Class Activity:

5B: Classifying Parallelograms in the Coordinate Plane

For each quadrilateral, (a) sketch the figure
(b) Find the slope & length of each side
(c) classify + state how you know what it is
(d) Find the slopes + lengths of diagonals to verify if they are $\perp$ or $\cong$ or not.
(e) verify that the diagonals bisect each other by showing their midpoints are the same (x, y)
*(f) Bonus: Find "e" algebraically using equations of drags.

#1. S(-2,2) A(3,4) V(2,1) G(-3,-1)

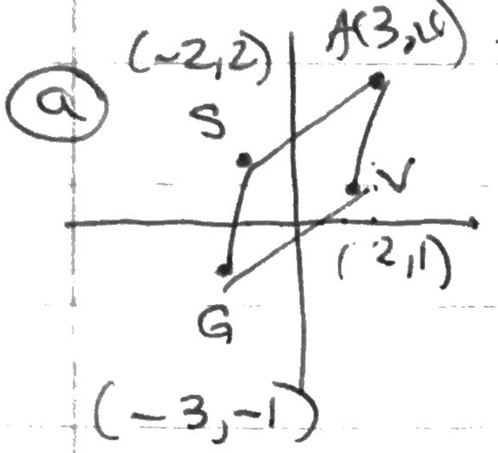
#2. B(-5,3) R(-1,4) U(1,-4) H(-3,-5)

#3. F(-4,0) L(1,-1) O(0,-6) W(-5,-5)

#4. R(3,-3) I(6,-2) D(5,-5) A(2,-6)

#1 SAVG S(-2, 2) A(3,4) V(2,1) G(-3,-1)

(a)



(b)

SA	$m = 2/5$	$\sqrt{29}$	$\parallel, \cong$
GV	$m = 2/5$	$\sqrt{29}$	
GS	$m = 3$	$\sqrt{10}$	$\parallel \cong$
VA	$m = 3$	$\sqrt{10}$	

$\not\perp \not\cong$

(c) ▱ SAVG is a <u>parallelogram</u> b/c opp sides are $\parallel$. (Also, opp. sides are $\cong$). B/C the sides are <u>not all</u> $\cong$, its <u>not</u> a rhombus & b/c the slopes are not opp & reciprocals, they are not $\perp$, so its not a rect.

(d) Diagonal: SV $m = -1/4$ $\sqrt{4^2+1^2} = \sqrt{17}$

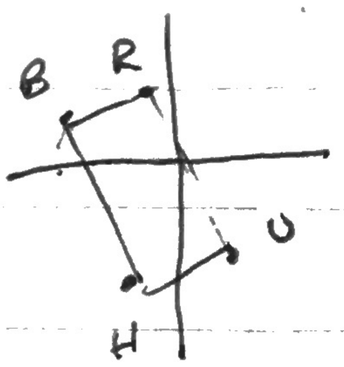
GA $m = 5/6$ $\sqrt{5^2+6^2} = \sqrt{61}$

Diags are <u>not</u> $\perp$ and <u>not</u> $\cong$

(e) Midpoint of SV = $(0, 3/2)$ of GA: $(0, 3/2)$ ✓

#2 BRUH B(-5,3) R(-1,4) U(1,-4) H(-3,-5)

(a)



(b)

BR	$m = \frac{1}{4}$	$\sqrt{4^2+1^2} = \sqrt{17}$	$\parallel$
HU	$m = \frac{1}{4}$	$= \sqrt{17}$	
BH	$m = \frac{-8}{2} = -4$	$\sqrt{8^2+2^2} = \sqrt{68} = 2\sqrt{17}$	$\parallel$
RU	$m = \frac{-8}{2} = -4$	$\sqrt{8^2+2^2} = \sqrt{68} = 2\sqrt{17}$	

$\perp, \not\cong$

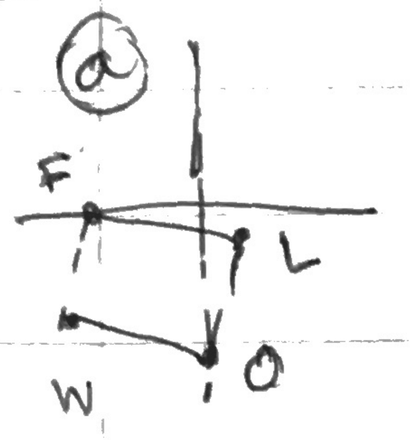
(c) BRUH is a rectangle. Opposite sides are $\parallel$ and cong, and adjacent sides are $\perp$ b/c -4 and $\frac{1}{4}$ are opp. recip.

(d) Diagonals BU $m = \frac{-7}{6}$ $\sqrt{85}$, HR $m = \frac{-9}{-2} = \frac{9}{2}$ $\sqrt{85}$

Diagonals are NOT $\perp$, but they <u>are</u> $\cong$.

(e) Midpoint of BU: $(-2, \frac{-1}{2})$ of HR $(-2, -\frac{1}{2})$ ✓

#3 FLOW F(-4,0) L(1,-1) O(0,-6) W(-5,-5)



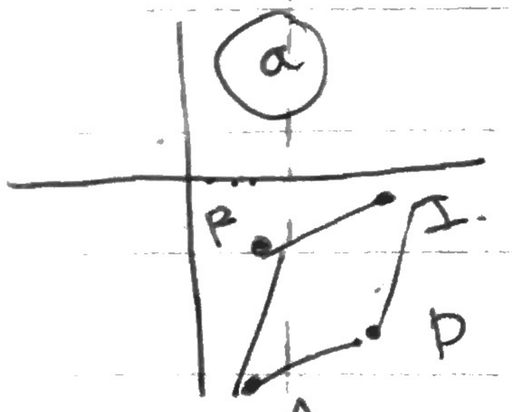
(b) FL $m = \frac{-1}{5}$ $\sqrt{26}$ } // ≅
WO $m = \frac{-1}{5}$ $\sqrt{26}$
WF $m = 5$ $\sqrt{26}$ } // ≅
OL $m = 5$ $\sqrt{26}$
} ⊥, ≇

(c) FLOW is a square bc opp sides are //, adj. sides are ⊥, and all sides are ≅.

(d) Diags: FO $m = \frac{-6}{4} = \frac{-3}{2}$ $\sqrt{6^2+4^2} = \sqrt{52} = 2\sqrt{13}$
WL $m = \frac{-4}{-6} = \frac{2}{3}$ $\sqrt{6^2+4^2} = \sqrt{52} = 2\sqrt{13}$
Diagonals are ⊥ and ≅.

(e) MP of FO (-2,-3) of WL (-2,-3) ✓

#4 RIDA R(3,-3) I(6,-2) D(5,-5) A(2,-6)



(b) RI $m = \frac{1}{3}$ $\sqrt{10}$ RA $m = \frac{-3}{-1} = 3$ $\sqrt{10}$
AD $m = \frac{1}{3}$ $\sqrt{10}$ DI $= \frac{-3}{1} = 3$ $\sqrt{10}$

(c) RIDA is a rhombus b/c all sides are ≅,
(but b/c slopes are not opp & recip, they are not ⊥, so it's not a rectangle)

(d) Diag: AI $m = \frac{-4}{4} = 1$ $4\sqrt{2}$
RD $m = \frac{-2}{2} = -1$ $2\sqrt{2}$
Diags are ⊥ but NOT ≅

(e) Midpt of AI (4,-4) ... of RD (4,-4) ✓