

Scatter graphs and correlation

Year 8 About 60 minutes No calculator 45 marks



Hints online, answers free with an account:

mathswariz.uk/worksheets/ks3-year-8-scatter-graphs-and-correlation/

Date _____

A Do Now

Quick questions to start.

A1 Last lesson [1 mark] **A2** Needed today [1 mark]

Two regular octagons are placed side by side at a point. Work out the size of the gap.

Answer

A line goes through (0, 4) and goes up 3 for every 1 across. Work out its height when $x = 5$.

Answer

A3 Year 7 [1 mark] **A4** From chapter 1 [1 mark]

Work out the mean of 12, 15, 18 and 23.

Answer

Increase £80 by 15%.

Answer

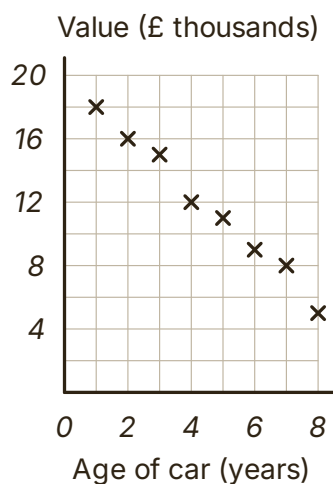
B Example, then your turn

Year 8

Your teacher works through each example with you. Then try the one beside it.

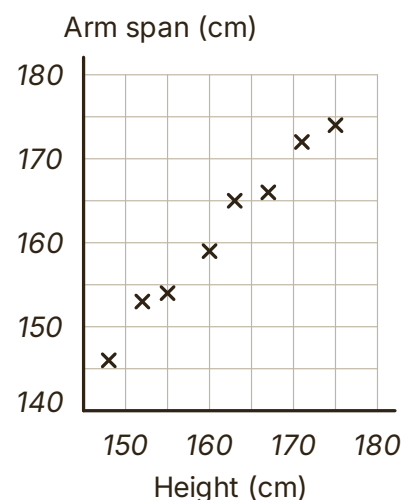
EXAMPLE 1

The scatter graph shows the age and the value of 8 cars. Describe the correlation. What does it tell you?



Hint As one value goes up, does the other go up, go down, or neither?

B1 The scatter graph shows the height and the arm span of 8 people. Describe the correlation. What does it tell you? [2 marks]



EXAMPLE 2

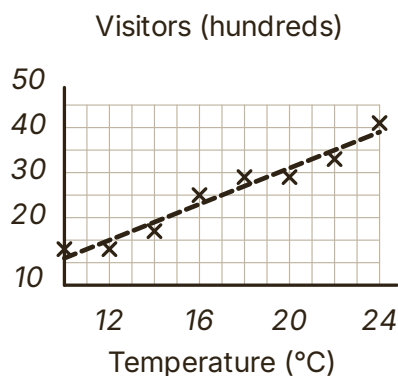
Sales of ice cream have positive correlation with temperature. Sales of hot drinks have negative correlation with temperature. What correlation would you expect between sales of ice cream and sales of hot drinks?

Hint Think about a hot day. What happens to each kind of sale?

- B2** Sales of scarves have negative correlation with temperature. Sales of hot chocolate have negative correlation with temperature. What correlation would you expect between sales of scarves and sales of hot chocolate? Give a reason. [2 marks]

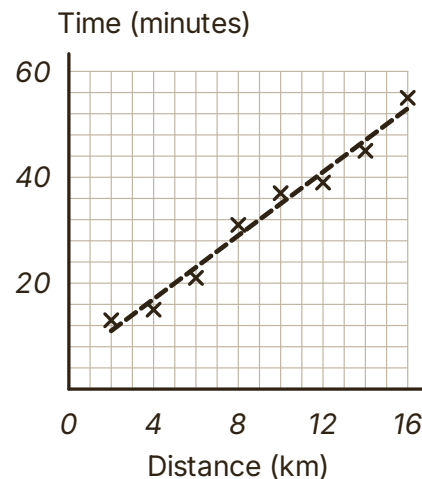
EXAMPLE 3

The graph shows the temperature and the number of visitors to a park on 8 days, with a line of best fit. Estimate the number of visitors on a day when the temperature is 17°C .



Hint Go up from 17 on the temperature axis to the line, then across to the other axis.

- B3** The graph shows the distance and the time of 8 taxi journeys, with a line of best fit. Estimate the time of a 9 km journey. [2 marks]



Answer minutes

EXAMPLE 4

A line of best fit for some children aged 8 to 15 shows their reading age. Explain why it should not be used to estimate the reading age of a 30-year-old.

Hint Look at which ages the data covers.

- B4** The data for the taxi journeys in B3 runs from 2 km to 16 km. Explain why the line of best fit should not be used to estimate the time of a 60 km journey. [2 marks]

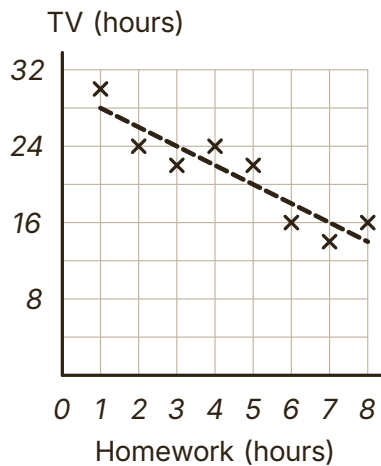
C1 *A* has positive correlation with *B*. *B* has negative correlation with *C*. What correlation would you expect between *A* and *C*? [2 marks]

Answer

C2 *P* has no correlation with *Q*. *Q* has positive correlation with *R*. What can you say about *P* and *R*? [2 marks]

Answer

C3 The graph shows the hours of homework and the hours of TV watched by 8 students in a week, with a line of best fit. Estimate the hours of homework done by a student who watches 20 hours of TV in a week. [2 marks]



Answer hours

C5 Which pair would have negative correlation? A: height and shoe size. B: age of a car and its value. C: house number and test mark. Give a reason. [2 marks]

C4 The table shows the shoe size (Size) and the height in cm (Height) of 7 students. One student does not fit the pattern. Who is it? Give a reason. [2 marks]

Name	Size	Height
Ava	4	150
Ben	5	156
Cal	6	160
Dev	7	166
Eli	5	178
Fay	8	171
Gus	9	176

C6 The table shows the hours of exercise a week and the resting heart rate (beats a minute) of 6 people. Describe the correlation and say what it means. [2 marks]

Hours	2	4	5	7	8	10
Heart rate	78	74	71	66	64	60

D1

Ice cream sales and the number of people with sunburn have positive correlation. Lena says, "This shows that eating ice cream causes sunburn."

[2 marks]

Explain why Lena is wrong.

D2 The scatter graph shows the age and the time to run 100 m for 8 children, with a line of best fit.

(a) Describe the correlation.

[1 mark]

Answer

(b) Estimate the time for an 11-year-old.

[2 marks]

Answer seconds

(c) A child runs 100 m in 13 seconds.

[2 marks]

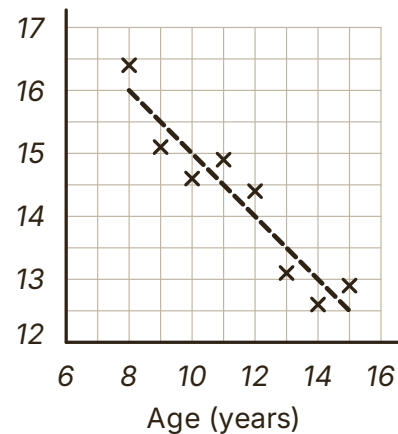
Estimate the child's age.

Answer years

(d) Explain why the line should not be used for a 4-year-old.

[2 marks]

Time to run 100 m (seconds)



Total for D2: 7 marks

D3 In a study of football teams, points gained has positive correlation with goals scored, and negative correlation with goals conceded.

(a) What correlation would you expect between goals scored and goals conceded?

[2 marks]

Answer

- (b) A team concedes very few goals. What would you expect about the number of points it gains? Give a reason. [2 marks]

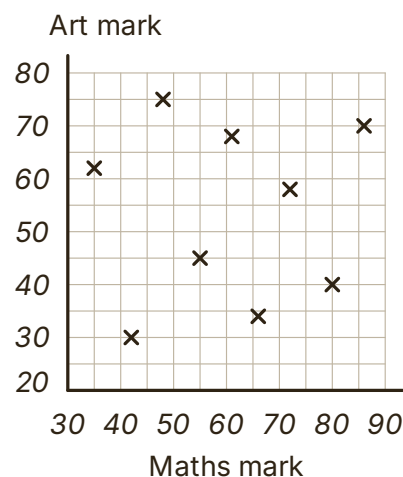
Total for D3: 4 marks

D4 The scatter graph shows the maths mark and the art mark of 9 students.

- (a) Describe the correlation. [1 mark]

Answer

- (b) Ali says, "I got 80 in maths, so the graph shows I will get about 80 in art." Explain why Ali is wrong. [3 marks]



Total for D4: 4 marks

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A line of best fit goes through the points (0, 10) and (8, 50). There is no graph. [4 marks]
Use the line to estimate y when $x = 13$, and x when $y = 35$.

Answer $y = \dots\dots$ $x = \dots\dots$

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** From $x = 0$ to $x = 8$ the line goes up $50 - 10 = 40$.
Hint 2 So the line goes up $40 \div 8 = 5$ for every 1 across, starting from 10.
Hint 3 For $y = 35$: $35 - 10 = 25$ above the start, and $25 \div 5$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can describe the correlation on a scatter graph and say what it means.

☐ ☐ ☐

I can work out the correlation between two things from two other correlations.

☐ ☐ ☐

I can use a line of best fit to make an estimate, and say when not to.

☐ ☐ ☐