MATHEMATICS · GRADES 7-9

Identifying Linear Patterns

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you tell whether something grows by the same amount each time, like a savings jar that gains the same coins every week, before you try to predict the next value. If the growth is steady, you can predict the future with confidence, and if it is not, you know a straight line prediction would be wrong. You use it to check a savings plan, a phone bill, or a training schedule before you trust a forecast built on it.



Rule

A pattern is linear when the change from one step to the next is always the same.

Check the gap between each pair of values in turn. If every gap is equal, the pattern is linear, and if any gap is different, it is not.

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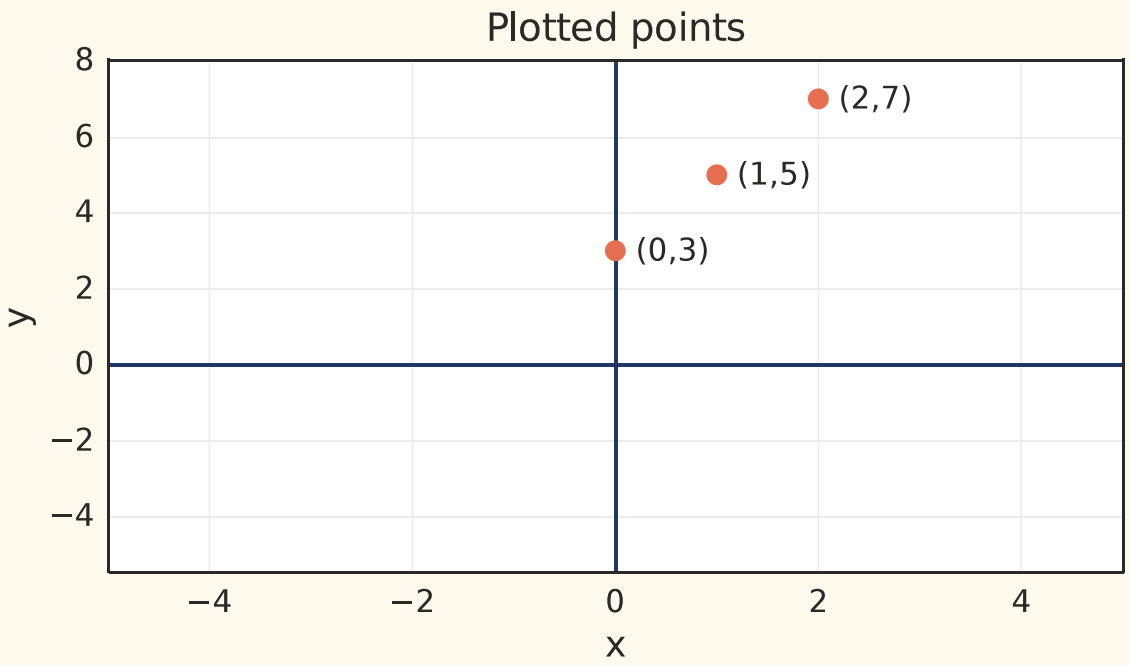
Worked examples

EXAMPLE 1

Q Is the table x: 0, 1, 2 and y: 3, 5, 7 linear?



SOLUTION

Find how y changes each time x rises by 1: 5 - 3 = 2, then 7 - 5 = 2

The change is the same, 2, every step.

Yes, it is linear, because y rises by a steady amount.

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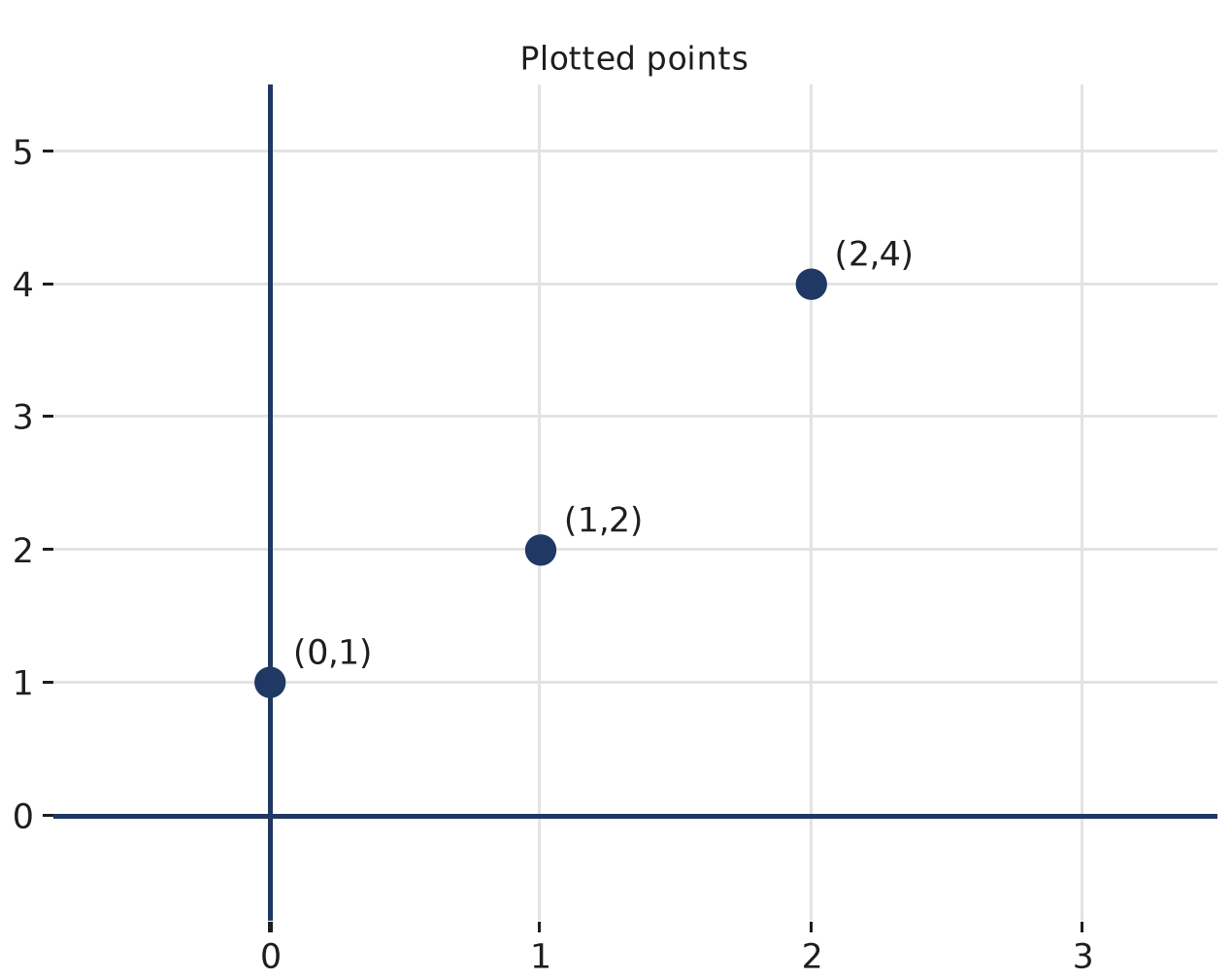
EXAMPLE 2

Q Is the table x: 0, 1, 2 and y: 1, 2, 4 linear?



SOLUTION

Find how y changes: 2 - 1 = 1, then 4 - 2 = 2

The changes, 1 and 2, are not the same.

No, it is not linear.

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Practice questions

1 Is the pattern in the table linear? Answer yes or no.

	0	1	2
x	0	1	2
y	2	4	6

A Yes

B No

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2 Is the pattern in the table linear? Answer yes or no.

	0	1	2
x	0	1	2
y	1	3	6

A Yes

B No

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3 Is the pattern in the table linear? Answer yes or no.

	0	1	2
x	0	1	2
y	10	7	4

A Yes

B No

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4 Is the pattern in the table linear? Answer yes or no.

	0	1	2
x	0	1	2
y	5	5	5

A Yes

B No

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5 Is the pattern in the table linear? Answer yes or no.

	0	1	2	3
x	0	1	2	3
y	2	5	8	11

A Yes

B No

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6 Is the pattern in the table linear? Answer yes or no.

	0	1	2	3
x	0	1	2	3
y	1	2	4	8

A Yes

B No

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7 Is the pattern in the table linear? Answer yes or no.

	0	1	2	3
x	0	1	2	3
y	3	7	11	15

A Yes

B No

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8 A quantity doubles each step. Is the pattern linear? Answer yes or no.

A Yes

B No

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9 In the table, what is the steady change in y each step?

	0	1	2	3
x	0	1	2	3
y	0	2	4	6

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10 In the table, what is the steady change in y each step?

	0	1	2	3
x	0	1	2	3
y	9	6	3	0

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ANSWER KEY

1. Yes

2. No

3. Yes

4. Yes

5. Yes

6. No

7. Yes

8. No

9. 2

10. -3

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