

Coordinate Distance Quest

Use right triangles to measure straight-line distance.

GRADE 8 • NY-8.G.8

NY-8.G.8 "Apply the Pythagorean Theorem to find the distance between two points in a coordinate system."

NAME _____

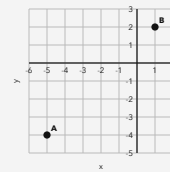
DATE _____

FIND THE TWO CHANGES

For points (x_1, y_1) and (x_2, y_2) , find the horizontal change and the vertical change. These changes are the legs of a right triangle, so distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. A negative change becomes positive when you square it.

WORKED EXAMPLE

Find the distance between A(-5, -4) and B(1, 2).



1. Horizontal change: $1 - (-5) = 6$.
2. Vertical change: $2 - (-4) = 6$.
3. Distance = $\sqrt{6^2 + 6^2} = \sqrt{72} = 6\sqrt{2}$.

Answer: $6\sqrt{2}$ units

PRACTICE 6 problems

- 1** Find the distance between A(0, 0) and B(3, 4).

ANSWER _____

- 2** Find the distance between C(-4, 2) and D(8, 7).

ANSWER _____

- 3** Find the distance between E(-6, -1) and F(2, 14).

ANSWER _____

- 4** Find the distance between M(3, -7) and N(10, 17).

ANSWER _____

- 5** Find the distance between R(-9, 6) and S(7, -10). Write your answer in simplest radical form.

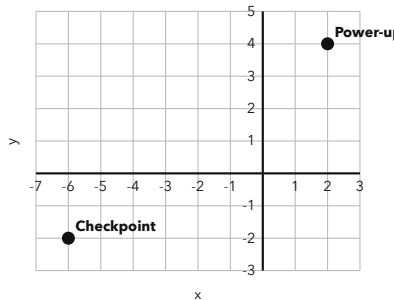
ANSWER _____

- 6** Find the distance between T(-8, 11) and U(12, -4).

ANSWER _____

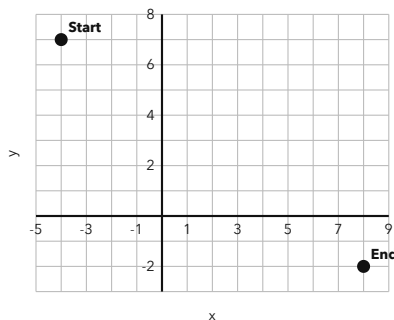
APPLY IT Show your work

- 1** On a game-design coordinate map, a player's avatar moves directly from a checkpoint at $(-6, -2)$ to a power-up at $(2, 4)$. How far does the avatar move?



ANSWER _____

- 2** A robotics team programs a robot to travel directly from $(-4, 7)$ to $(8, -2)$ on a coordinate floor. How far does the robot travel?



ANSWER _____

CHALLENGE One step up

Point $A(-2, 1)$ and point $B(4, y)$ are 10 units apart. Find all possible values of y . Explain how you know.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the distance between A(0, 0) and B(3, 4).	5 units
2	Find the distance between C(-4, 2) and D(8, 7).	13 units
3	Find the distance between E(-6, -1) and F(2, 14).	17 units
4	Find the distance between M(3, -7) and N(10, 17).	25 units
5	Find the distance between R(-9, 6) and S(7, -10). Write your answer in simplest radical form.	$16\sqrt{2}$ units
6	Find the distance between T(-8, 11) and U(12, -4).	25 units

PART 2 • APPLY IT

- 10 units** The horizontal change is 8 and the vertical change is 6. The distance is $\sqrt{8^2 + 6^2} = 10$.
- 15 units** The horizontal change is 12 and the vertical change is 9. The distance is $\sqrt{12^2 + 9^2} = 15$.

CHALLENGE

$y = 9$ or $y = -7$, because the horizontal change is 6, so the vertical change must be 8 or -8.

Accept equivalent distance forms, such as $\sqrt{256 + 256}$ before simplification for problem 5. For the challenge, students must give both possible y-values and connect them to a vertical change of 8 units.