MATHEMATICS · GRADES 7-9

Graphing Linear Relationships

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you picture a steady relationship at a glance, like a taxi fare rising by the same amount for every kilometre you travel. A straight line shows you the starting cost and the rate it climbs, so you can read off the answer for any distance without doing the maths again. You see it in phone plans, delivery charges, and fuel costs, anywhere the price starts somewhere and then rises steadily.

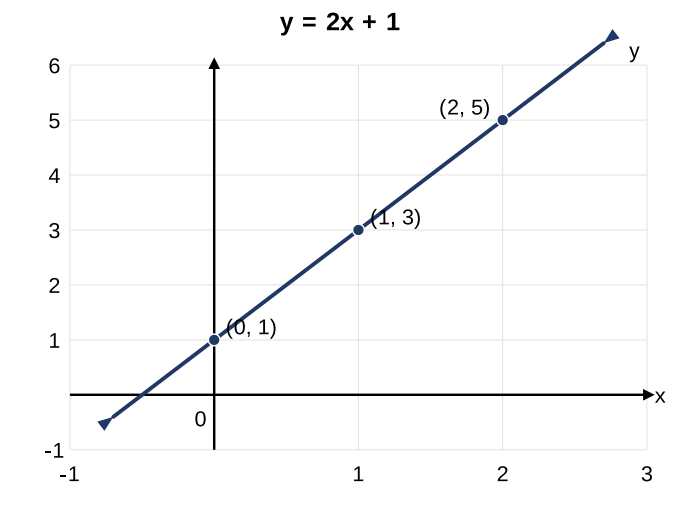


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Worked examples

EXAMPLE 1

Q Graph $y = 2x + 1$



SOLUTION

Make a table: for x = 0, y = 1; for x = 1, y = 3; for x = 2, y = 5.

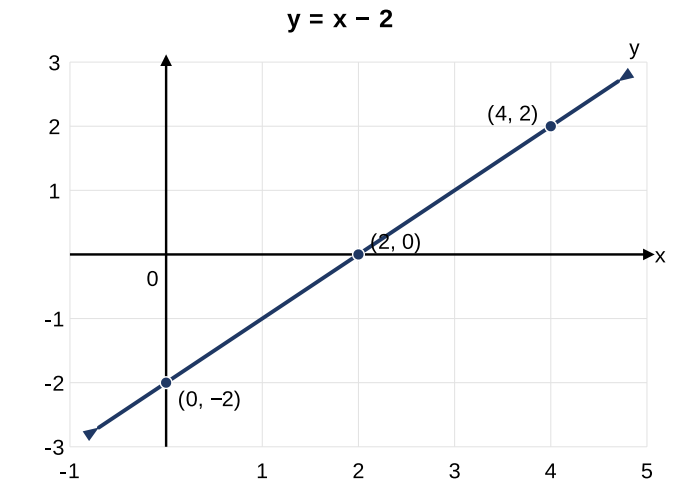
Plot (0, 1), (1, 3), and (2, 5) on the grid.

Join them with a straight line and arrows at both ends.

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EXAMPLE 2

Q Graph y = x - 2



SOLUTION

Make a table: for x = 0, y = - 2; for x = 2, y = 0; for x = 4, y = 2.

Plot (0, - 2), (2, 0), and (4, 2).

Join them with a straight line and arrows at both ends.

Practice questions

1 The line is y = 2x + 1. Find y when x = 2

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2 The line is $y = x - 2$. Find x when $y = 4$.

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3 A taxi charges by distance, and the cost follows $y = 3x$, where x is the number of kilometres and y is the cost in dollars. Find the cost for a 2 km trip.

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4 A plant grows by the rule $y = x + 4$, where x is weeks and y is height in cm. Find y when $x = 1$

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5 The line is $y = -x + 3$. Find y when $x = 3$

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6 A phone plan follows $y = 2x - 1$, where x is gigabytes and y is the cost in dollars. Find y when $x = 2$

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7 The line $y = x + 1$ crosses the y-axis at which point?

A. (0, 1)

B. (1, 0)

C. (0, 0)

D. (-1, 0)

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8 Is the point (2, 5) on the line $y = 2x + 1$? Check by finding y when $x = 2$

- A Yes
- B No

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9 What is the slope of the line $y = -2x + 5$?

- A -2
- B 2
- C 5
- D -5

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10 A line passes through points A(1, 3) and B(3, 7). Find y when x = 2

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ANSWER KEY

1. 5

2. 6

3. 6

4. 5

5. 0

6. 3

7. (0, 1)

8. Yes

9. -2

10. 5

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