

WA7MNALP1

Linear and non-linear patterns and relationships

Core + Challenge

Tables of Values and Graphs

I can complete tables of values from a rule, plot points in the first quadrant and use a graph to find unknown values.

Name: _____ Date: _____ Score: _____ / 56

Key idea

Table of values: substitute each x into the rule. $y = 2x + 1$: $x = 0, 1, 2, 3 \rightarrow y = 1, 3, 5, 7$

Plot each pair (x, y) : across x , then up y . Linear rules give points in a **straight line**.

Read the rule from a table: the constant change in y is the number in front of x ; the value at $x = 0$ is the constant.

Non-linear rules such as $y = x^2$ give a curve: the differences change (1, 3, 5, 7 ...).

A Fluency *practise the skill*

/ 16 marks

Find the missing value, or answer the question.

1. $y = 2x + 1$, $x = 0$ _____

9. $y = \frac{x}{2} + 1$, $x = 8$ _____

2. $y = 2x + 1$, $x = 3$ _____

10. $y = 2x + 1$, $y = 13$ _____

3. $y = 3x - 2$, $x = 1$ _____

11. $y = 3x - 2$, $y = 19$ _____

4. $y = 3x - 2$, $x = 4$ _____

12. Linear? (1, 2), (2, 4), (3, 6) _____

5. $y = x + 5$, $x = 2.5$ _____

13. Linear? (1, 1), (2, 4), (3, 9) _____

6. $y = x^2$, $x = 6$ _____

14. Is (3, 11) on $y = 3x + 2$? _____

7. $y = 10 - x$, $x = 3$ _____

15. Is (2, 5) on $y = 2x + 2$? _____

8. $y = 4x$, $x = 1.5$ _____

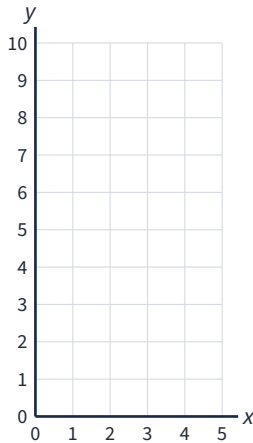
16. Rule for x : 0, 1, 2 $\rightarrow y$: 4, 7, 10 _____

B

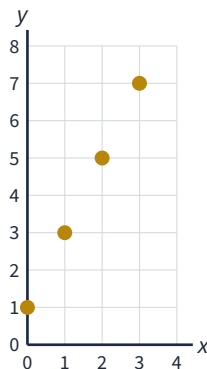
Core *apply the skill to problems*

/ 22 marks

- 1 Complete a table of values for $y = 2x + 1$ for $x = 0$ to 4, then plot the points on the grid and join them. [3 marks]



- 2 The points on this graph follow a linear rule. Write a table of values and find the rule. [2 marks]



Answer: _____

- 3 A taxi fare is $C = 2.5k + 4$ dollars. Complete a table for $k = 0, 2, 4, 6$ km. [2 marks]

Answer: _____

- 4 Rectangles all have length 5 cm and widths $w = 1, 2, 3, 4$ cm. Complete a table of areas. Describe what the graph of area against width would look like. [2 marks]

Answer: _____

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- 5 For the rectangles in the previous question, what width gives an area of 18.5 cm^2 ? [2 marks]

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Answer: _____

- 6 Squares have side lengths $s = 1, 2, 3, 4 \text{ cm}$. Complete a table of their areas. Is the relationship linear? Explain. [2 marks]

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Answer: _____

- 7 A tank holds 200 L and drains at 15 L per minute, so $V = 200 - 15t$. [2 marks]
(a) How much is left after 6 minutes?
(b) After how many minutes is it empty?

.....

Answer: _____

- 8 Plan A costs $20 + 0.5m$ dollars and Plan B costs $35 + 0.2m$ dollars for m minutes. [3 marks]
(a) Complete a table for $m = 0, 25, 50, 75$.
(b) When do they cost the same?

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Answer: _____

- 9 Is the point $(4, 13)$ on the line $y = 3x + 1$? Show how you know. [2 marks]

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Answer: _____

- 10 A walker travels at 5 km/h, so $d = 5t$. How far does she walk in 2.5 hours? What point would this be on the graph? [2 marks]

.....

Answer: _____

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C**Reasoning** *explain, justify and check*

/ 9 marks

- 1 Explain how you can tell from a table of values whether the graph will be a straight line. [2 marks]

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- 2 Explain why the graph of $y = 2x + 1$ is a straight line. [2 marks]

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- 3 Ben plotted the point (2, 5) at 5 across and 2 up. Explain his mistake. [2 marks]

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- 4 Compare $y = 2x + 1$ and $y = x^2$ for $x = 1, 2, 3, 4$. For which values is x^2 larger? What do you notice? [3 marks]

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D**Challenge** *multi-step and problem-solving*

/ 9 marks

- 1 The points (1, 5), (3, 11) and (6, 20) lie on a straight line. Find its rule. [2 marks]

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Answer: _____

- 2 Where do the lines $y = 4x + 1$ and $y = 6x - 9$ meet? [2 marks]

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Answer: _____

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- 3 A table has x : 1, 2, 3, 4 and y : 3, 6, 12, 24.

[3 marks]

(a) Is it linear?

(b) Describe the rule in words.

(c) Find y when $x = 5$.

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Answer: _____

- 4 Plant A is 12 cm tall and grows 3 cm per week. Plant B is 4 cm tall and grows 5 cm per week.
After how many weeks is Plant B taller?

[2 marks]

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 9 **Total ____ / 56**

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