

Name: Key

Hour: \_\_\_\_\_

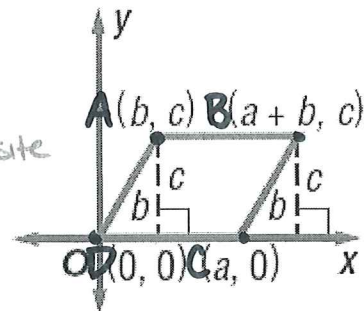
## Coordinates of Quadrilaterals Homework

1) Prove the following figure is a parallelogram.

a) Prove that the opposite sides of a parallelogram are parallel.

$$AB = \frac{c-0}{b-(a+b)} = \frac{0}{-a} = 0 \quad BC = \frac{c-0}{(a+b)-a} = \frac{c}{b} \quad \therefore \text{opposite sides are } \parallel$$

$$CD = \frac{0-0}{0-a} = \frac{0}{-a} = 0 \quad AD = \frac{c-0}{b-0} = \frac{c}{b}$$



b) Prove that the opposite sides of a parallelogram are congruent.

$$\left. \begin{array}{l} AB = a \\ CD = a \\ AD = \sqrt{b^2 + c^2} \\ BC = \sqrt{b^2 + c^2} \end{array} \right\} \text{Pythagorean Thm}$$

$\therefore$  opposite sides are  $\cong$

c) Prove that the diagonals of a parallelogram bisect each other. (same midpoint means they bisect each other)

$$BD = \left( \frac{0+a+b}{2}, \frac{0+c}{2} \right) = \left( \frac{a+b}{2}, \frac{c}{2} \right)$$

$$AC = \left( \frac{a+b}{2}, \frac{0+c}{2} \right) = \left( \frac{a+b}{2}, \frac{c}{2} \right)$$

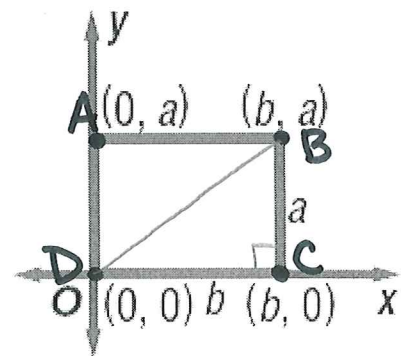
$\therefore$  diagonals bisect each other

2) Prove the following figure is a rectangle.

a) Prove that the opposite sides of a rectangle are parallel and consecutive sides are perpendicular.

$$AB = \frac{a-a}{0-b} = \frac{0}{-b} = 0 \quad BC = \frac{a-0}{b-b} = \frac{a}{0} = \text{undefined}$$

$$CD = \frac{0-0}{b-0} = \frac{0}{b} = 0 \quad AD = \frac{0-a}{0-0} = \frac{-a}{0} = \text{undefined}$$



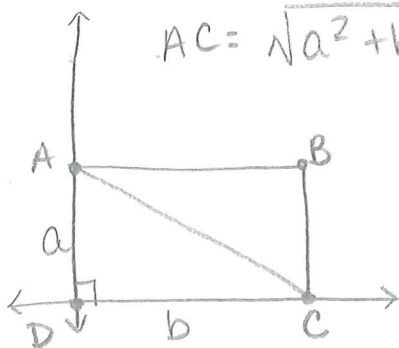
$\therefore$  opposite sides are  $\parallel$  and consecutive sides are  $\perp$

b) Prove that the diagonals of a rectangle are congruent.

$$AC = \sqrt{a^2 + b^2}$$

$$DB = \sqrt{a^2 + b^2}$$

$\therefore$  diagonals are  $\cong$

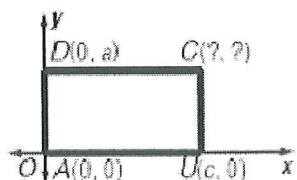


Name: \_\_\_\_\_

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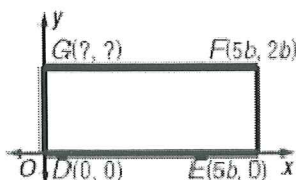
Find the missing coordinates of each figure.

1. rectangle



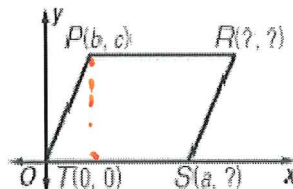
$C(c, a)$

2. rectangle



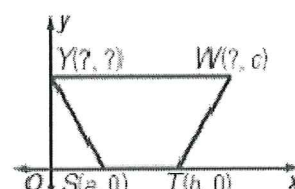
$G(0, 2b)$

3. parallelogram



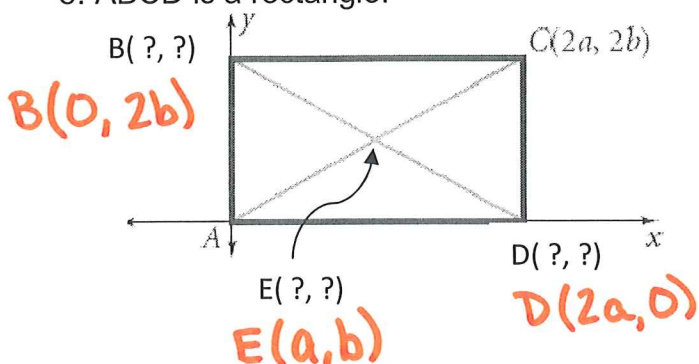
$R(a+b, c)$   
 $S(a, 0)$

4. isosceles trapezoid



$Y(0, c)$   
 $W(a+b, c)$

5. ABCD is a rectangle.

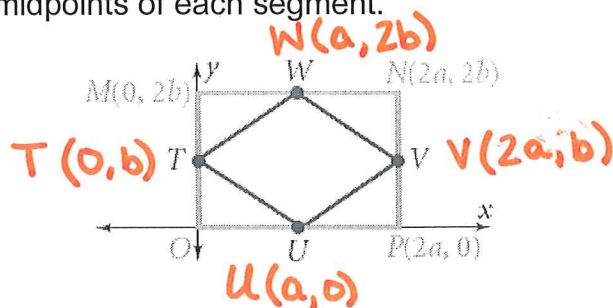


$B(0, 2b)$

$E(a, b)$

$D(2a, 0)$

6. Find points T, U, V, and W if they are the midpoints of each segment.



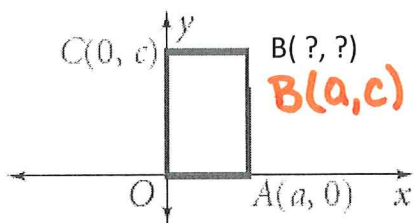
$W(a, 2b)$

$T(0, b)$

$U(a, 0)$

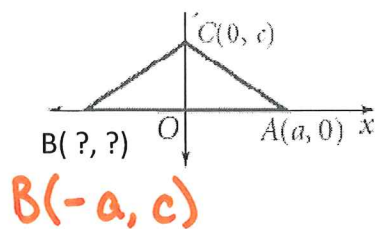
$V(2a, b)$

7. Rectangle



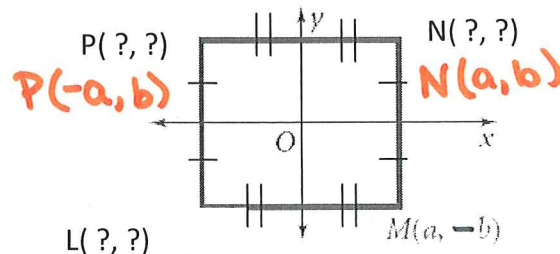
$B(a, c)$

8. Isosceles Triangle



$B(-a, c)$

10. Rectangle



$P(-a, b)$

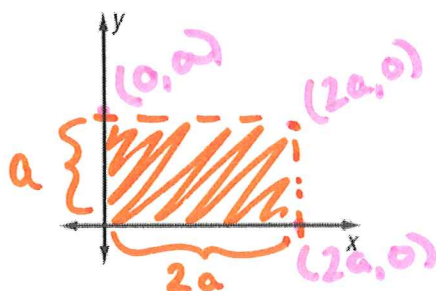
$N(a, b)$

$L(-a, -b)$

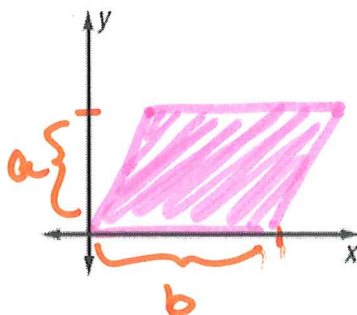
$L(-a, -b)$

Position angle label each figure on the coordinate plane.

11. Rectangle with length  $2a$  units and height  $a$  units



13. parallelogram with side length  $b$  units and height  $a$  units



12. isosceles trapezoid with height  $a$  units, bases  $c - b$  units and  $b + c$  units

