to estimate the cost of a candy bar weighing 109 g.

(2)

(Total 8 marks)

5. It is decided to take a random sample of 10 students to see if there is any linear relationship between height and shoe size. The results are given in the table below.

Height (cm) (x)	**Shoe size (y)**
175	8
160	9
180	8
155	7
178	10
159	8
166	9
185	11
189	10
173	9

(a) Write down the equation of the regression line of shoe size (y) on height (x), giving your answer in the form $y = mx + c$.

(3)

(b) Use your equation in part (a) to predict the shoe size of a student who is 162 cm in height.

(2)

(c) Write down the correlation coefficient.

(1)

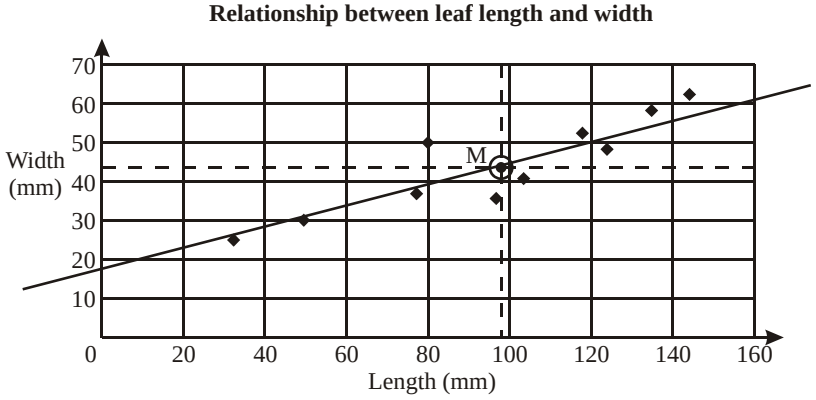
(d) Describe the correlation between height and shoe size.

(2)

(Total 8 marks)

1. (a) (see diagram) (A1) (C1)

(b)



(A2) (C2)

Notes:

(a) Award (A1) for the point M.

(b) Award (A1) for a line of best fit going through M and (A1) for a reasonable line of best fit

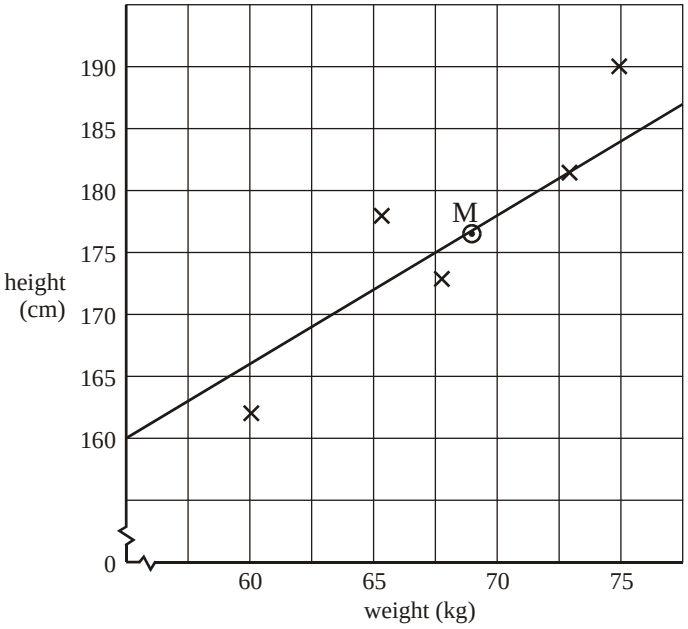
(c) leaf length and leaf width are positively correlated (R1) (C1)

[4]

2. (a) (i) $\frac{182+173+162+178+190}{5} = 177$ cm (A1)

(ii) $\frac{73+68+60+66+75}{5} = 68.4$ kg (A1)

(b)



(A1)(A1)

Note: *Award (A1) for at least 3 points plotted correctly;*
(A1) for a line of best fit through (68.4, 177)

[4]

3. (a) II (A1) (C1)

(b) V (A1) (C1)

(c) III (A1) (C1)

(d) I (A1) (C1)

[4]

4. (a) $r = \dfrac{S_{xy}}{(S_x S_y)} = \dfrac{5.81}{(19.2 \times 0.307)}$ (M1)

$= 0.986$ (A1) 2

Note: *Award (G2) for 0.985 from GDC.*

(b) Strong, positive correlation (A1) 1

(c) $y = 0.182 + 0.0158x$ (G3)

OR

$y - 1.325 = \frac{5.81}{19.2^2}(x - 72.5)$ (M1)(A1)

$y = 0.0158x + 0.182$ (A1) 3

(d) $y = 0.0158 \times 109 + 0.182$ (M1)
$= 1.90$ euros. (A1) 2
[8]

5. (a) $y = 0.070x - 3.22$ (G3) 3

Notes: *Award (G1) for correct m value, (G1) for 3.22, (G1) for negative sign.*
Accept 0.07x.

(b) $y = 0.070 \times 162 - 3.22$ (M1)
$= 8.12$
Therefore shoe size 8 or 9 (8.12). (A1)

OR

$y = 8$ or 9 (G2) 2

(c) $r = 0.681$ (A1) 1

(d) Moderately strong, positive correlation. (A1)(A1)
[8]