MATHEMATICS · GRADES 7-9

Graphing Using Slope and Intercept

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you sketch a cost or distance line quickly, like a phone bill that starts with a monthly fee and adds a charge per minute. The intercept tells you where the line starts and the slope tells you how fast it climbs, so you can draw the whole picture from two numbers. That is all you need to compare two phone plans, work out a taxi fare for any distance, or see how a savings balance grows month by month.



Rule

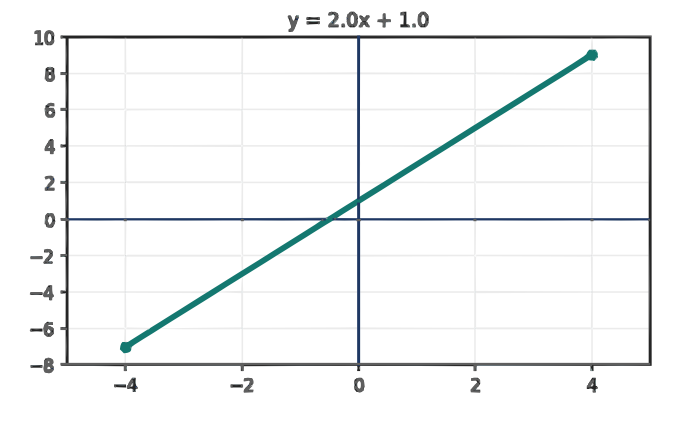
Graphing using slope and intercept: plot the y-intercept (0, b) first, then step out using the slope as rise over run to find the next point, and draw a straight line through them.

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Worked examples

EXAMPLE 1

Q Graph $y = 2x + 1$



SOLUTION

Plot the y-intercept (0, 1).

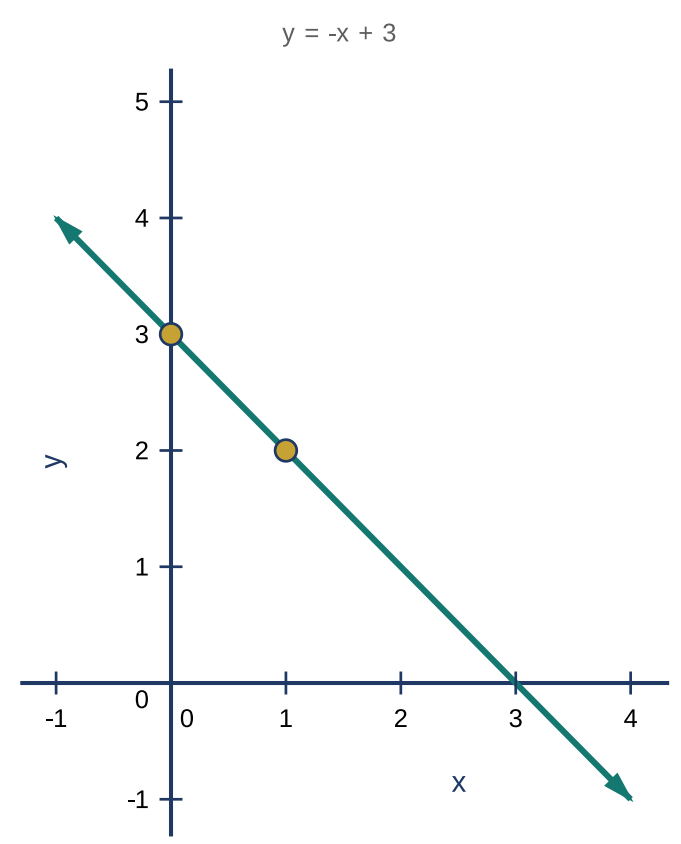
Slope 2 means rise 2, run 1: from (0, 1) go up 2 and right 1 to (1, 3).

Draw a straight line through the points, with arrows at both ends.

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EXAMPLE 2

Q Graph y = - x + 3



SOLUTION

Plot the y-intercept (0, 3).

Slope - 1 means go down 1 and right 1 to (1, 2).

Draw a straight line through the points, with arrows at both ends.

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Practice questions

1 Where does the line $y = 3x + 2$ cross the y-axis? Give the point.

- **A** (2, 0)
- **B** (0, 2)
- **C** (0, 3)
- **D** (3, 2)

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2 Starting at the y-intercept (0, 2) of $y = 3x + 2$, use the slope to find the next point 1 across.

- **A** (1, 5)
- **B** (0, 5)
- **C** (1, 2)
- **D** (2, 5)

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3 Where does the line $y = 2x - 3$ cross the y-axis? Give the point.

- **A** (0, 3)
- **B** (-3, 0)
- **C** (0, -3)
- **D** (3, 0)

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4 Give the y-intercept point of $y = -2x + 4$

- **A** (4, 0)
- **B** (0, -4)
- **C** (-2, 4)
- **D** (0, 4)

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5 Starting at the y-intercept (0, 4) of $y = -2x + 4$, use the slope to find the next point 1 across.

- A (1, 4)
- B (0, 2)
- C (1, 2)
- D (2, 4)

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6 What is the y-intercept of $y = -x + 3$? Give the point.

- A (0, 3)
- B (3, 0)
- C (0, -3)
- D (1, 3)

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7 A line has equation $y = 5x + 1$. What is the next point 1 across?

- **A** (0, 6)
- **B** (1, 6)
- **C** (6, 1)
- **D** (1, 1)

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8 A line has equation $y = \frac{1}{2}x + 2$. Starting at the y-intercept, what is the next point 2 across?

- **A** (2, 3)
- **B** (1, 3)
- **C** (2, 2)
- **D** (3, 2)

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9 For $y = 4x - 2$, give the y-intercept point and the next point 1 across using the slope.

- **A** (0, 2) and (1, -2)
- **B** (0, -2) and (1, -2)
- **C** (0, 2) and (1, 2)
- **D** (0, -2) and (1, 2)

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10 For $y = -3x + 5$, give the y-intercept point and the next point 1 across using the slope.

- **A** (0, 5) and (1, 5)
- **B** (0, -5) and (1, 2)
- **C** (0, 5) and (1, 2)
- **D** (0, 5) and (1, -2)

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ANSWER KEY

1. (0, 2)

2. (1, 5)

3. (0, -3)

4. (0, 4)

5. (1, 2)

6. (0, 3)

7. (1, 6)

8. (2, 3)

9. (0, -2) and (1, 2)

10. (0, 5) and (1, 2)

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