

2.5 The Distance Between any Two Points

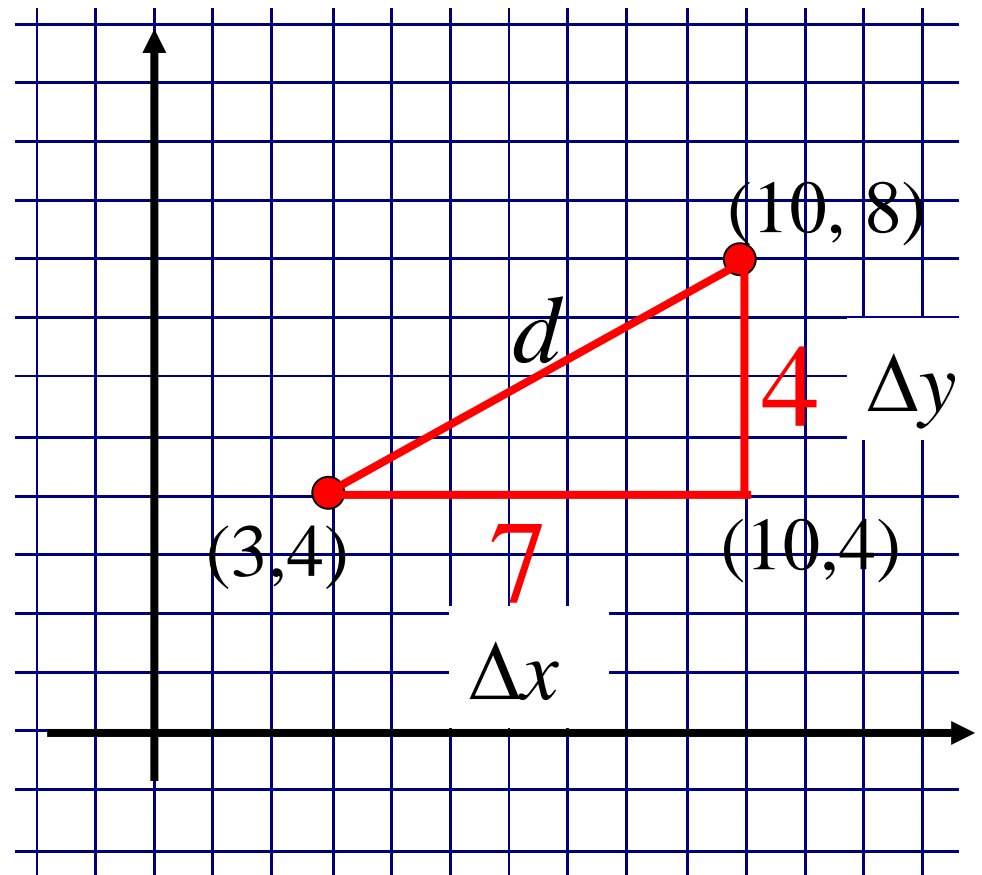
Example 1: determine the distance between the points (3,4) and (10, 8).

$$d = \sqrt{7^2 + 4^2}$$

$$d = \sqrt{49 + 16}$$

$$d = \sqrt{65}$$

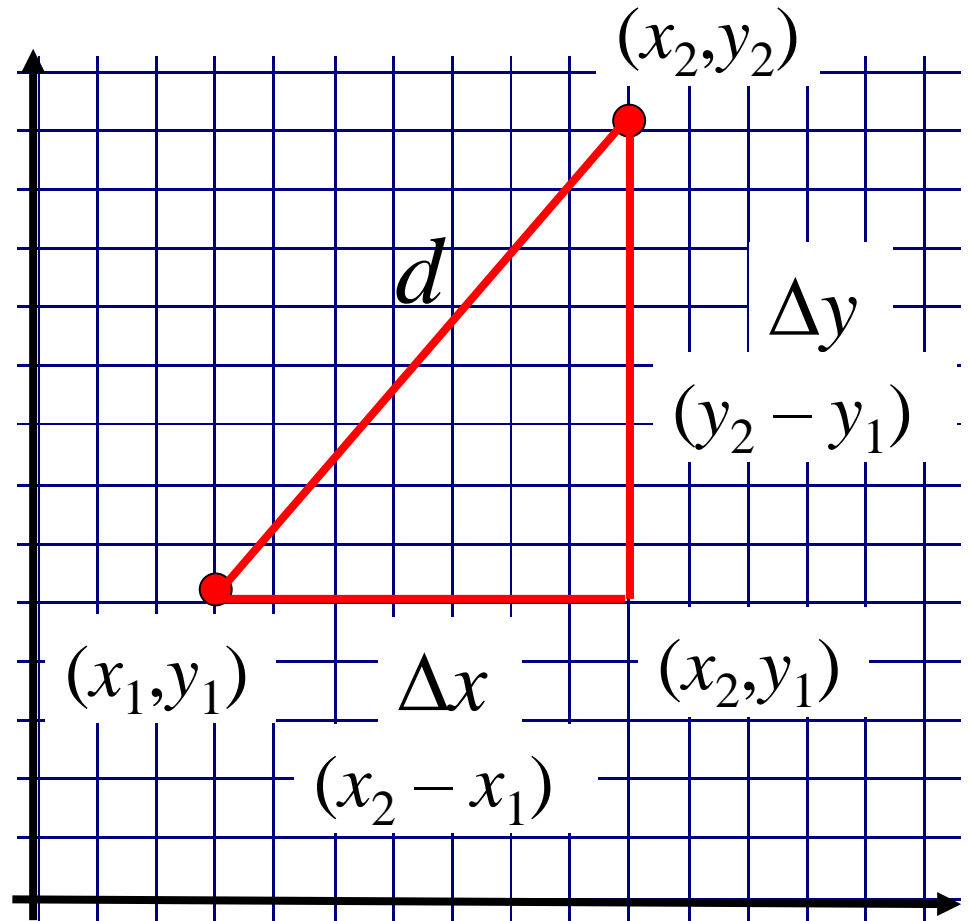
$$d \approx 8.1$$



Distance Formula given points (x_1, y_1) , (x_2, y_2)

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

$$d = \sqrt{\Delta x^2 + \Delta y^2}$$



Ex 2. Determine the distance between the points

$(5, -3)$ and $(8, 7)$

(x_1, y_1) (x_2, y_2)

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

$$d = \sqrt{(8 - 5)^2 + (7 - (-3))^2}$$

$$d = \sqrt{(3)^2 + (10)^2}$$

$$d = \sqrt{9 + 100}$$

$$d = \sqrt{109}$$

$$d \approx 10.4$$

Ex 3. Determine the distance between the points

$(-2, -4)$ and $(-7, 3)$
 (x_1, y_1) (x_2, y_2)

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

$$d = \sqrt{[-7 - (-2)]^2 + [3 - (-4)]^2}$$

$$d = \sqrt{(-7 + 2)^2 + (3 + 4)^2}$$

$$d = \sqrt{(-5)^2 + (7)^2}$$

$$d = \sqrt{74}$$

$$d = \sqrt{25 + 49}$$

$$d \approx 8.6$$

Ex 4. Determine the perimeter of the triangle $A(2, 8)$
and $B(6, 3)$ and $C(-2, 1)$

find d_1

find d_2

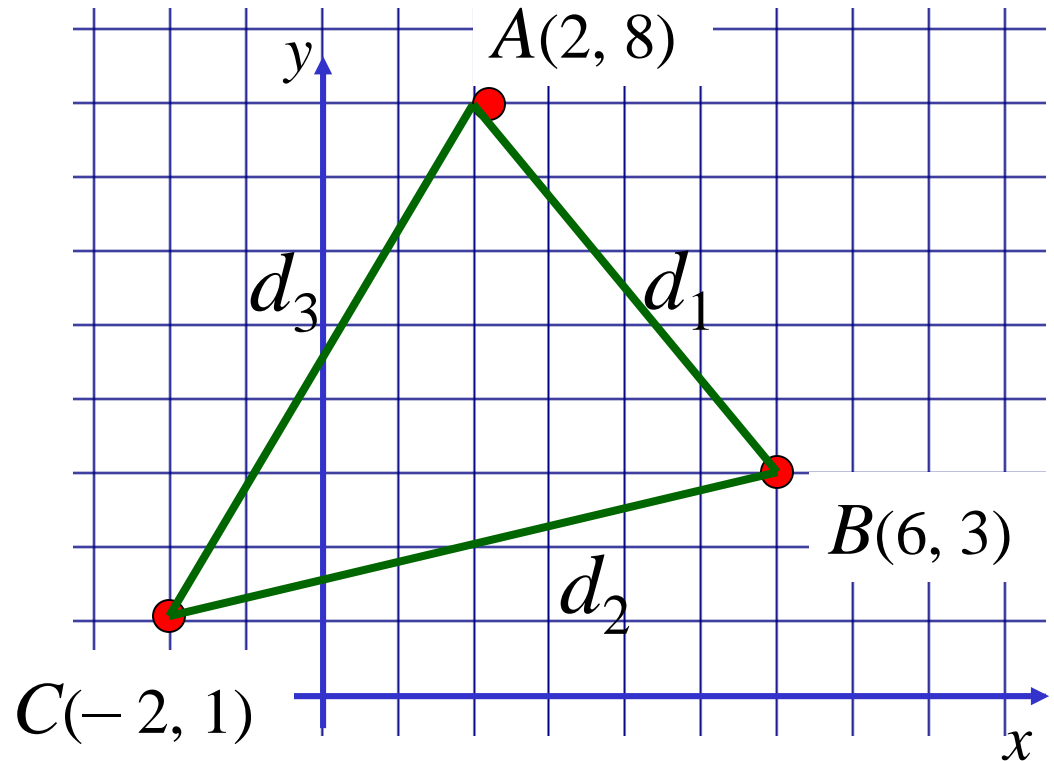
find d_3

The perimeter:

$$P = d_1 + d_2 + d_3$$

$$P = \sqrt{41} + \sqrt{68} + \sqrt{65}$$

$$P \approx 22.7$$



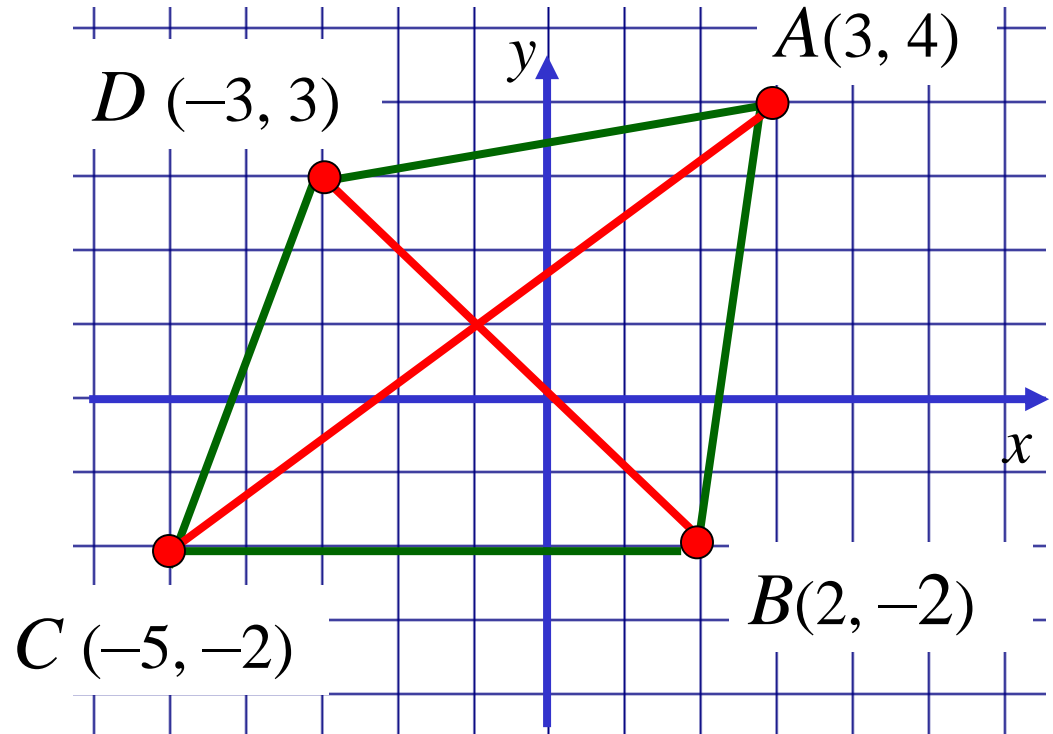
Ex 5. Determine the lengths of the diagonals of quadrilateral $A(3, 4)$, $B(2, -2)$, $C(-5, -2)$ and $D(-3, 3)$

Join AC and BD

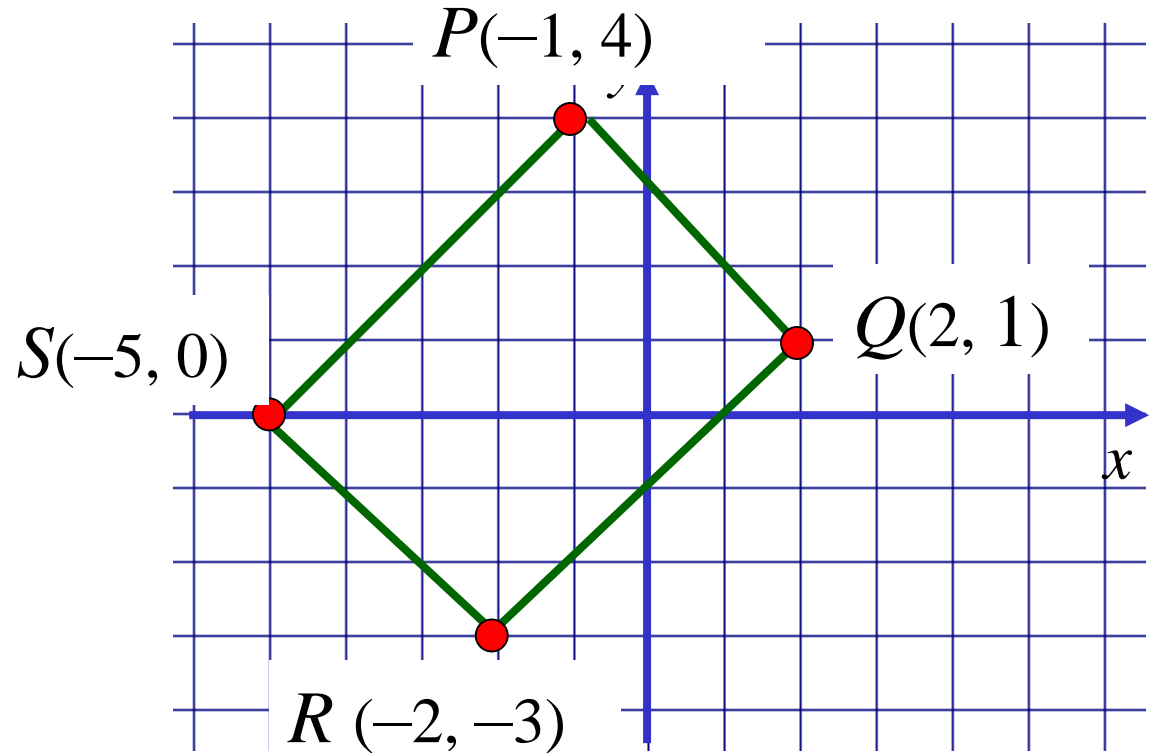
Find the length of AC and BD .

$$AC = 10$$

$$BD \approx 7.1$$



Ex 6. Determine the fourth vertex **S** of the rectangle
 $P(-1, 4)$, $Q(2, 1)$, $R(-2, -3)$



$S(-5, 0)$