FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

S6: Scatter graphs

Solve problems using scatter graphs and lines of best fit

20 marks · 25 minutes · Non-calculator

1) A line of best fit passes through (2, 30) and (8, 70). Find its equation and use it to estimate y when $x = 5$

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[Question 1: 3 marks]

2) The mean of the x-values is 3.5 and the mean of the y-values is 50. Explain why a line of best fit should pass through (3.5, 50).

[Question 2: 2 marks]

3) Ice-cream sales y and temperature x °C fit $y = 4.2x + 12$. Interpret the 4.2 in context.

[Question 3: 2 marks]

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4) For cars aged 1 to 10 years, value y (£1000s) and age x fit $y = -1.5x + 18$. Estimate the age of a car worth £6000 and comment on reliability.

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[Question 4: 3 marks]

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5) Most points on a scatter graph lie close to $y = 2x$, but one point is $(5, 25)$. Explain how you should treat this point when drawing a line of best fit.

[Question 5: 2 marks]

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6) A line of best fit for children aged 5 to 12 gives height $h = 6a + 80$ cm. Use it to predict the height of a 30-year-old and explain why the prediction is unreliable.

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[Question 6: 3 marks]

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7) There is positive correlation between the number of fire engines at a fire and the damage caused. Explain why this does not mean fire engines cause damage.

[Question 7: 2 marks]

8) Points: $(1, 10)$, $(2, 14)$, $(3, 15)$, $(4, 20)$, $(5, 21)$. Find the mean point. Use the gradient between the first and last points to write a line through the mean point.

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[Question 8: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$y = \frac{20}{3}x + \frac{50}{3}$; 50	Gradient $\frac{40}{6}$ (P1); intercept (P1); 50 (A1).
2	Explanation	A line of best fit goes through the mean point (C2).
3	Explanation	Each extra degree adds about 4.2 sales (C2).
4	8 years; reliable	$-1.5x + 18 = 6$ (P1); 8 (A1); within the data range (C1).
5	Explanation	It is an outlier and should be ignored (C2).
6	260 cm; unreliable	$6 \times 30 + 80$ (P1); 260 (A1); extrapolation, people stop growing (C1).
7	Explanation	Bigger fires cause both (C2).
8	(3, 16); $y = 2.75x + 7.75$	Mean point (A1); gradient 2.75 (P1); equation (A1).