LESSON MAKER PRO

# Straight-Line Routes

*Find distances on a coordinate plane.*

**HIGH SCHOOL · MT.CORE.GEOM.MEAS.1**

**MT.CORE.GEOM.MEAS.1** "Use the Pythagorean Theorem to calculate distance in the coordinate plane."

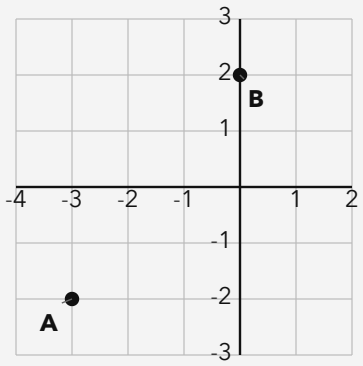
NAME _____ DATE _____

## THE DISTANCE RULE

The horizontal and vertical changes between two points form the legs of a right triangle. Use the Pythagorean Theorem to find the straight-line distance: $d = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$.

## WORKED EXAMPLE

Find the distance from A to B on the grid.

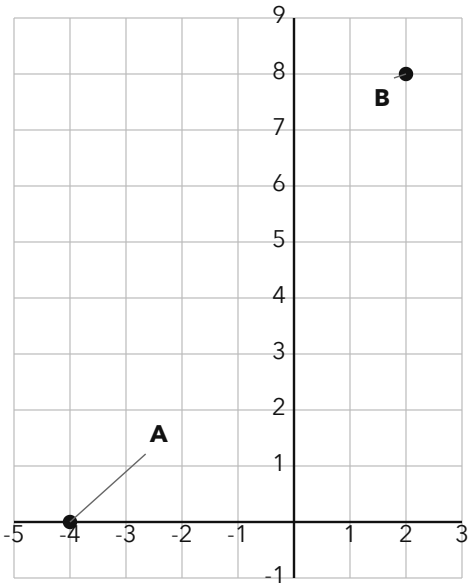



1. Horizontal change: 0 - (-3) = 3.
2. Vertical change: 2 - (-2) = 4.
3. Distance = $\sqrt{(3^2 + 4^2)} = \sqrt{25} = 5$.

**Answer: 5 units**

## PRACTICE 6 problems

**1** Find the distance from A to B on the grid.




**ANSWER** _____

**2** Find the distance between C(-1, -4) and D(4, 8).

**ANSWER** _____

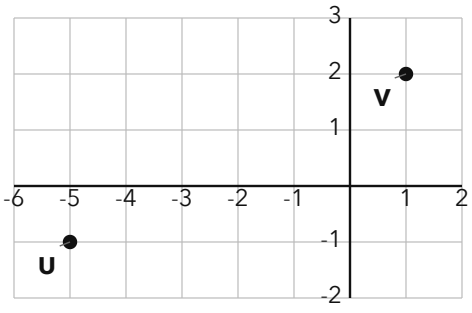
**3** Find the distance between P(2, -5) and Q(9, -5).

**ANSWER** _____

**4** Find the distance between R(-6, 3) and S(-6, -5).

**ANSWER** _____

**5** Find the exact distance from U to V on the grid.




**ANSWER** _____

**6** Find the exact distance between E(-7, -4) and F(-3, 3).

**ANSWER** _____

## APPLY IT Show your work

**1** In a video game, your character is at (-8, -6), and the next checkpoint is at (0, 9). Each coordinate unit represents 1 meter. How far away is the checkpoint in a straight line?

WORK SPACE

**ANSWER** _____

**2** On a concert grounds map, the stage is at (-3, -4), and a food truck is at (9, 5). Each coordinate unit represents 10 meters. What is the straight-line distance from the stage to the food truck?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

Point A is at (-4, -1). Point B is at (4, y) and is 10 units from A. Find every possible value of y, and explain why there is more than one.

WORK SPACE AND ANSWER

**ANSWER KEY** # Straight-Line Routes



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Find the distance from A to B on the grid. | **10 units** |
| 2 | Find the distance between C(-1, -4) and D(4, 8). | **13 units** |
| 3 | Find the distance between P(2, -5) and Q(9, -5). | **7 units** |
| 4 | Find the distance between R(-6, 3) and S(-6, -5). | **8 units** |
| 5 | Find the exact distance from U to V on the grid. | **$3\sqrt{5}$ units** |
| 6 | Find the exact distance between E(-7, -4) and F(-3, 3). | **$\sqrt{65}$ units** |

## PART 2 · APPLY IT

1. **17 meters** The horizontal change is 8 units, and the vertical change is 15 units. The distance is $\sqrt{(8^2 + 15^2)} = 17$ meters.
2. **150 meters** The distance on the map is $\sqrt{(12^2 + 9^2)} = 15$ units. At 10 meters per unit, the distance is 150 meters.

## CHALLENGE

**y = 5 or y = -7. The vertical change can be 6 or -6 because both give a distance of $\sqrt{(8^2 + 6^2)} = 10$.**

Accept equivalent exact radical forms, such as $\sqrt{45}$ for $3\sqrt{5}$. For the challenge, students must give both values of y.