

# Finding the Distance Between Two Points

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 18

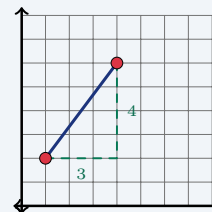
## Quick Review and Helpful Hints

The distance between two points comes from the Pythagorean theorem:  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ . Find the horizontal change and the vertical change, square each, add them, then take the square root. Simplify the radical when possible.

► **Example:** Find the distance between (1, 2) and (4, 6).

**Work:** Horizontal change:  $4 - 1 = 3$ . Vertical change:  $6 - 2 = 4$ .

Then  $d = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25}$ . ★ **Answer:**  $d = 5$



$$d = \sqrt{3^2 + 4^2} = 5.$$

## Practice Problems

Find the distance between each pair of points. Simplify radicals.

- |                        |       |                        |       |
|------------------------|-------|------------------------|-------|
| 1. (0, 0) and (3, 4)   | _____ | 8. (0, 0) and (1, 1)   | _____ |
| 2. (0, 0) and (6, 8)   | _____ | 9. (2, 2) and (5, 6)   | _____ |
| 3. (1, 1) and (4, 5)   | _____ | 10. (0, 0) and (2, 2)  | _____ |
| 4. (2, 3) and (2, 9)   | _____ | 11. (1, 1) and (4, 1)  | _____ |
| 5. (1, 2) and (7, 2)   | _____ | 12. (-2, 0) and (1, 4) | _____ |
| 6. (0, 0) and (5, 12)  | _____ | 13. (0, 0) and (8, 6)  | _____ |
| 7. (-1, -1) and (2, 3) | _____ | 14. (3, 1) and (3, 8)  | _____ |

## Word Problems

15. On a map, a school is at (0, 0) and a library is at (9, 12), in miles. How far apart are they? \_\_\_\_\_
16. A drone flies in a straight vertical line from (2, 1) to (2, 9). How far did it travel? \_\_\_\_\_
17. Two ships are at (0, 0) and (5, 12) on a grid measured in kilometers. Find the distance between them. \_\_\_\_\_
18. A walking path runs straight from (1, 2) to (4, 6), measured in blocks. How long is the path? \_\_\_\_\_



## Answer Keys

- |                                    |                                      |   |
|------------------------------------|--------------------------------------|---|
| 1. <input type="text" value="5"/>  | 7. <input type="text" value="5"/>    | 13. <input type="text" value="10"/>       |
| 2. <input type="text" value="10"/> | 8. <input type="text" value="√2"/>   | 14. <input type="text" value="7"/>        |
| 3. <input type="text" value="5"/>  | 9. <input type="text" value="5"/>    | 15. <input type="text" value="15 miles"/> |
| 4. <input type="text" value="6"/>  | 10. <input type="text" value="2√2"/> | 16. <input type="text" value="8 units"/>  |
| 5. <input type="text" value="6"/>  | 11. <input type="text" value="3"/>   | 17. <input type="text" value="13 km"/>    |
| 6. <input type="text" value="13"/> | 12. <input type="text" value="5"/>   | 18. <input type="text" value="5 blocks"/> |

### Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Use the distance formula: the legs are 3 and 4, so  $d = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$ . So the final answer is 5.
2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Legs 6 and 8:  $d = \sqrt{36 + 64} = \sqrt{100} = 10$ . So the final answer is 10.
3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The changes are 3 across and 4 up:  $d = \sqrt{9 + 16} = 5$ . So the final answer is 5.
4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Same  $x$ , so the points are stacked vertically – just subtract:  $9 - 3 = 6$ . So the final answer is 6.
5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Same  $y$ , so they sit on a horizontal line:  $7 - 1 = 6$ . So the final answer is 6.
6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Legs 5 and 12:  $d = \sqrt{25 + 144} = \sqrt{169} = 13$ . So the final answer is 13.
7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The changes are 3 and 4:  $d = \sqrt{9 + 16} = 5$ . So the final answer is 5.
8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Legs 1 and 1:  $d = \sqrt{1 + 1} = \sqrt{2}$ , already in simplest form. So the final answer is  $\sqrt{2}$ .
9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Changes of 3 and 4 again:  $d = \sqrt{9 + 16} = 5$ . So the final answer is 5.
10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Legs 2 and 2:  $d = \sqrt{4 + 4} = \sqrt{8} = 2\sqrt{2}$ . So the final answer is  $2\sqrt{2}$ .
11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Same  $y$ , so just measure the horizontal gap:  $4 - 1 = 3$ . So the final answer is 3.
12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Changes 3 and 4:  $d = \sqrt{9 + 16} = 5$ . So the final answer is 5.
13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Legs 8 and 6:  $d = \sqrt{64 + 36} = \sqrt{100} = 10$ . So the final answer is 10.
14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Same  $x$ , a vertical line:  $8 - 1 = 7$ . So the final answer is 7.
15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is  $d = \sqrt{9^2 + 12^2} = \sqrt{225} = 15$  miles. So the final answer is 15 miles.
16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A straight vertical flight has the same  $x$ , so the distance is  $9 - 1 = 8$  units. So the final answer is 8 units.
17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is  $d = \sqrt{5^2 + 12^2} = \sqrt{169} = 13$  km. So the final answer is 13 km.
18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is  $d = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$  blocks. So the final answer is 5 blocks.



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