MATHEMATICS · GRADES 10-12

Slope between coordinate points

Difficulty level: Advanced

Mathematics: Grades 10-12

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Overview of the concept

This is how you work out how steep a line is from two points on a map or a graph, like how fast a hill climbs between two spots on a hiking trail. You know where each point sits, and the steepness is just how much the height changes compared with how far along you travel. That one number tells you whether the climb between those two spots is gentle or punishing. Hikers, surveyors, and anyone reading a graph use it to turn two points into a clear picture of the slope.



Rule

Slope between two points: slope = $\dfrac{\text{change in y}}{\text{change in x}}$.

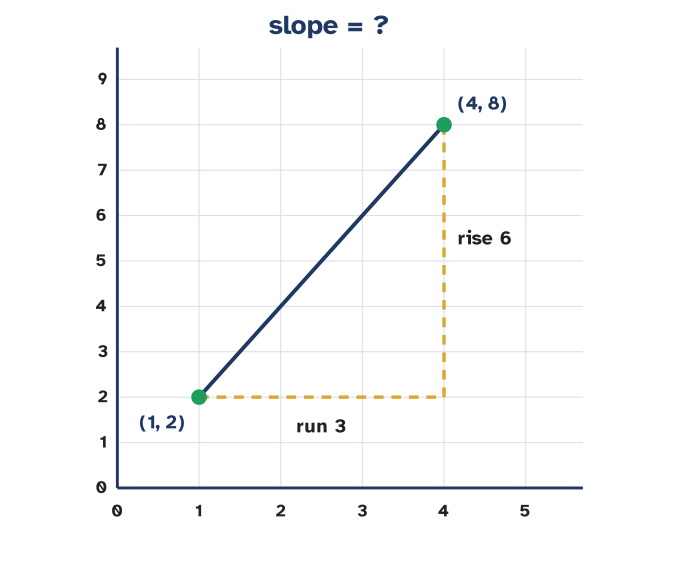
Subtract the first point's y from the second point's y for the rise, and the first point's x from the second point's x for the run, then divide.

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Worked examples

EXAMPLE 1

Q Find the slope between (1, 2) and (4, 8).



SOLUTION

Rise: 8 - 2 = 6

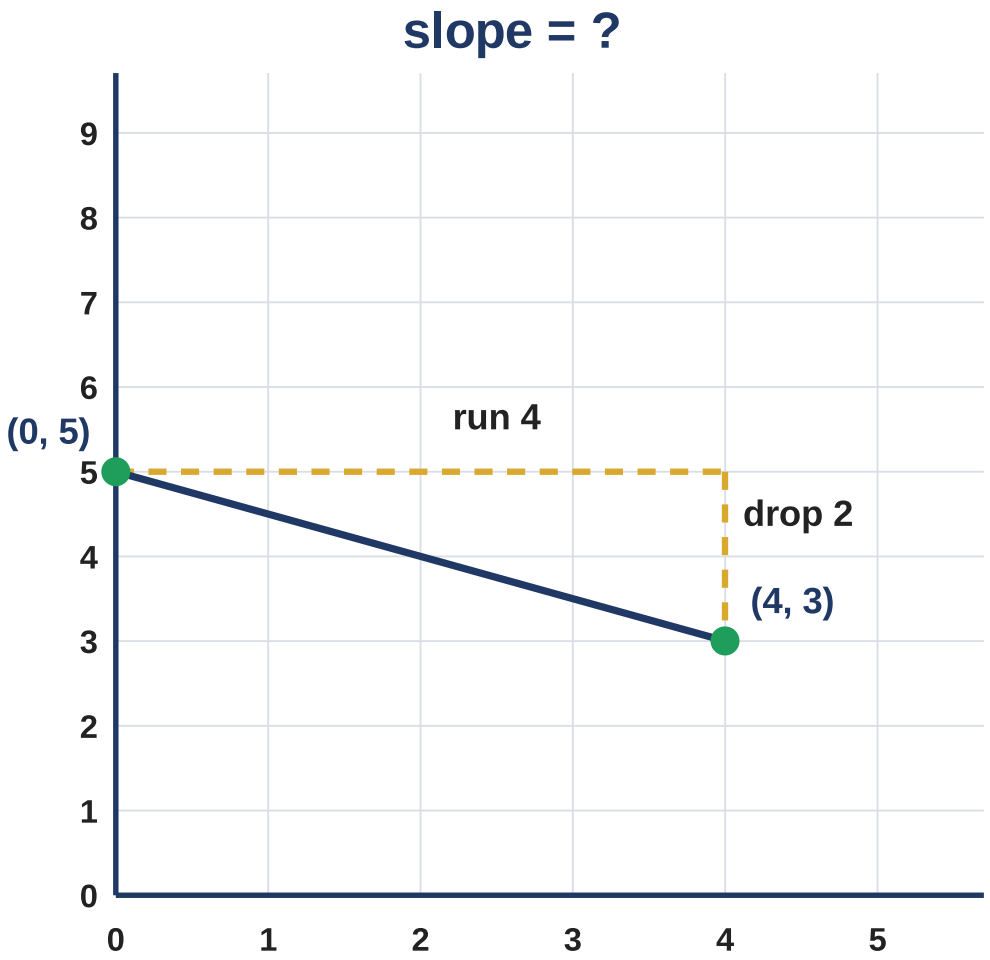
Run: 4 - 1 = 3

Slope = $\frac{6}{3}$ = 2

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EXAMPLE 2

Q Find the slope between (0, 5) and (4, 3).



SOLUTION

Rise: 3 - 5 = -2

Run: 4 - 0 = 4

Slope = $\frac{-2}{4} = \frac{-1}{2}$

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Practice questions

1 Points (0, 0) and (2, 4) lie on a line. What is the slope of the line?

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2 A line with slope 2 passes through (1, 1) and (3, y). What is y?

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3 A line goes through (2, 7) and (6, 5). Find its slope.

- **A** $\frac{1}{2}$
- **B** $\frac{-1}{2}$
- **C** -2
- **D** 2

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4 Find the slope between (1, 6) and (3, 2).

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5 Which two points give a line with slope -1?

A (0, 0) and (5, -5)

B (0, 0) and (5, 5)

C (0, 0) and (-5, -5)

D (0, 0) and (1, 1)

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6 Find the slope between (0, 3) and (6, 3).

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7 Find the slope between (2, 0) and (2, 9).

- A 0
- B 1
- C Undefined
- D -1

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8 A line through (0, 2) has slope 2. What is the y-coordinate of the point on the line with x = 4?

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9 A line has slope $\frac{-3}{2}$ and passes through (0, 4). What is the y-coordinate of the point on the line with x = 2?

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10 Line A goes through (0, 1) and (4, 9). Line B goes through (0, 0) and (4, 4). Which line is steeper?

A Line A

B Line B

C They are equally steep

D You cannot tell

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ANSWER KEY

1. 2

2. 5

3. $\frac{-1}{2}$

4. -2

5. (0, 0) and (5, -5)

6. 0

7. Undefined

8. 10

9. 1

10. Line A

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