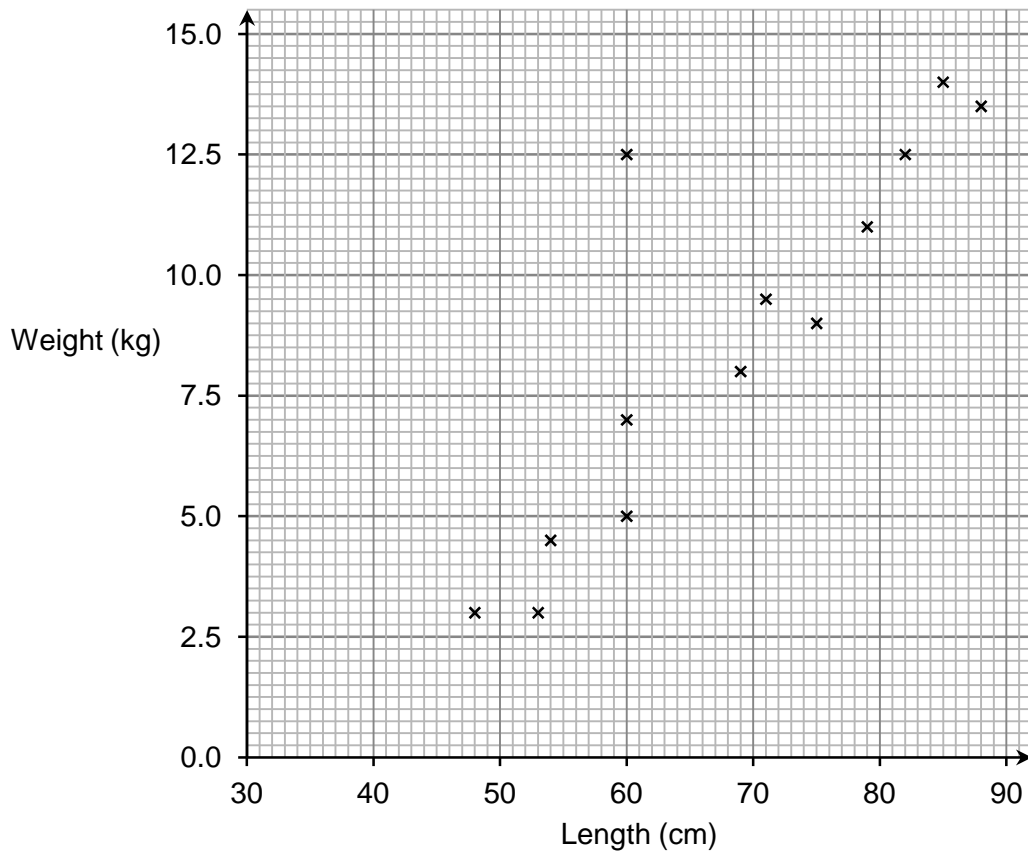## Foundation Check In - 12.03c & 12.03d
Analysing data: Bivariate Data

1. An experiment finds that using thicker insulation material in a loft reduces the amount of heat lost through the roof. Describe the type of correlation you might see on a graph of the results of the experiment.

2. A student thinks that people who are good at maths are also good at English. What type of correlation would support this hypothesis for a graph of maths test results against English test results for a group of students?

For questions 3-6 use the graph below.

3. The graph above shows weight and length of fish caught in a river survey.
   Draw a line of best fit on the graph.

4. Estimate the expected weight of a fish which is 50 cm long.

5. Circle any point on the graph that may be considered an outlier.

6. The graph shows a positive correlation. Explain what this shows about the relationship between the weight and length of the fish.
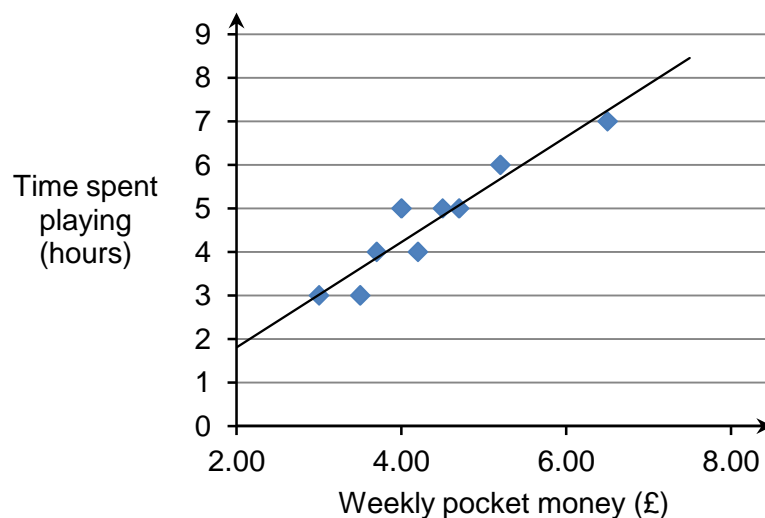
7. Leon has kept a record of his best 100 m running times each year.

Age	8	9	10	11	12	13	14	15
Time (s)	15.15	14.56	14.26	14.01	13.47	13.32	13.21	12.59

Does this data suggest he should be running 100 m races in less than 10 seconds by the time he is 22 years old? Explain your reasoning.

8. Gillian displays data collected from classmates, plotting their weekly pocket money against time spent playing computer games. She concludes that to get more pocket money she should spend more time playing computer games.
Is she correct? Explain your answer.

9. **For this question, use the graph used in questions 3-6.**
A rule states that any fish shorter than 70 cm must be returned to the river. An angler only has a scale to weigh the fish. How might he decide which fish to return to the lake?

10. A survey of 30 cyclists finds a strong negative correlation between "hours spent training" and "race times". It also finds a strong positive correlation between "hours spent training" and "amount of money spent on cycling equipment". What type of correlation might you expect to find between "race times" and "money spent on cycling equipment"?

Extension

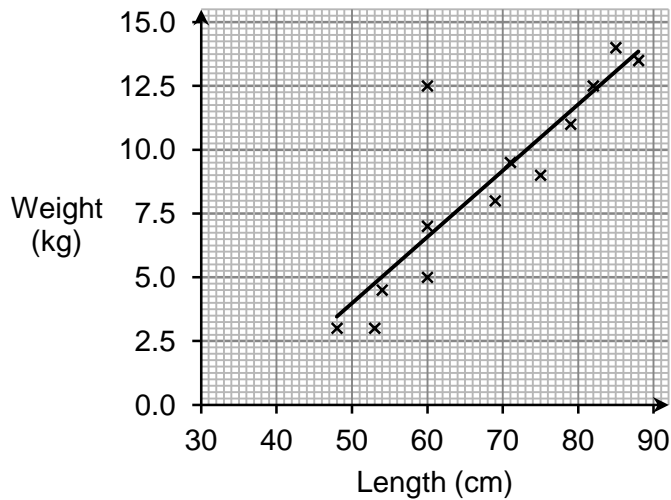Data from a survey is provided in the table.

Height, cm	188	169	150	145	162	183	174	155	172	164	176	159
Shoe size	45	44	41	40	42	46	44	43	43	41	43	48

One item of data does not appear to fit. Identify the item of data and say what might be done to ensure it does not affect conclusions drawn from an analysis of the data.
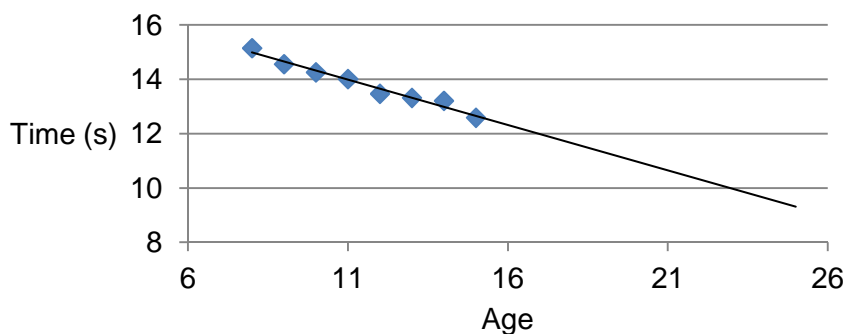
Answers

1. Negative

2. Positive

3.

4. ≈ 3 kg

5. Correct point circled (60, 12.5)

6. "Longer fish weigh more" oe

7. Although a line of best fit extrapolates to 10 seconds at 22 years old there is no guarantee that he will continue to improve each year at the same rate.
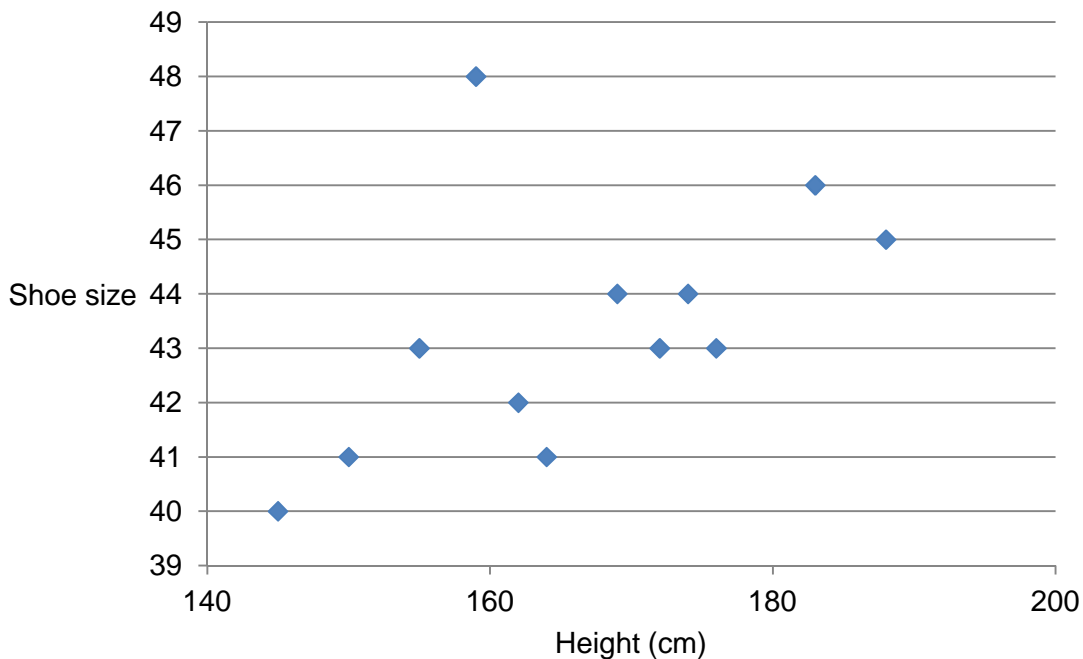

8. The scatter diagram does show a correlation, but this does not imply a causal relationship (an increase in time playing computer games will not result in more pocket money).

9. Using the line of best fit, a 70 cm fish weighs around 7.5 kg, so return any fish that weigh less than 7.5 kg.

10. Negative correlation

Extension

Height 159 cm, shoe size 48 appears to not fit the data. Going back to the source data and checking that the data is correct is the best option where this is possible. Excluding the data item from any calculations would deal with the problem where it is not possible to check the source data.

GCSE (9–1)
MATHEMATICS

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Interpret correlation within the context of the variables			
AO1	2	Interpret correlation within the context of the variables			
AO1	3	Draw a line of best fit			
AO1	4	Use a line of best fit to make interpolation predictions			
AO1	5	Identify an outlier on a scatter graph			
AO2	6	Interpret correlation within the context of the variables			
AO2	7	Understand the limitations of extrapolation			
AO2	8	Recognise that correlation does not imply causation			
AO3	9	Interpolate from data			
AO3	10	Interpret correlation within the context of the variables			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Interpret correlation within the context of the variables			
AO1	2	Interpret correlation within the context of the variables			
AO1	3	Draw a line of best fit			
AO1	4	Use a line of best fit to make interpolation predictions			
AO1	5	Identify an outlier on a scatter graph			
AO2	6	Interpret correlation within the context of the variables			
AO2	7	Understand the limitations of extrapolation			
AO2	8	Recognise that correlation does not imply causation			
AO3	9	Interpolate from data			
AO3	10	Interpret correlation within the context of the variables			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Interpret correlation within the context of the variables			
AO1	2	Interpret correlation within the context of the variables			
AO1	3	Draw a line of best fit			
AO1	4	Use a line of best fit to make interpolation predictions			
AO1	5	Identify an outlier on a scatter graph			
AO2	6	Interpret correlation within the context of the variables			
AO2	7	Understand the limitations of extrapolation			
AO2	8	Recognise that correlation does not imply causation			
AO3	9	Interpolate from data			
AO3	10	Interpret correlation within the context of the variables			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Interpret correlation within the context of the variables			
AO1	2	Interpret correlation within the context of the variables			
AO1	3	Draw a line of best fit			
AO1	4	Use a line of best fit to make interpolation predictions			
AO1	5	Identify an outlier on a scatter graph			
AO2	6	Interpret correlation within the context of the variables			
AO2	7	Understand the limitations of extrapolation			
AO2	8	Recognise that correlation does not imply causation			
AO3	9	Interpolate from data			
AO3	10	Interpret correlation within the context of the variables			