10-5 The Distance Formula

- Finds the distance between any 2 pts.

\[d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}\]
Ex. 1  Find the distance between the points at (2, 3) and (-4, 6).

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

\[ = \sqrt{(-4-2)^2 + (6-3)^2} \]

\[ = \sqrt{(-6)^2 + (3)^2} \]

\[ = \sqrt{36 + 9} = \sqrt{45} \approx 6.71 \text{ units} \]
Ex. 2 Find the distance between the points at (4, -1) and (-2, -5).

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

\[ = \sqrt{(-2-4)^2 + (-5+1)^2} \]

\[ = \sqrt{(-6)^2 + (-4)^2} \]

\[ = \sqrt{36 + 16} \]

\[ = \sqrt{52} \approx 7.21 \]
Ex. 3  Tracy's golf ball is 20 feet short and 8 feet to the right of the cup. On her first putt, the ball lands 2 feet to the left and 3 feet beyond the cup. If the ball went in a straight line, how far did it go?
Ex. 4  Find the possible values of a if the distance between the points at (7, 5) and (a, -3) is 10 units.

\[ X_2 Y_2 \]

\[ 10 = \sqrt{(a-7)^2 + (-3-5)^2} \]

\[ 10 = \sqrt{a^2 -14a +49 +81} \]

\[ 10 = \sqrt{a^2 -14a +113} \]

\[ (10)^2 = (\sqrt{a^2 -14a +113})^2 \]

\[ 100 = a^2 -14a +113 \]

\[ -100 = a^2 -14a +13 \]

\[ a^2 -14a +13 = 0 \]

\[ (a-1)(a-13) = 0 \]

\[ a = 1 \text{ or } a = 13 \]
Ex. 5  Find the possible values of $a$ if the distance between the points at $(3, a)$ and $(-4, 5)$ is $\sqrt{58}$ units.