MATHEMATICS · GRADES 7-9

Distance on a Coordinate Plane

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you work out the straight distance between two places on a grid map. Two towns on a road map, two players on a field, or two stops on a bus route all sit on a grid, and the formula gives you the distance as the crow flies. That is the number you need before you can work out travel time or the length of a fence. It turns a map into a measuring tool.



Rule

Distance on a coordinate plane: $d = \sqrt{(\text{horizontalgap}^2 + \text{verticalgap}^2)}$.

The two gaps are the legs of a right triangle, and the distance is its hypotenuse. That is the Pythagorean theorem applied to the grid.

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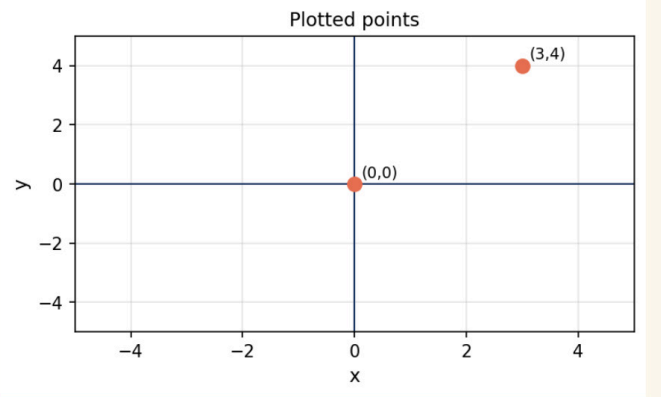
Worked examples

EXAMPLE 1

Q Find the distance between (0, 0) and (3, 4)



SOLUTION

Horizontal gap: 3 - 0 = 3. Vertical gap: 4 - 0 = 4

Use the Pythagorean theorem: distance squared = $3^2 + 4^2 = 9 + 16 = 25$

Distance = $\sqrt{25} = 5$

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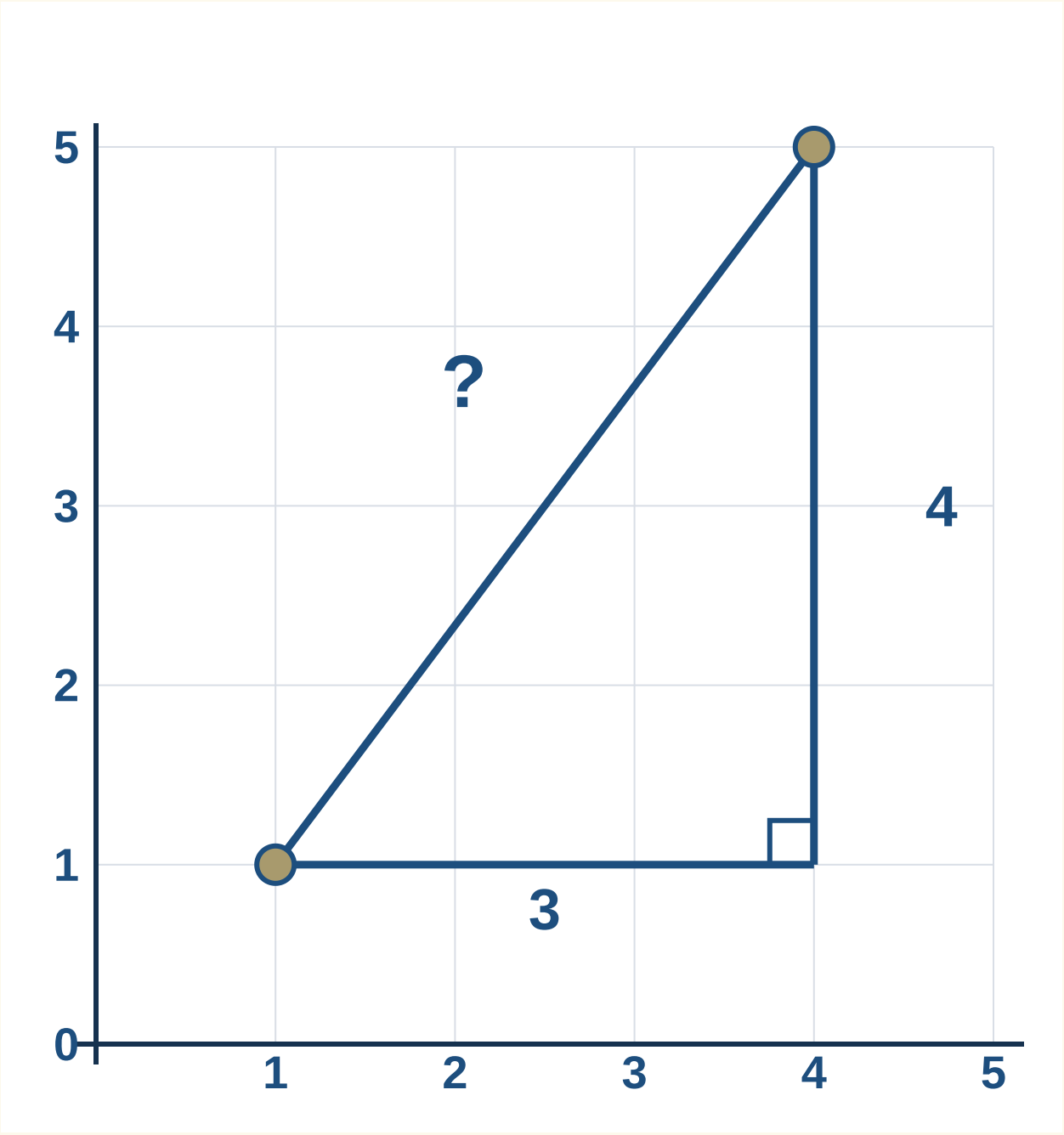
EXAMPLE 2

Q Find the distance between (1, 1) and (4, 5)



SOLUTION

Horizontal gap: 4 - 1 = 3. Vertical gap: 5 - 1 = 4

Distance squared = $3^2 + 4^2 = 25$

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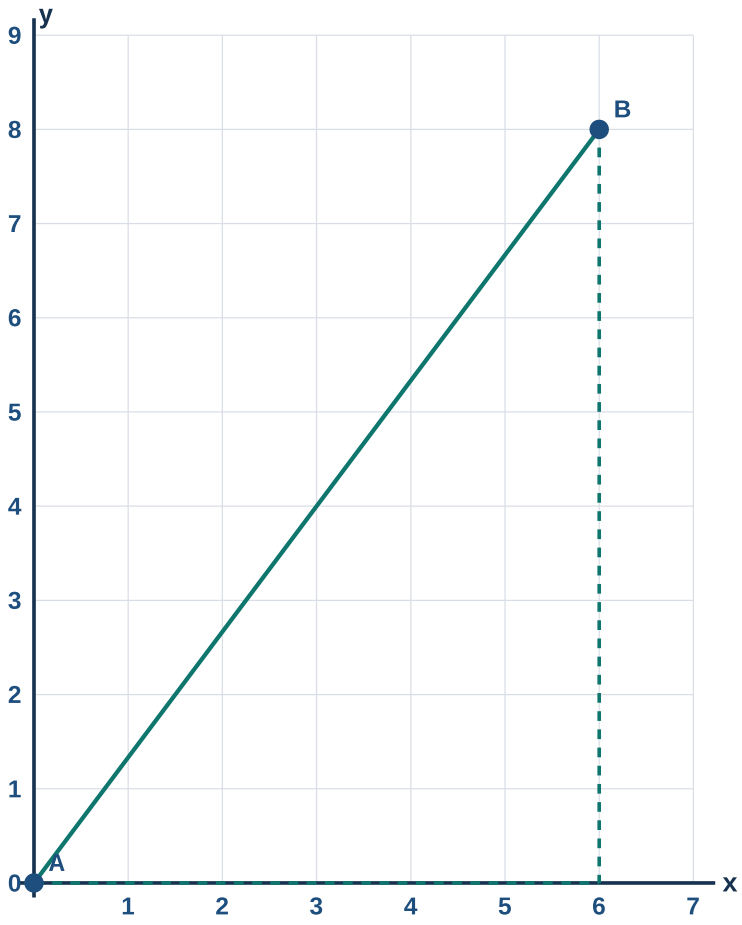
Distance = 5

Practice questions

1 Find the distance from A to B.



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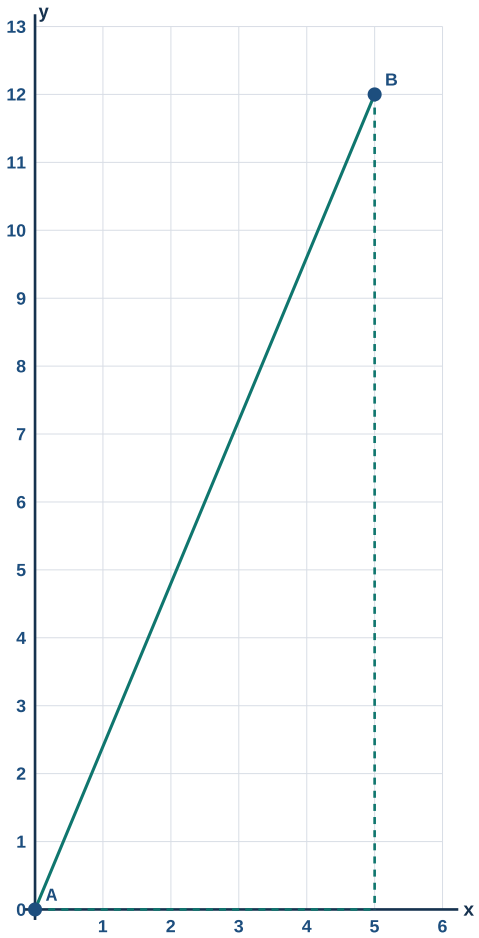
2 Find the distance from A to B.



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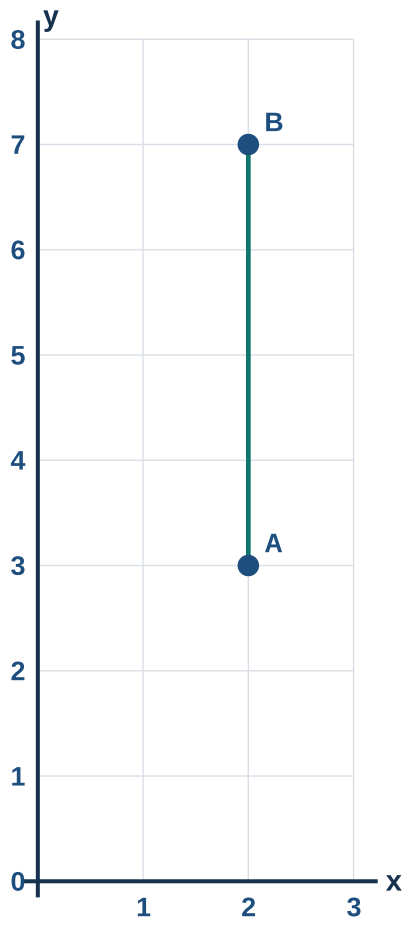
Find the distance from A to B.



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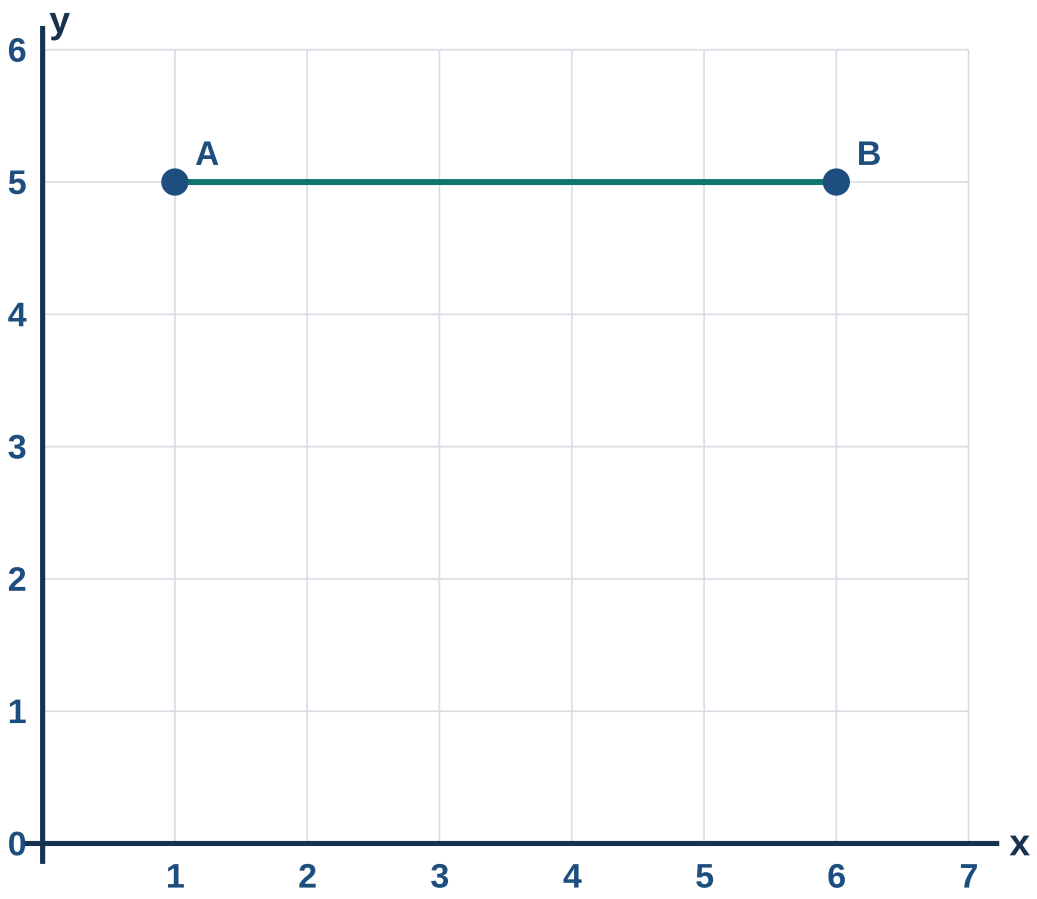
Find the distance from A to B.



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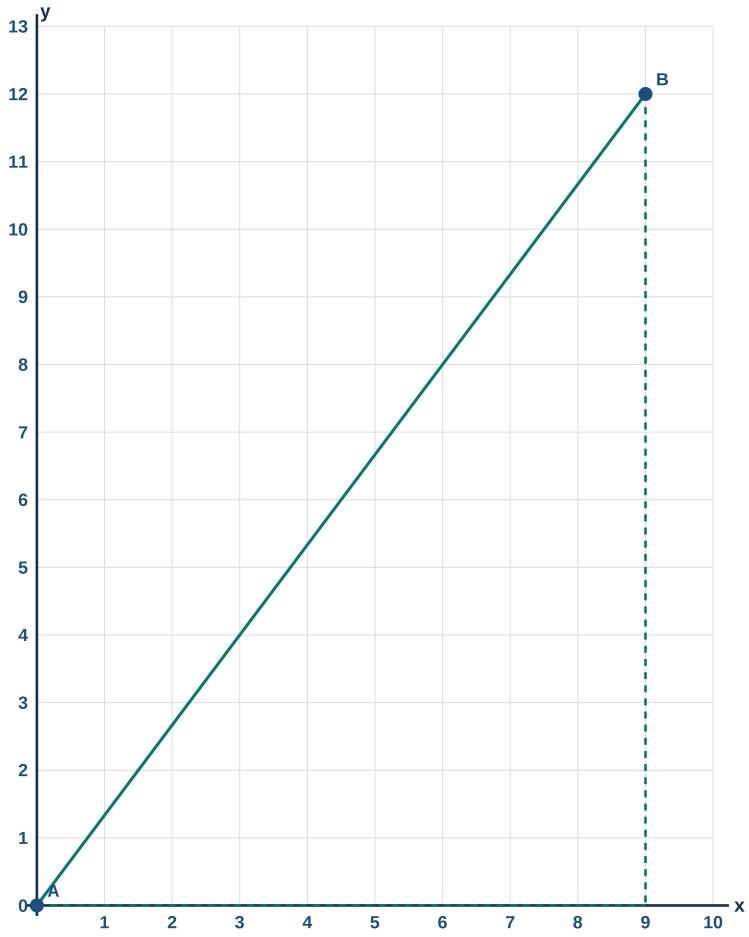
Find the distance from A to B.



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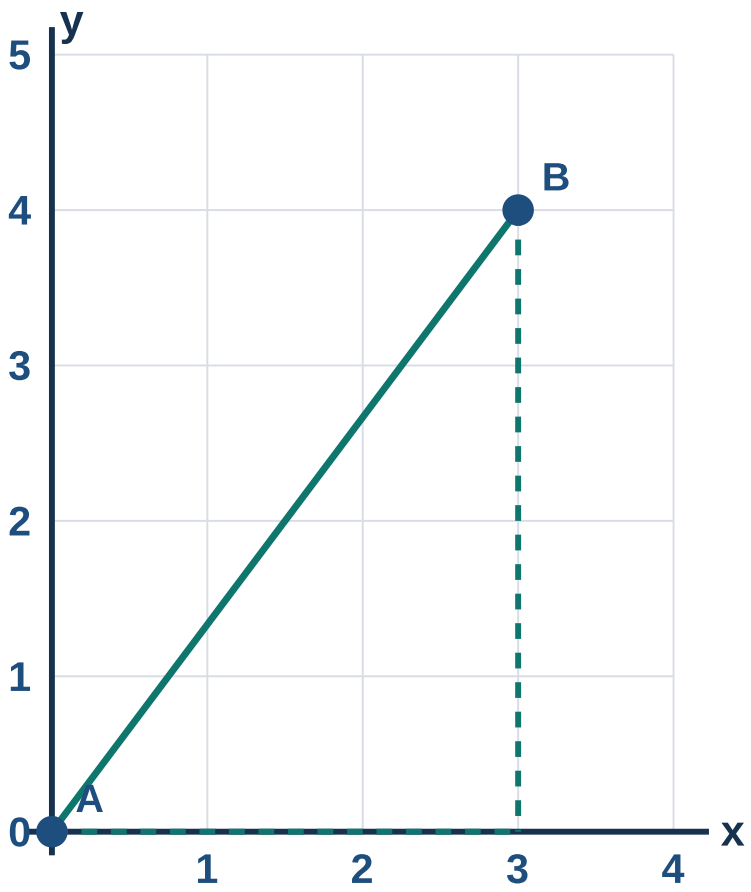
6 **Find the distance from A to B, in grid units.**



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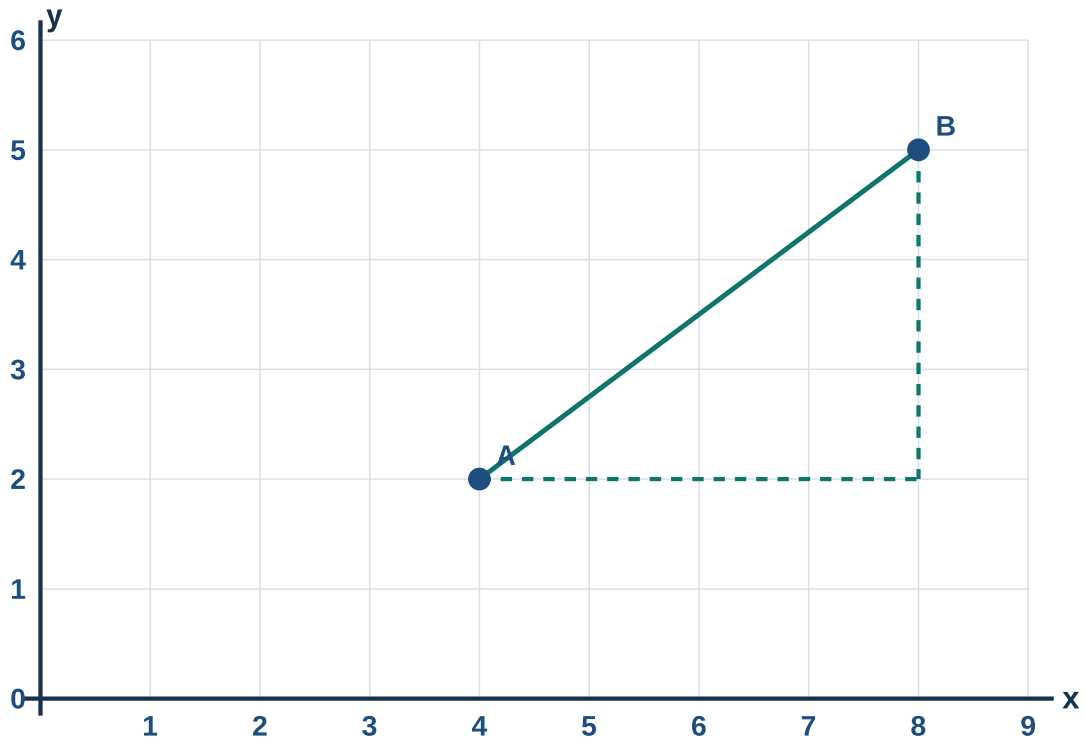
Find the distance from A to B.



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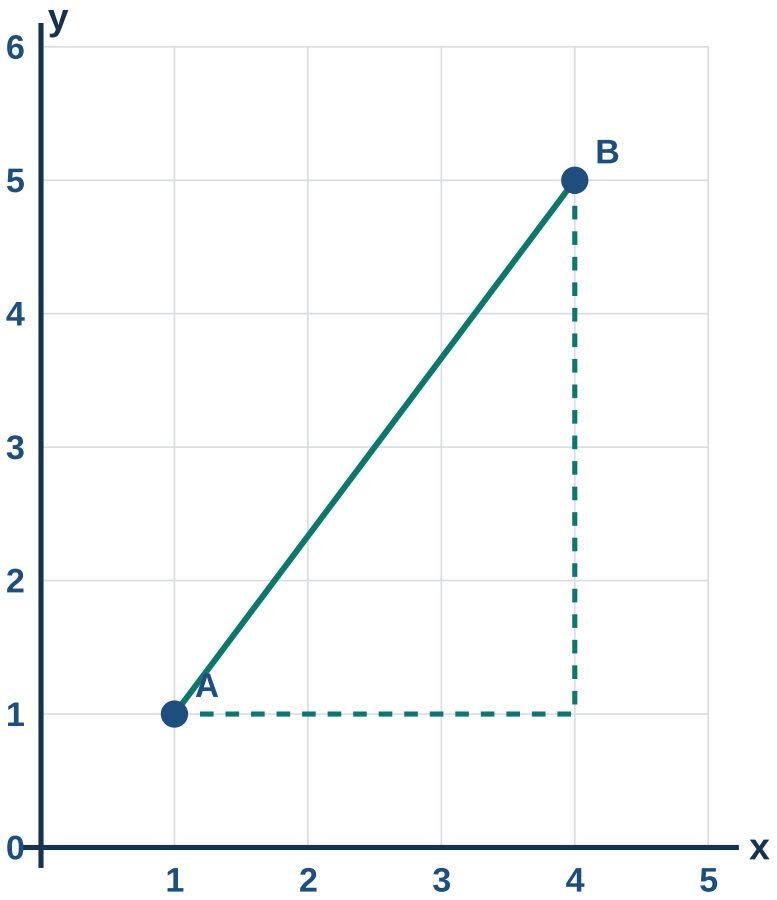
What is the horizontal gap between A and B, in grid units?



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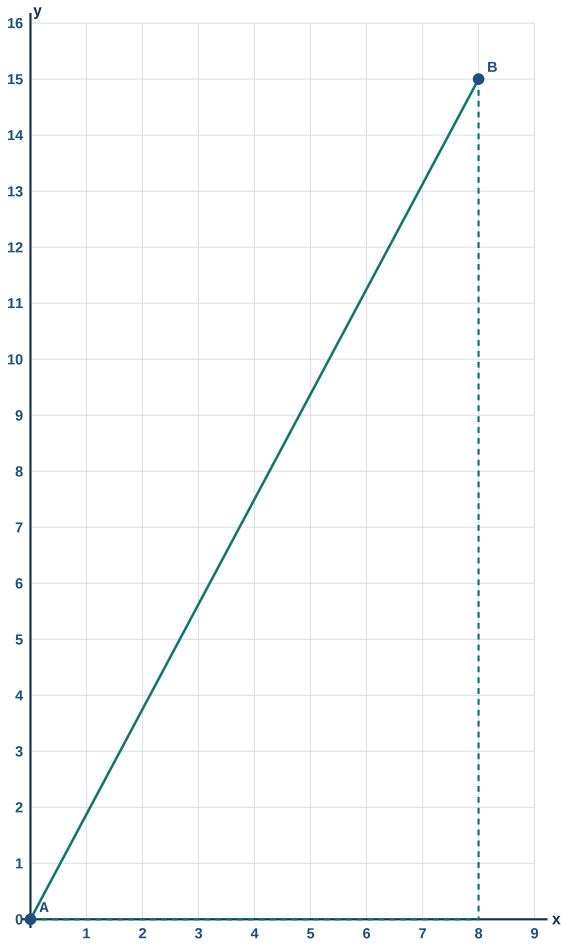
Find the distance from A to B.



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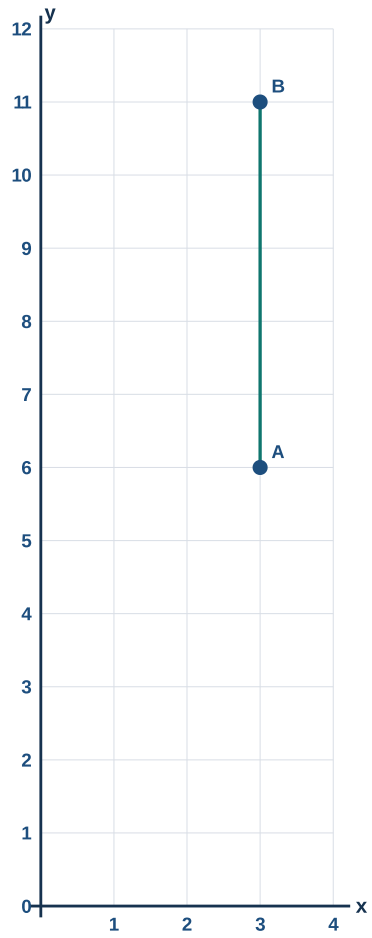
What is the horizontal gap between A and B, in grid units?



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ANSWER KEY

1. 10

2. 13

3. 4

4. 5

5. 15

6. 5

7. 5

8. 3

9. 17

10. 0

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