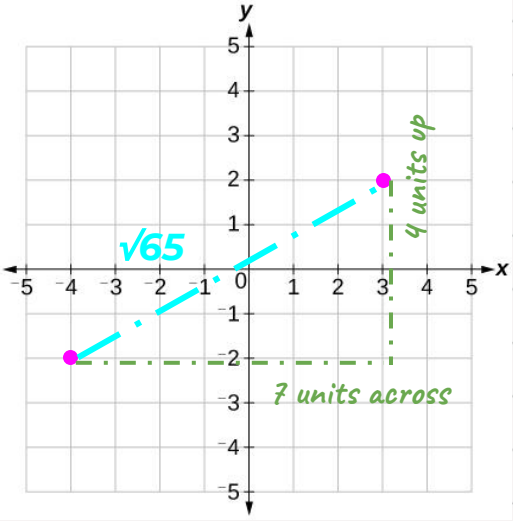
The Pythagorean Theorem in the Coordinate Plane

Like Counting Rise over Run

There will be problems about finding distance between two points in the coordinate plane. Instinct may have you draw a diagonal line and attempt to count the squares diagonally to get the answer. Please don't. A diagonal distance across a unit is slightly larger than an up/down or left/right.

Just as you had to "draw a triangle" of sorts to count slope of linear functions on the coordinate grid, you take two points and connect them vertically and horizontally to create a triangle. Then, you've guessed it, use the Pythagorean Theorem to find the missing length.



- You begin with two points (usually given to you as ordered pairs only)
- You can quickly plot the two points on a graph and count the units (left/right and up/down) between them
- Use those distances to find the missing length
- $7^2 + 4^2 = c^2$ so **$c = \sqrt{65}$**
- Rule of thumb: leave coordinate plane distances under the radical unless it says to round

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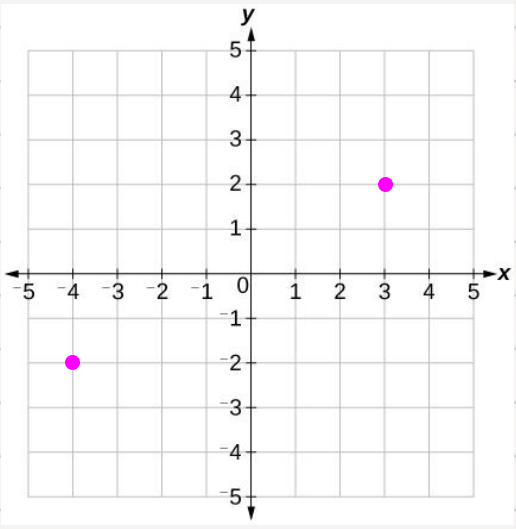
Using the absolute value

Absolute value and distance are one in the same. Absolute value is generally seen as "spaces along the number line" and distance, well, is distance from point A to point B.

We can use the distance/absolute value approach to finding the diagonal distance between two points in the coordinate plane.

Let's look at the same two points from the previous example.

(-4, -2) and (3, 2)



- **You can take the absolute value between the x-values to get 7**
- **You can take the absolute value between the y-values to get 4**
- Now, use $7^2 + 4^2$ to find the value for c
- **The answer is still √65**