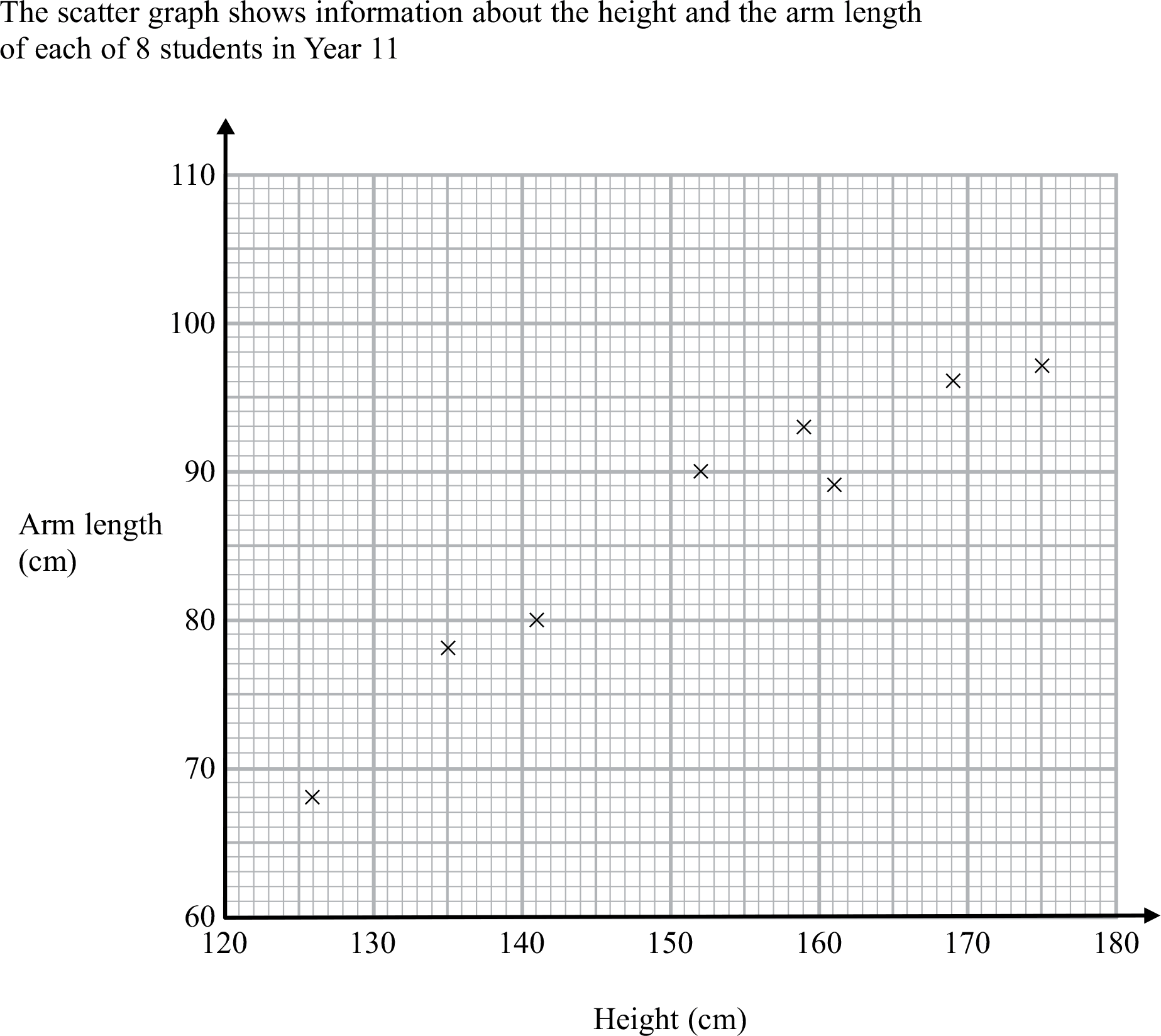
**Scatter Graphs (and Least Squares Regression Lines)**

The scatter graph shows information about the height and the arm length of some students in Year 11.



1. On the scattergraph, plot the remaining information from the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Height (cm) | 126 | 132 | 135 | 141 | 152 | 159 | 161 | 166 | 169 | 175 |
| Arm length (cm) | 68 | 75 | 78 | 80 | 90 | 93 | 89 | 93 | 96 | 97 |

1. What type of correlation does this scatter graph show?
2. Draw in a line of best fit

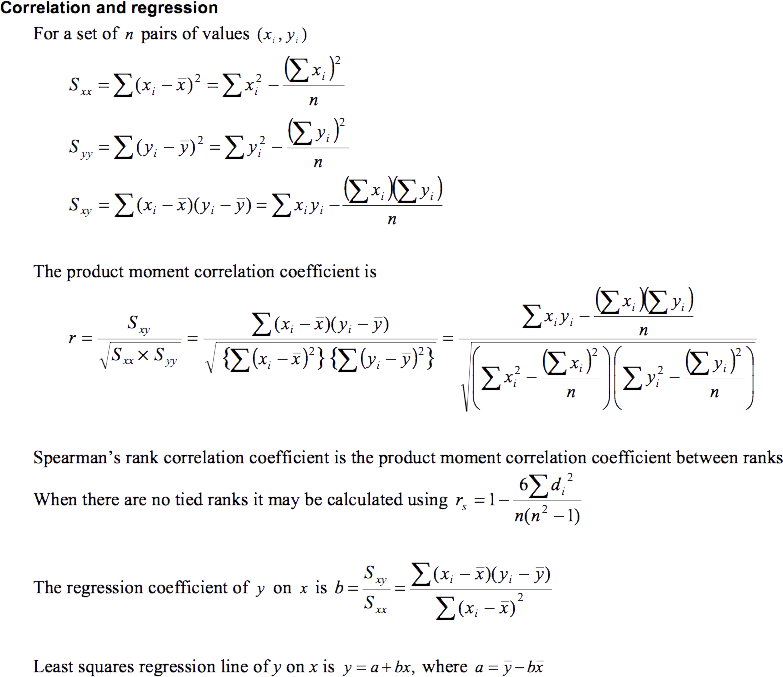
A different student in Year 11 has a height of 148 cm.

1. Estimate the arm length of this student.

(Exam question adapted from Edexcel higher tier paper 1, November 2012)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *xi* | 126 | 132 | 135 | 141 | 152 | 159 | 161 | 166 | 169 | 175 |
| *xi*2 |  |  |  |  |  |  |  |  |  |  |
| *yi* | 68 | 75 | 78 | 80 | 90 | 93 | 89 | 93 | 96 | 97 |
| *yi*2 |  |  |  |  |  |  |  |  |  |  |
| *xi yi* |  |  |  |  |  |  |  |  |  |  |

Find:



Use the values that you found in parts (a)-(j) together with the excerpt of the formula book above to find;

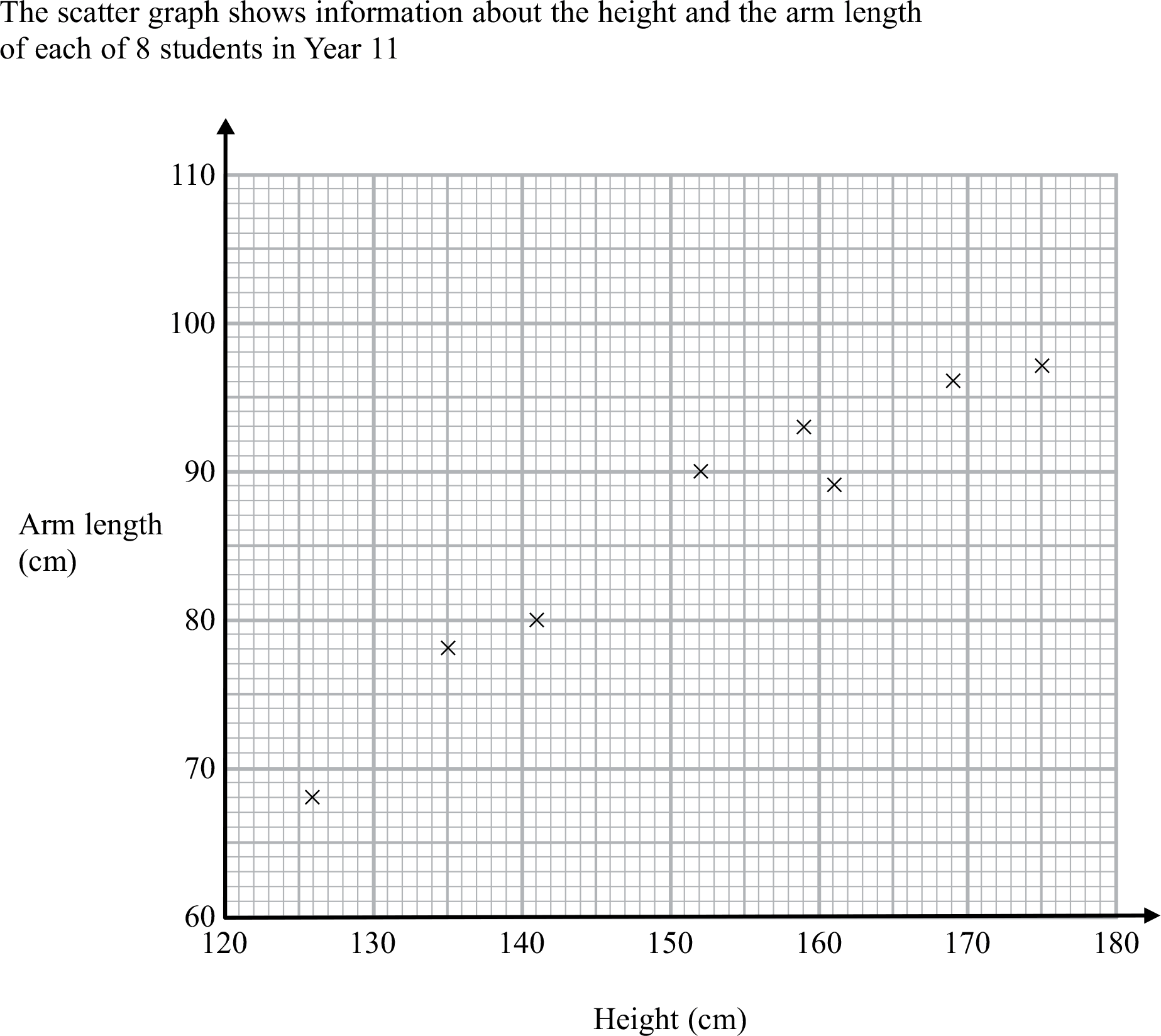
1. The product moment correlation coefficient, *r*, of *x* and *y.*
2. The regression coefficient, *b*, of *y* on *x.*
3. The equation of the least squares regression line of *y* on *x*, in the form

.

1. Use your values of and to plot the coordinate on the scatter graph.
2. Use your equation of the least squares regression line to find a corresponding *y* value for and plot this coordinate on the scatter graph. Draw in the least squares regression line of *y* on *x*. Compare this with your original line of best fit.

**Scatter Graphs (and Least Squares Regression Lines) - Answers**

The scatter graph shows information about the height and the arm length of some students in Year 11.



**X**

**X**

**X**

**X**

1. On the scattergraph, plot the remaining information from the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Height (cm) | 126 | 132 | 135 | 141 | 152 | 159 | 161 | 166 | 169 | 175 |
| Arm length (cm) | 68 | 75 | 78 | 80 | 90 | 93 | 89 | 93 | 96 | 97 |

1. What type of correlation does this scatter graph show? (strong) positive
2. Draw in a line of best fit

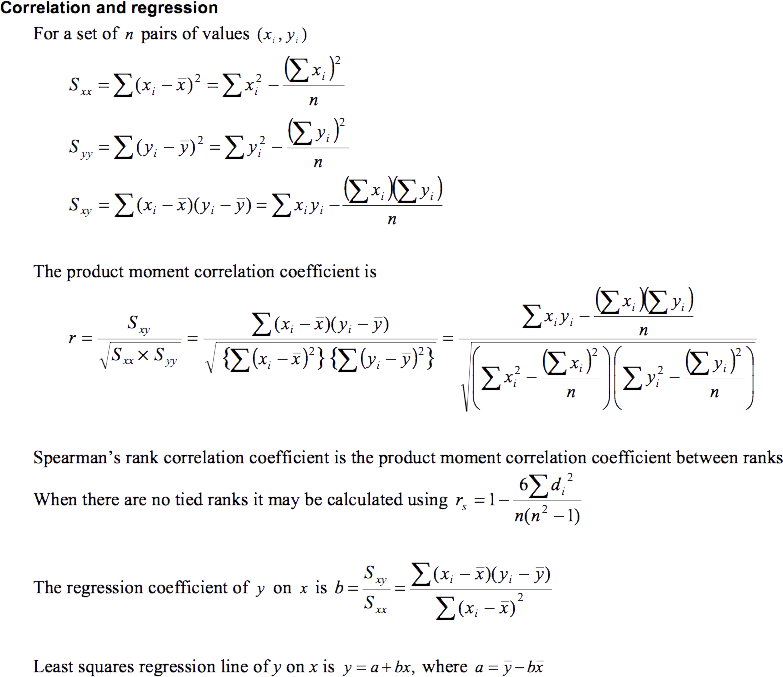
A different student in Year 11 has a height of 148 cm.

1. Estimate the arm length of this student. 84 cm

(Exam question adapted from Edexcel higher tier paper 1, November 2012)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *xi* | 126 | 132 | 135 | 141 | 152 | 159 | 161 | 166 | 169 | 175 |
| *xi*2 |  |  |  |  |  |  |  |  |  |  |
| *yi* | 68 | 75 | 78 | 80 | 90 | 93 | 89 | 93 | 96 | 97 |
| *yi*2 |  |  |  |  |  |  |  |  |  |  |
| *xi yi* |  |  |  |  |  |  |  |  |  |  |

Find:



Use the values that you found in parts (a)-(j) together with the excerpt of the formula book above to find;

1. The product moment correlation coefficient, *r*, of *x* and *y.* 0.973
2. The regression coefficient, *b*, of *y* on *x.* 0.566
3. The equation of the least squares regression line of *y* on *x*, in the form

.

1. Use your values of and to plot the coordinate on the scatter graph.
2. Use your equation of the least squares regression line to find a corresponding *y* value for and plot this coordinate on the scatter graph. Draw in the least squares regression line of *y* on *x*. Compare this with your original line of best fit.