JustMaths

Scatter Graphs (H)

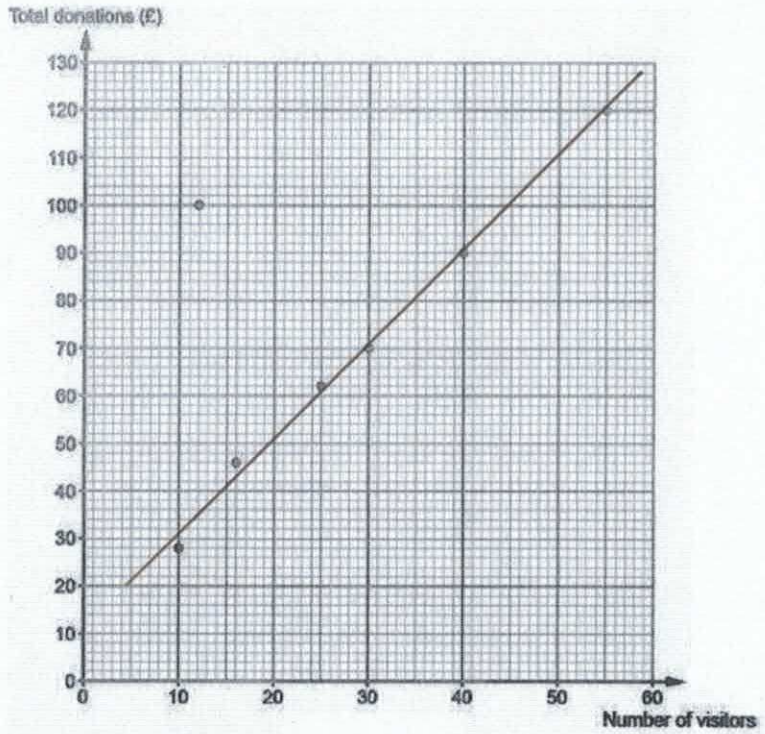
A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

Name:	Solutions
Total Marks:	

1. The number of visitors to an animal rescue centre and the total donations received were recorded every day for 7 days.

   The table and scatter diagram below show the results.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of visitors	40	10	16	30	25	55	12
Total donations (£)	90	28	46	70	62	120	100



JustMaths

(a) Draw, by eye, a line of best fit on your scatter diagram.

(Line drawn ignoring outlier [1]

(b) Describe the relationship between the number of visitors and the total donations.

Strong positive correlation [1]

(c) Which particular day does not fit the relationship?

(12, 100) → Sunday [1]

(d) The animal rescue centre manager says:

"If we have 35 visitors to the centre next Wednesday we will definitely receive £80 in donations."

(i) Explain how the manager may have come to this conclusion?

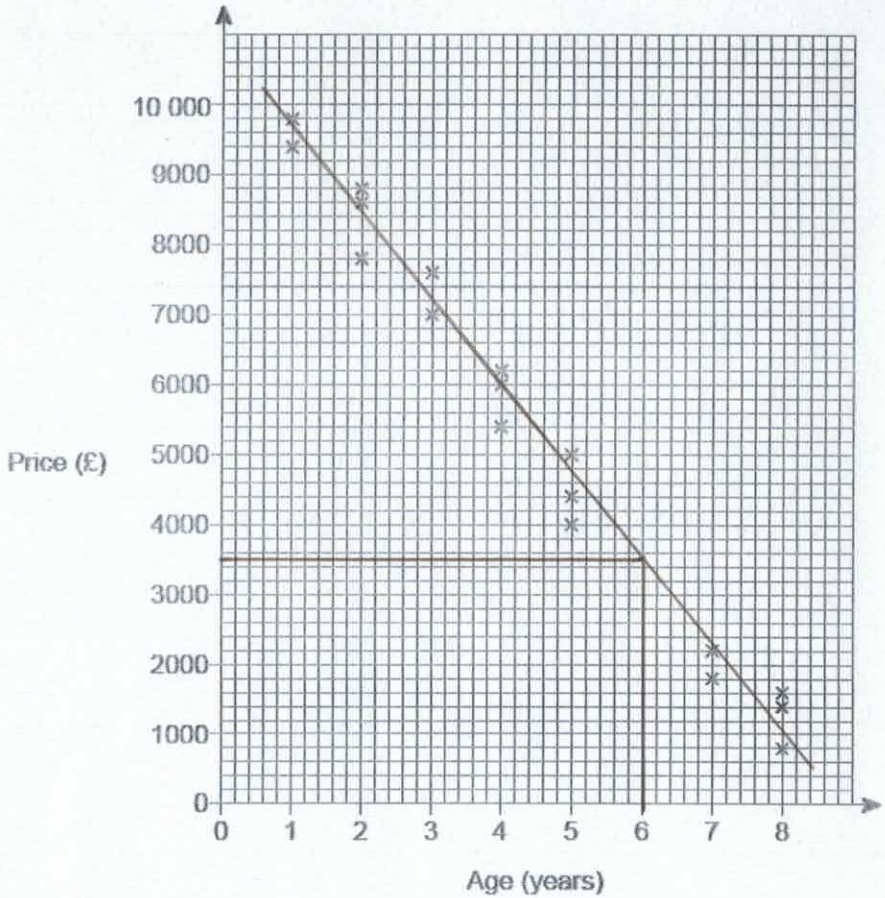
Reading up from 35 visitors & across to £80 [1]

(ii) Is the manager's statement correct?

You must give a reason for your answer.

No, it's only an estimate of likely donations. [1]

2. The scatter graph shows the age and the price of 18 cars.



The cars are all the same make and model.

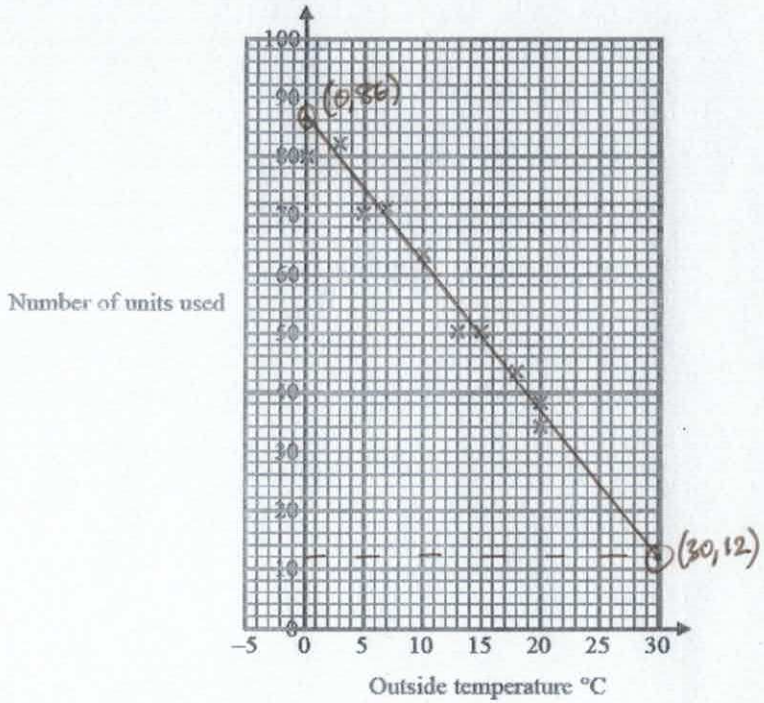
Use a line of best fit to estimate the price of a 6-year old car.

£3500

[2]

3. In a survey, the outside temperature and the number of units of electricity used for heating were recorded for ten homes. (also on Fdn)

The scatter diagram shows this information.



Molly says,

"On average the number of units of electricity used for heating decreases by 4 units for each °C increase in outside temperature."

(a) Is Molly right?

Show how you get your answer.

LOBF + gradient triangle

Grad. = $\frac{\text{diff. in } y}{\text{diff. in } x} = \frac{12-86}{30-0} = \frac{-74}{30} \simeq -2.5$

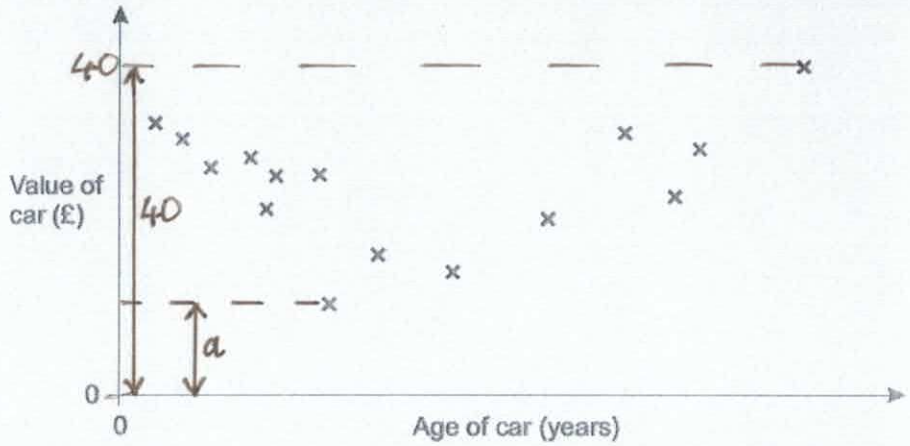
No, Molly is wrong (2.5 not 4.) [3]

(b) You should not use a line of best fit to predict the number of units of electricity used for heating when the outside temperature is 30°C.

Give one reason why.

Extrapolation (outside range of observed vals)
(Also electricity likely to be used for cooling when 30°C outside.) [1]

4. This scatter graph shows the values of 15 sports cars plotted against their ages.



a) (i) Lewis thinks that there is no correlation between the ages and values of these cars.

Is Lewis correct?

Give a reason for your answer.

No clear correlation as relationship is not linear
→ Lewis is correct

[2]

(ii) Sebastian thinks that there is a relationship between the ages and values of these cars.

Is Sebastian correct?

Give a reason for your answer.

Yes, there is a relationship, just not a linear one.

[2]

b) The car with the highest value is 40 years old.

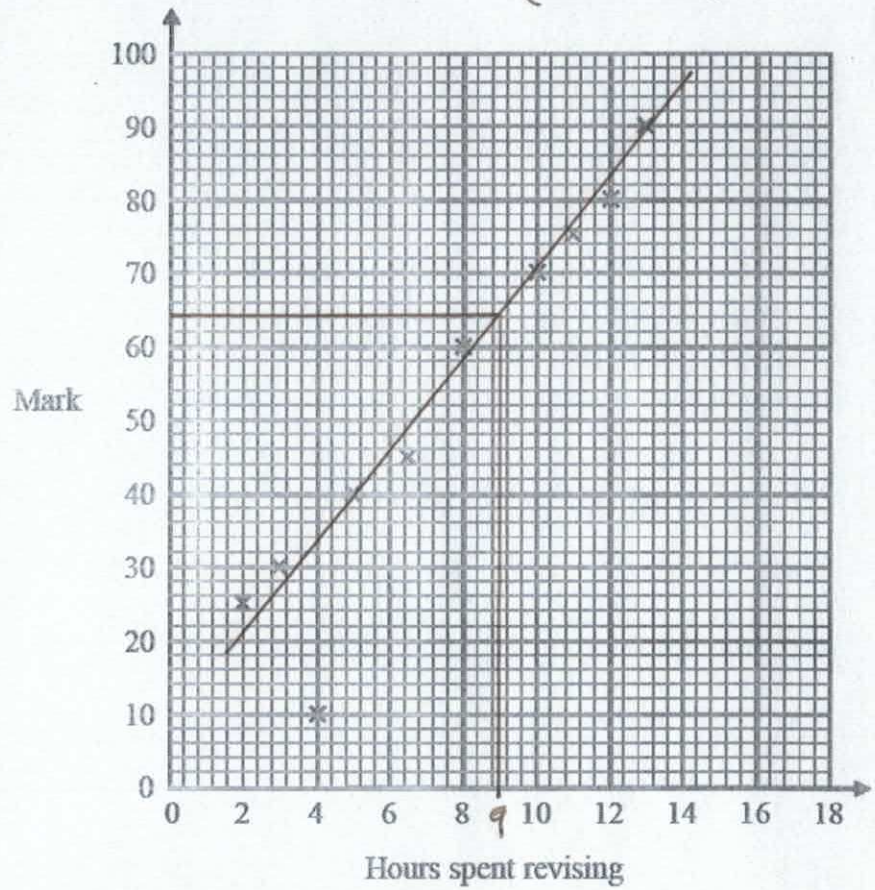
Estimate the age of the car with the lowest value.

a is about ¼ of 40
(maybe slightly more)

b) ..... 10 ..... years [2]

5. The scatter diagram shows information about 10 students.

For each student, it shows the number of hours spent revising and the mark the student achieved in a Spanish test. (Also in Fdn.)



One of the points is an outlier.

(a) Write down the coordinates of the outlier.

..... (4, 10) ..... [1]

For all the other points

(b) (i) draw the line of best fit,

(ii) describe the correlation. Strong positive correlation.

[2]

A different student revised for 9 hours.

(c) Estimate the mark this student got

64 [1]

The Spanish test was marked out of 100

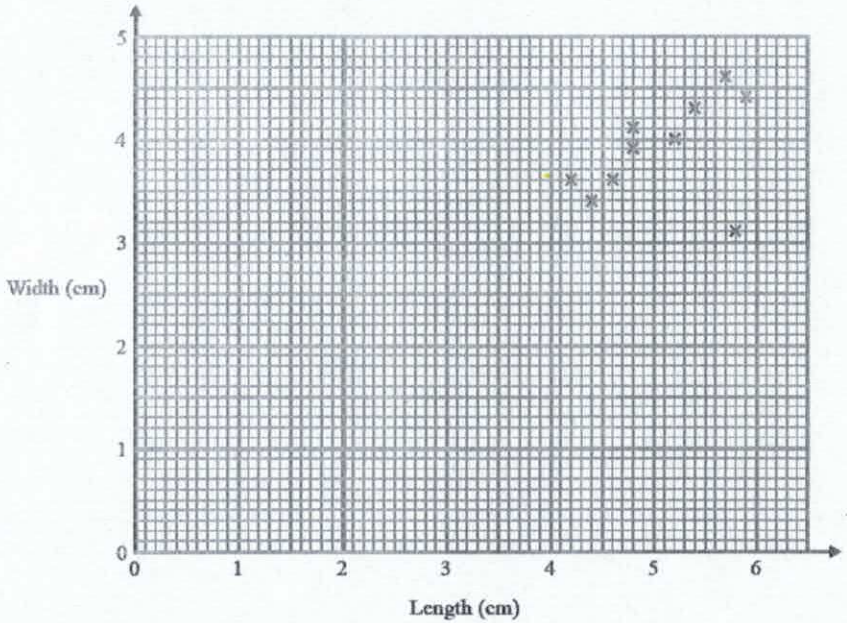
Lucia says: *"I can see from the graph that had I revised for 18 hours I would have got full marks."*

(d) Comment on what Lucia says.

Not valid – extrapolation
(graph only has data for up to 13 hours) [1]

4. Katie measured the length and the width of each of 10 pine cones from the same tree.

She used her results to draw this scatter graph. (Also on Fdn.)



(a) Describe one improvement Katie can make to her scatter graph.

Magnify area with data
(by omitting 0-4 on x- and 0-3 on y-axis)

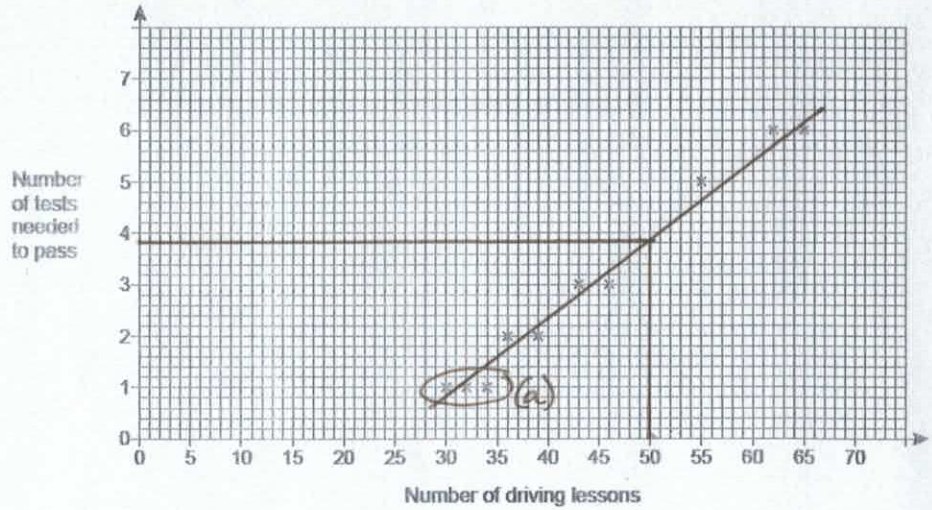
[1]

The point representing the results for one of the pine cones is an outlier.

(b) Explain how the results for this pine cone differ from the results for the other pine cones.

Very narrow for its length. [1]

5. The scatter graph shows the number of driving lessons and the number of tests needed to pass by 10 people. (Also on Fdn.)



(a) What proportion of the 10 people passed on their first test?

3/10 [1]

(b) Describe the correlation.

Circle your answer.

[1]

strong positive weak positive weak negative strong negative

(c) Use a line of best fit to estimate the number of tests needed to pass by a person who has 50 lessons.

4 (can't have 3.8 tests)

[2]

(d) Meera says,

"I can use the trend to predict the number of driving tests needed to pass for any number of driving lessons."

Comment on her statement.

Not correct outside the 30-65 lesson range.

(Graph suggests that for less than 28 lessons you'd pass before you'd taken the test once!)

[1]

CREDITS AND NOTES

Question	Awarding Body
1	WJEC Eduqas
2	AQA
3	Pearson Edexcel
4	OCR
5	Pearson Edexcel
6	Pearson Edexcel
7	AQA

Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.

Links:

AQA http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300

OCR http://ocr.org.uk/gcsemaths

Pearson Edexcel http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html

WJEC Eduqas http://www.eduqas.co.uk/qualifications/mathematics/gcse/

Contents:

This version contains questions from:

AQA – Sample Assessment Material, Practice set 1 and Practice set 1

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2

WJEC Eduqas – Sample Assessment Material