

### 3 5.2 Distance Formula NOTES

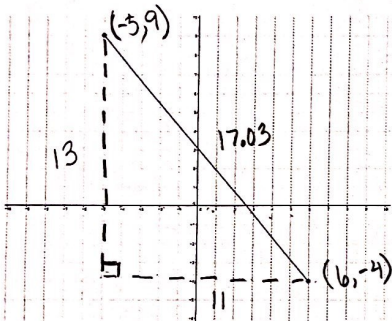
#### Pythagorean Theorem

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

#### Distance Formula

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

Example 1) Find the distance between the points two ways.



#### Pythagorean Theorem

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

$$13^2 + 11^2 = c^2$$

$$169 + 121 = c^2$$

$$290 = c^2$$

$$\sqrt{290} = c$$

$$17.03 \approx c$$

#### Distance Formula

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

$$d = \sqrt{(6 - (-5))^2 + (-4 - 9)^2}$$

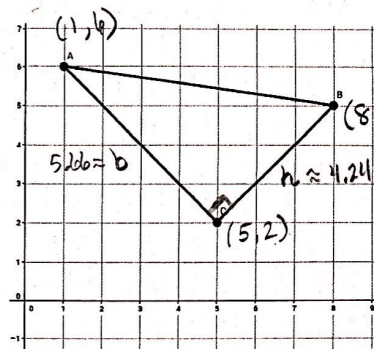
$$d = \sqrt{(11)^2 + (-13)^2}$$

$$d = \sqrt{121 + 169}$$

$$d = \sqrt{290}$$

$$d \approx 17.03$$

Example 2) Find the area of triangle ABC.



$$A = \frac{1}{2} b \cdot h$$

$$A = \frac{1}{2} (5 \cdot 6) (4 \cdot 24)$$

$$A = 12 \text{ unit}^2$$

$$\overline{AC} = \sqrt{(1-5)^2 + (6-2)^2}$$

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

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

$$= \sqrt{32} \approx 5.66$$

$$\overline{BC} = \sqrt{(8-5)^2 + (5-2)^2}$$

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

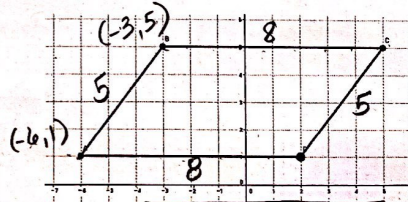
$$= \sqrt{9 + 9}$$

$$= \sqrt{18} \approx 4.24$$

Example 3) Find the perimeter of parallelogram ABCD

$$P = \overline{AB} + \overline{BC} + \overline{CD} + \overline{AD}$$

$$5 + 8 + 5 + 8 = 26 \text{ units}$$



$$\overline{AB} = \sqrt{(-3 - (-6))^2 + (5 - 1)^2}$$

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

$$= \sqrt{9 + 16} = \sqrt{25} = 5$$