Using a Radical in a Formula

The portion of the line between the two points is called a **line segment**.

A line has infinite length, while a line segment has a specific length.

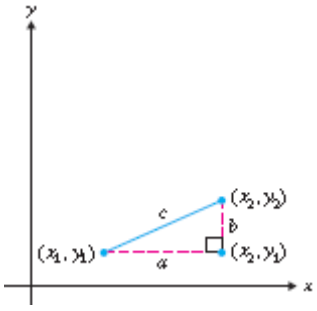
The formula for finding the distance between two points (the length of a line segment) includes a radical.

Distance Formula (based on the Pythagorean Theorem)

The distance between any two points (x_1, y_1) and (x_2, y_2) is given by

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

[In my words – the distance between any two points is the square root of …
the 'run along the x-axis' squared + the 'rise along the y-axis' squared]



The distance formula is derived from the Pythagorean Theorem:

$$a^2 + b^2 = c^2$$

Using the square root property to solve for c, the result is:

$$c = \sqrt{a^2 + b^2} \text{ or } c = \sqrt{(leg1)^2 + (leg2)^2}$$

In the diagram, one can see that 'a' or 'leg1' represents the change in x values.
'b' or 'leg2' represents the change in x values.

Find the distance between the points (4,2) and (12,8). [length of 'c' in the Pythagorean Theorem]

$$d = \sqrt{(12-4)^2 + (8-2)^2} \qquad d = \sqrt{(8)^2 + (6)^2} = \sqrt{64+36} = \sqrt{100} = \pm 10$$

Since the problem involves distance, + 10 is the reasonable solution.
The distance between the two points is 10 units.

TRY:

Find the distance between (2, 5) and (6, 8)