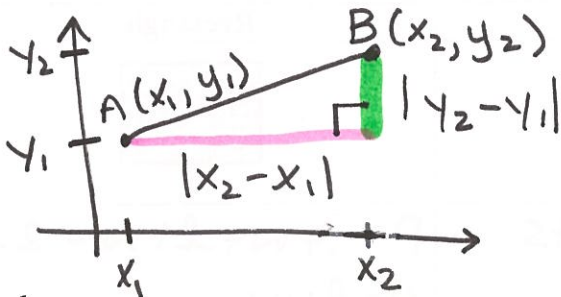


The Distance Formula

Lesson Objective: INBAT And lengths of segments in the coordinate plane.

The Distance Formula: If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in the coordinate plane, then the distance between A and B is:



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

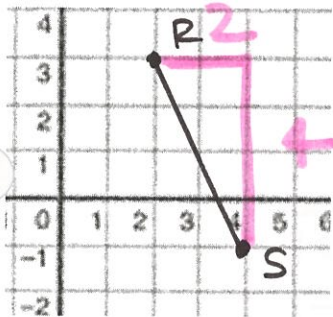
$$\sqrt{AB^2} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$AB = \pm \sqrt{}$$

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

Example:

- Find the distance between $R(2, 3)$ and $S(4, -1)$. Make a sketch on the coordinate plane provided.



Method #1: Pyth. Thm

$$RS^2 = 2^2 + 4^2$$

$$RS^2 = 4 + 16$$

$$\sqrt{RS^2} = \sqrt{20}$$

$$RS = \pm \sqrt{20} \rightarrow \sqrt{20}$$

$$\sqrt{4 \cdot 5}$$

$$RS = 2\sqrt{5}$$

$$RS \approx 4.47$$

Method #2:

Dist. Formula

$$RS = \sqrt{(2 - 4)^2 + (3 - (-1))^2}$$

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

$$= \sqrt{4 + 16}$$

$$= \sqrt{20}$$

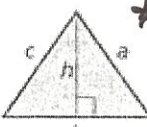
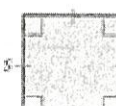
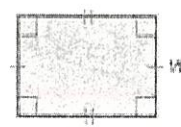
$$= 2\sqrt{5}$$

$$\approx 4.47$$

Perimeter in the Coordinate Plane

Lesson Objective: **INBAT** find perimeter + area of figures in the coordinate plane.

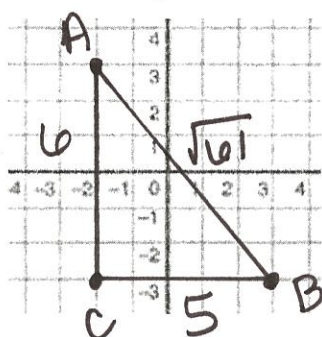
Review: Perimeter (P) and Area (A) Formulas

Triangle	Square	Rectangle
 $b \perp h$		
$P = a + b + c$ $A = \frac{1}{2}bh$	$P = s + s + s + s = 4s$ $A = s \cdot s = s^2$	$P = l + w + l + w = 2l + 2w$ $A = l \cdot w$

Finding Perimeter in the Coordinate Plane

Example:

2. Find the perimeter of $\triangle ABC$ with vertices $A(-2, 3)$, $B(3, -3)$ and $C(-2, -3)$.



$$AC = 6$$

$$BC = 5$$

$$AB^2 = 6^2 + 5^2$$

$$AB^2 = 36 + 25$$

$$\sqrt{AB^2} = \sqrt{61}$$

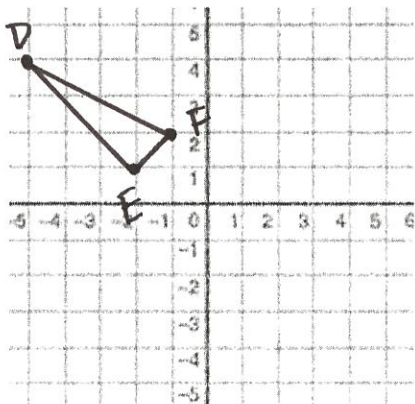
$$AB = \pm \sqrt{61} \rightarrow \sqrt{61}$$

$$P = 5 + 6 + \sqrt{61}$$

$$P = 11 + \sqrt{61}$$

$$P \approx 18.81$$

3. Find the perimeter of $\triangle DEF$ with vertices $D(-5, 4)$, $E(-2, 1)$ and $F(-1, 2)$



$$DE^2 = 3^2 + 3^2$$

$$DE = \sqrt{18} = 3\sqrt{2}$$

$$EF^2 = 1^2 + 1^2$$

$$EF = \sqrt{2}$$

$$DF^2 = 2^2 + 4^2$$

$$DF = 2\sqrt{5}$$

$$P = 3\sqrt{2} + \sqrt{2} + 2\sqrt{5}$$

$$P = 4\sqrt{2} + 2\sqrt{5}$$

$$P \approx 10.13$$