

WA8MNALP1

Linear and non-linear patterns and relationships

Core + Challenge

Comparing Lines and Solving Graphically — Marking Key

I can compare lines on the same axes, recognise parallel lines and use points of intersection to solve equations.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 11 **Total: 58**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	1	up 1 for every 1 across
2	B	same gradient (1)
3	C	both cross at (0, 2)
4	(0, 2)	read from grid
5	(2, 4)	$x + 2 = 4$
6	(-1, 4)	$-2x + 2 = 4$
7	(2, -2)	$x - 4 = -2x + 2$
8	no	parallel lines
9	$y = 3x + 5$	same m, c = 5
10	no	gradients 5 and 2
11	$x = 2$	where A meets D
12	$x = -1$	where C meets D
13	(4, 12)	$3x = 12$
14	(2, 5)	$3x = 6$
15	$y = -x$	$c = 0$
16	$y = -5x$	$5 > 3$ (ignore the sign)

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B

Core answers, working and marks

/ 22 marks

Q	Answer	Working / sample response	Marks
1	$x = 3$	The lines meet at (3, 7), so $x = 3$ $2x + 1 = 7 \rightarrow 2x = 6 \rightarrow x = 3 \checkmark$ <i>1 mark: graphical</i> <i>1 mark: algebraic check</i>	2
2	(2, 3)	Lines cross at (2, 3) $-2 + 5 = 3 \checkmark$ $2(2) - 1 = 3 \checkmark$ <i>1 mark: (2, 3)</i> <i>1 mark: both checked</i>	2
3	$x = 2$ (lines meet at (2, 1))	$y = 3 - x$ through (0, 3), (3, 0); $y = x - 1$ through (0, -1), (1, 0) They meet at (2, 1) Check: $3 - 2 = 1 = 2 - 1 \checkmark$ <i>1 mark: each line</i> <i>1 mark: $x = 2$</i>	3
4	(a) $y = 2x + 3$, $y = 2x - 5$, $y = 4 + 2x$ (b) $y = 2x + 3$ and $y = -2x + 3$	(a) gradient 2 in each (b) $c = 3$ in each <i>1 mark each</i>	2
5	(a) 8 GB (\$52) (b) Plan A, by \$6	Lines cross at (8, 52): $20 + 4g = 36 + 2g \rightarrow g = 8$ 5 GB: $A = 20 + 20 = \$40$, $B = 36 + 10 = \$46$ A is cheaper by \$6 <i>1 mark: 8 GB</i> <i>1 mark: costs at 5 GB</i> <i>1 mark: A by \$6</i>	3
6	$y = -3x - 2$	Parallel: $m = -3$ Through (0, -2): $c = -2$ <i>1 mark each</i>	2
7	$x = 2$; lines meet at (2, 4)	$4x = 8 \rightarrow x = 2$ $y = 3(2) - 2 = 4$: the lines intersect at (2, 4) <i>1 mark: $x = 2$</i> <i>1 mark: intersection (2, 4)</i>	2
8	$c = 3$; yes	$7 = 4 + c \rightarrow c = 3$ Both have gradient 4, so they are parallel <i>1 mark each</i>	2
9	Trips longer than 4 km	$2d + 6 = 3d + 2 \rightarrow d = 4$ (both \$14) B is steeper, so B costs more after 4 km (e.g. 5 km: A \$16, B \$17) <i>1 mark: 4 km</i> <i>1 mark: longer than 4 km</i>	2
10	After 10 weeks (\$200 each)	$K = 15w + 50$, $A = 8w + 120$ $15w + 50 = 8w + 120 \rightarrow 7w = 70 \rightarrow w = 10$; \$200 <i>1 mark: equations</i> <i>1 mark: 10 weeks</i>	2

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C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	No solution: parallel lines	Subtracting $3x$ gives $1 = -2$, which is false So no x -value makes the y -values equal Same gradient, different y -intercepts: parallel lines <i>1 mark: $1 = -2$</i> <i>1 mark: no solution</i> <i>1 mark: parallel</i>	3
2	No	Gradients are 2 and 3, which are different They meet at (1, 5) <i>1 mark: no</i> <i>1 mark: reason</i>	2
3	Hard to read non-whole values	If lines meet at $x = \frac{1}{3}$, reading the grid only gives an estimate like 0.3; algebra gives the exact value. <i>1 mark: reason</i> <i>1 mark: example</i>	2
4	All pass through (0, 4); different gradients	Same y -intercept 4: they all cross the y -axis at (0, 4) Gradients 1, -1, 3: different steepness and direction <i>1 mark each</i>	2

D

Challenge *solutions and marking criteria*

/ 11 marks

Q	Answer	Working / sample response	Marks
1	9 square units	Vertices: (0, 1), (6, 1) and (3, 4) Base = 6, height = $4 - 1 = 3$ Area = $\frac{1}{2} \times 6 \times 3 = 9$ <i>1 mark: vertices</i> <i>1 mark: base and height</i> <i>1 mark: 9</i>	3
2	(1, 2)	L: $m = 3, 5 = 6 + c \rightarrow y = 3x - 1$ $3x - 1 = -x + 3 \rightarrow x = 1$ $y = 2: (1, 2)$ <i>1 mark: L</i> <i>1 mark: $x = 1$</i> <i>1 mark: (1, 2)</i>	3
3	5, 6, 7, 8 or 9 visits	Flexi = Casual when $40 + 5v = 15v \rightarrow v = 4$ Flexi = Unlimited when $40 + 5v = 90 \rightarrow v = 10$ Flexi is strictly cheapest for 5 to 9 visits <i>1 mark: $v = 4$</i> <i>1 mark: $v = 10$</i> <i>1 mark: 5 to 9</i>	3

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Q	Answer	Working / sample response	Marks
4	(a) $k = 0$ (b) $k = 3$	(a) $2k + 1 = 3(2) - 5 = 1 \rightarrow k = 0$ (b) parallel when $k = 3$ (and $1 \neq -5$) <i>1 mark each</i>	2