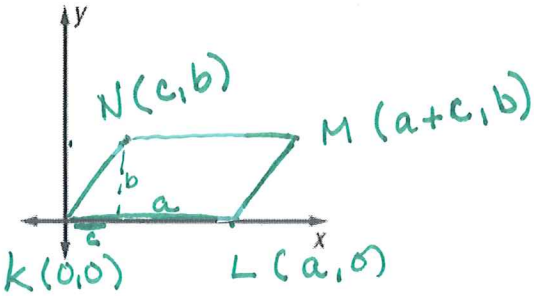
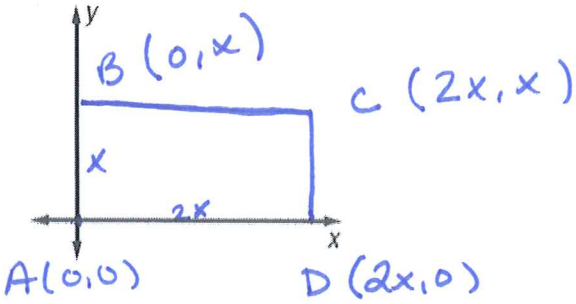
ACC: Coordinates of Quadrilaterals Homework

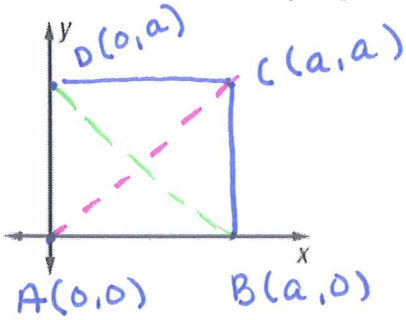
1. Paralellogram KLMN with length a and height b.



2. Rectangle ABCD with the length twice the width.



3. PROOF: *Position and label a square on the coordinate plane with side length of a. Then write a coordinate proof*



a) Prove that the opposite sides are parallel.

Slope AB = 0
Slope BC = undef.
Slope CD = 0
Slope DA = undef.

AB // CD and BC // DA
∴ op sides are //

b) Prove that consecutive sides form right angles (are perpendicular).

From the above slopes, we can see that consecutive slopes are op. reciprocals
∴ consecutive sides form Right ∠s

c) Prove that opposite sides are congruent.

AB = a
BC = a
CD = a
AD = a

AB ≅ CD and BC ≅ DA
∴ op. sides are ≅

d) Prove that the diagonals of a square are congruent.

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

$\boxed{AC = a\sqrt{2}}$
OR
$\boxed{AC = |a|\sqrt{2}}$

$DB^2 = a^2 + a^2$
$\boxed{DB = a\sqrt{2}}$
OR
$\boxed{DB = |a|\sqrt{2}}$

AC ≅ BC
∴ diags of a square are ≅

e) Prove that the diagonals of a square are perpendicular.

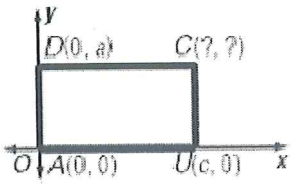
Slope of BD $= -\frac{a}{a} = -1$
Slope AC $= \frac{a}{a} = 1$
$> \perp$

BD ⊥ AC
∴ diags of a square are ⊥

Basic Questions:

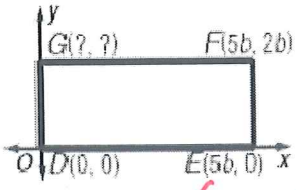
Find the missing coordinates of each figure.

1. rectangle



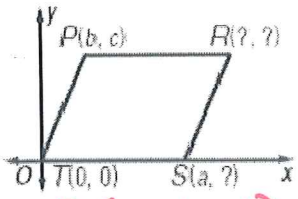
C(c, a)

2. rectangle



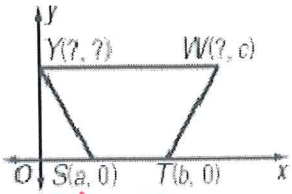
G(0,2b)

3. parallelogram



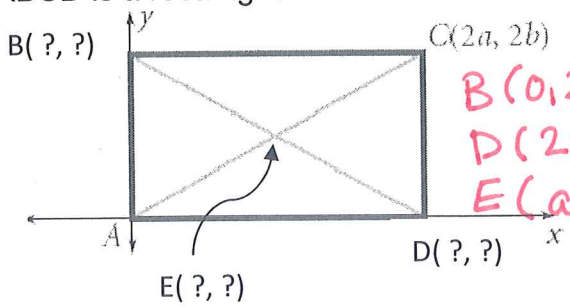
R(a+b, c)
S(a, 0)

4. isosceles trapezoid



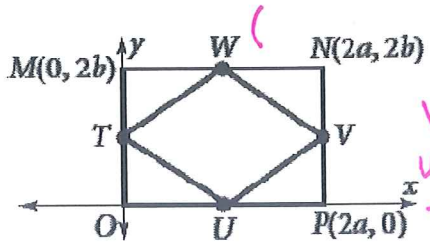
Y(0,c)
W(a+b, c)

5. ABCD is a rectangle.



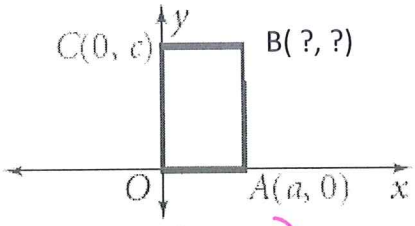
B(0,2b)
D(2a,0)
E(a,b)

6. Find points TUV and W if they are the midpoints of each segment.



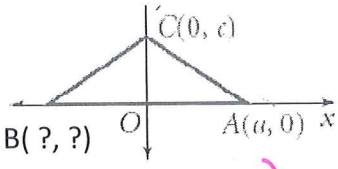
W(a, 2b)
V(2a, b)
U(a, 0)
T(0, b)

7. Rectangle



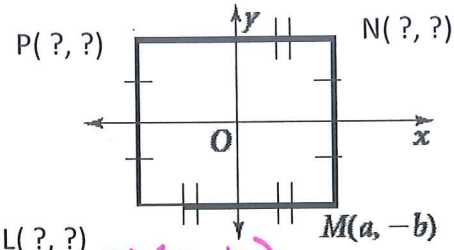
B(a,c)

8. Isosceles Triangle



B(-a,c)

10. Rectangle



N(a,b)
L(-a,-b)
P(-a,b)

11. Determine whether ABCD is a parallelogram, rectangle, rhombus, and/or a square given the set of vertices. Explain your work! Classify all that apply!
A(-1,-5) B(-3,0) C(2,2) D(4,-3).
For each that applies you must write the words "It is a __(type of quad)_____ *because* _____"

Slope AB $= -\frac{5}{2}$ Slope BC $= \frac{2}{5}$ Slope CD $= -\frac{5}{2}$ Slope AD $= \frac{2}{5}$

AB $= \sqrt{29}$ BC $= \sqrt{29}$ CD $= \sqrt{29}$ AD $= \sqrt{29}$

It is a parallelogram because op. sides are //
It is a rectangle because consecutive sides are ⊥ creating 4 Right ∠s.
It is a Rhombus because all 4 sides are ≅
It is a Square because it has 4 Right ∠s and all ≅ sides.