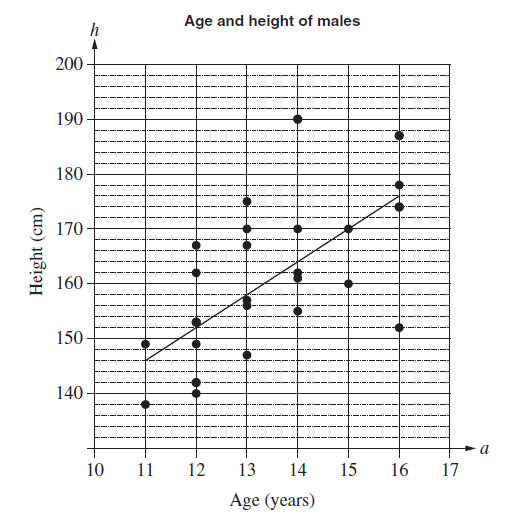
 NESA exemplar question solutions

MS-S4 Bivariate data analysis

Solutions for questions from the NESA topic guidance related to bivariate data analysis.

1. Ahmed collected data on the age () and the height () of males aged to years. He created a scatterplot of the data and constructed a line of best fit to model the relationship between the ages and height of males.



1. Determine the gradient of the line of best fit shown on the graph.

Solution: Line of best fit passes through the points () and ()

The gradient of the line of best fit is

1. Explain the meaning of the gradient in the context of the data.

Solution: The gradient is positive which indicates that as age increases the height of the male also increases at a rate of approximately cm per year.

1. Determine the equation of the line of best fit shown on the graph.

*Solution:* passing through the point ()

The equation for the line of best fit is

1. Use the line of best fit to predict the height of a typical -year-old male.

Solution: when

The height of a typical -year-old male is cm.

1. Why would this model not be useful for predicting the height of a typical -year-old male?

Solution: when

Using this model the height of a typical -year-old male would be cm. This is not a reasonable solution and assumes that males continue to grow at the same rate for the rest of their life. This model is not useful for predicting the height of a typical -year-old male as it is extrapolating the data.

| Height (cm) | 165 | 153 | 146 | 138 | 149 | 172 | 170 | 158 | 163 | 154 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Right Foot (cm) | 26 | 21 | 20 | 19 | 22 | 24 | 25 | 23 | 22 | 25 |

1. The height and length of the right foot of high school students were measured. The results were tabulated as follows:
2. Using technology, calculate the Pearson correlation coefficient for the data.

Solution:

1. Describe the strength of the association between height and length of the right foot

Solution: the Pearson correlation coefficient of (correct to 2 decimal places) indicates a strong positive linear association between a students height and the length of their right foot.