

WA8MNALP1

Linear and non-linear patterns and relationships

Core + Challenge

Graphing Linear Relationships

I can use a table of values to graph $y = mx + c$, read points from a line and test whether a point lies on a line.

Name: _____ Date: _____ Score: _____ / 58

Key idea

A **linear relationship** $y = mx + c$ has a straight-line graph. Make a **table of values** by substituting x -values into the rule.

Example $y = 2x - 1$: $x = -1, 0, 1, 2 \rightarrow y = -3, -1, 1, 3$. Plot the points (x, y) and rule a line through them (at least 3 points).

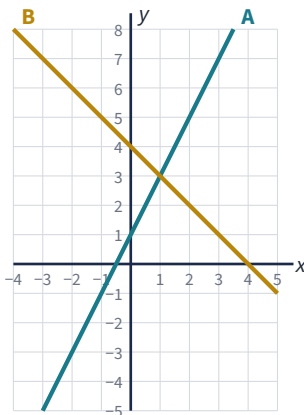
A point lies **on the line** if its coordinates make the rule true: $(3, 5)$ on $y = 2x - 1$? $2 \times 3 - 1 = 5 \checkmark$.

Watch negatives: $y = -x + 4$ at $x = -2$ gives $y = -(-2) + 4 = 6$. When m is negative the line goes **down** from left to right.

A Fluency *practise the skill*

/ 16 marks

Q10–16 use lines A and B on the grid. 1 mark each.



- | | |
|--------------------------------------|--|
| 1. $y = 3x - 2$ when $x = 4$ _____ | 9. x when $y = 11$ on $y = 2x + 3$ _____ |
| 2. $y = 3x - 2$ when $x = -1$ _____ | 10. Line A: y when $x = 2$ _____ |
| 3. $y = -2x + 5$ when $x = 3$ _____ | 11. Line A: x when $y = -3$ _____ |
| 4. $y = -2x + 5$ when $x = -2$ _____ | 12. Line B: y when $x = -1$ _____ |

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5. $y = \frac{x}{2} + 4$ when $x = -6$ _____

13. Line B crosses the x-axis at _____

6. $y = 5 - x$ when $x = -3$ _____

14. Line A crosses the y-axis at _____

7. Is $(2, 7)$ on $y = 3x + 1$? _____

15. Point where A and B meet _____

8. Is $(-1, 4)$ on $y = -2x + 3$? _____

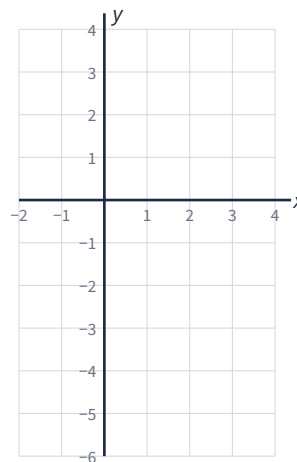
16. Line B goes up or down (left to right)? _____

B**Core** *apply the skill to problems*

/ 22 marks

- 1 Complete the table of values for $y = 2x - 3$, then plot the points and draw the line on the grid. [3 marks]

x	-1	0	1	2	3
y					



Answer: _____

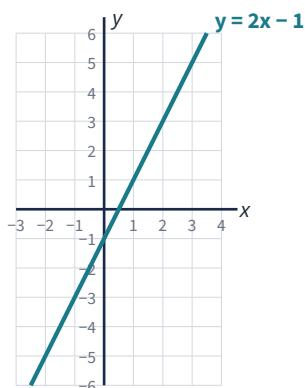
- 2 Complete the table of values for $y = -3x + 2$. [2 marks]

x	-2	-1	0	1	2
y					

Answer: _____

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- 3 The graph shows the line $y = 2x - 1$. Use it to find (a) y when $x = 3$, (b) x when $y = -5$. [2 marks]



Answer: _____

- 4 Which of the points $(2, 1)$, $(-1, -8)$ and $(4, 6)$ lie on the line $y = 3x - 5$? Show your working. [2 marks]

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Answer: _____

- 5 The point $(k, 11)$ lies on the line $y = 4x - 1$. Find k . [2 marks]

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Answer: _____

- 6 A Perth plumber charges a \$60 call-out fee plus \$40 per hour, so $C = 40h + 60$. Complete the table, then explain why the graph of C against h is a straight line. [3 marks]

h (hours)	0	1	2	3	4
C (\$)					

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Answer: _____

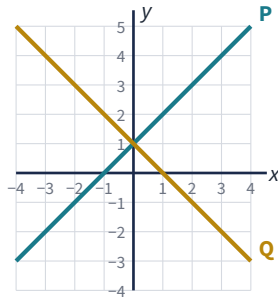
- 7 On a winter night at Bluff Knoll the temperature is $T = 18 - 3h$ °C, h hours after sunset. Find T after 4 hours, and when the temperature reaches 0 °C. [2 marks]

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Answer: _____

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- 8 The grid shows the lines $y = x + 1$ and $y = -x + 1$. Which is line P and which is line Q? Explain how you know. [2 marks]



Answer: _____

- 9 Does the line $y = -\frac{x}{2} + 3$ pass through the point $(-4, 5)$? Show your working. [2 marks]

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Answer: _____

- 10 Is the relationship in this table linear? Explain using the differences between the y-values. [2 marks]

x	0	1	2	3	4
y	1	3	7	13	21

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Answer: _____

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Explain why the points of $y = 2x + 1$ always lie on a straight line. (Think about what happens to y when x increases by 1.) [2 marks]

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- 2 Zac's table for $y = -2x + 3$ says that $x = -2$ gives $y = -1$. Find his mistake and correct it. [2 marks]

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- 3 Why is it a good idea to plot at least three points before ruling a straight line? [2 marks]

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- 4 True or false: the point $(0, c)$ is always on the line $y = mx + c$. Explain. [3 marks]

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D Challenge *multi-step and problem-solving*

/ 11 marks

- 1 The points $(1, 5)$, $(3, 11)$ and $(a, 20)$ lie on the same straight line. Find the rule of the line and the value of a . [3 marks]

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Answer: _____

- 2 The point $(2, 7)$ lies on the line $y = mx + 3$. Find m , then find where the line crosses the x -axis. [3 marks]

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Answer: _____

- 3 The lines $y = 2x + 1$ and $y = -x + 7$ and the x -axis form a triangle. Find its area. [3 marks]

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Answer: _____

- 4 List every point on the line $y = 13 - 3x$ whose coordinates are both positive whole numbers. [2 marks]

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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