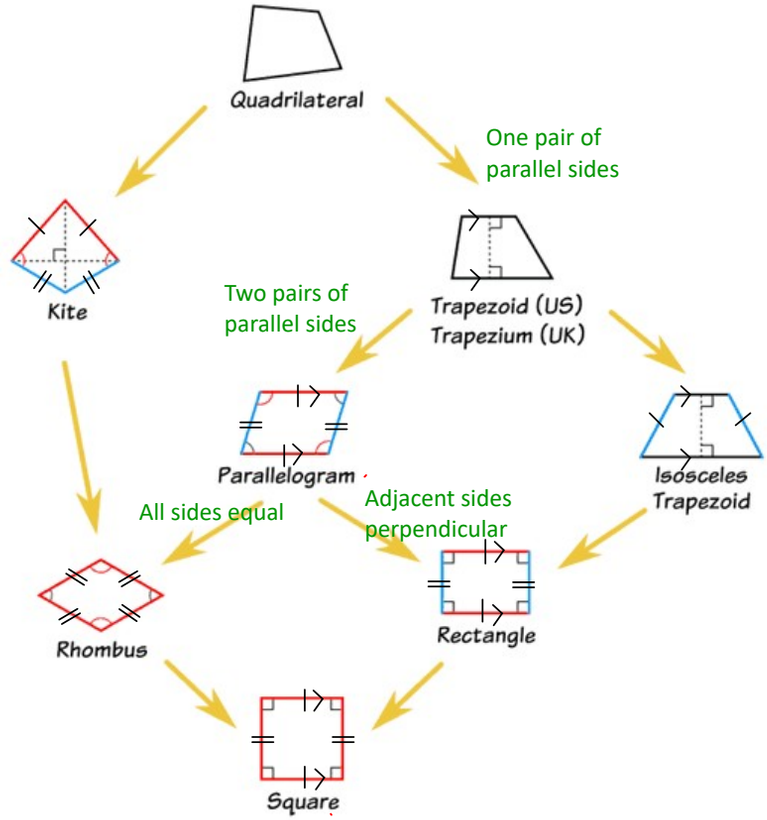
6.5 Verify Properties of Quadrilaterals

Classifying Quadrilaterals:



Mar 8-7:30 AM

Using your formulas for slope, midpoint, and distance,what would you have to do to prove that a quadrilateral is a.....

kite - lengths of all 4 sides, pairs of adjacent sides are equal

trapezoid -slopes of one pair of opposite sides must be equal
For isosceles trapezoid...check that 2 non-parallel sides have equal length

parallelogram -slopes of opposite sides must be equal

rhombus - use distance formula to find all 4 lengths...they must all be equal

square - use distance formula to find all 4 lengths...they must all be equal
- use slope formula to show that we have 2 pairs of equal slopes that are negative reciprocals

rectangle - use distance formula to find all 4 lengths...opposite sides must be equal
- use slope formula to show that we have 2 pairs of equal slopes that are negative reciprocals

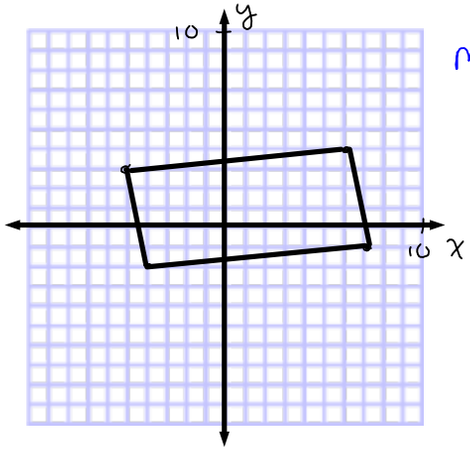
Mar 6-2:10 PM

Ex 1: Classify quadrilateral ABCD defined by: A(-5,3), B(-4,-2), C(7,-1), and D(6,4).

Note: Make sure you connect the vertices in order....A is attached to B...B to C, C to D and D to A but they do not always need to be in alphabetical order.

A B

D C



$m_{AB} = -5$ $m_{BC} = \frac{1}{11}$ $m_{CD} = -5$ $m_{DA} = \frac{1}{11}$

GRAPH

$m_{AB} \parallel m_{CD}$ (NOT perpendicular! not negative recip.

$m_{BC} \parallel m_{DA}$

Parallelogram ✓

Rhombus? → Check side lengths...

Length AB

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

$= \sqrt{(-4-(-5))^2+(-2-3)^2}$

$= \sqrt{1+25}$

$= \sqrt{26}$

$\doteq 5.1$

Length BC

$d = \sqrt{122}$

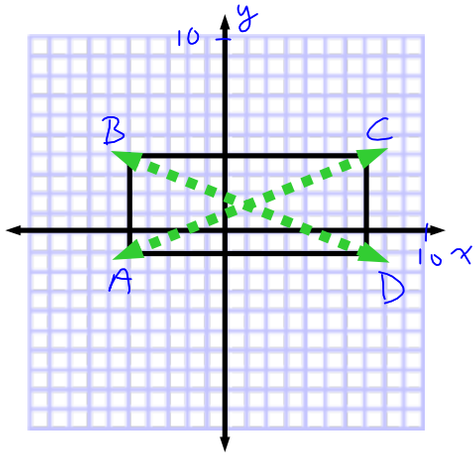
$\doteq 11.0$

Sides not equal!

∴ This is a parallelogram!

Mar 6-2:28 PM

Ex 2: Given rectangle A(-5,-1), B(-5,4), C(7,4) and D(7,-1) draw a sketch of the quadrilateral. Prove that diagonals AC and BD bisect each other.



Do they have the same midpoint?

$M_{AC} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ $M_{BD} = \left(1, \frac{3}{2}\right)$ GRAPH

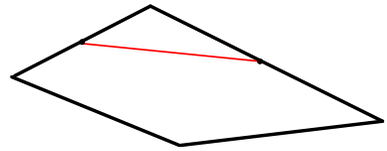
$= \left(\frac{-5+7}{2}, \frac{-1+4}{2}\right)$

$= \left(1, \frac{3}{2}\right)$

$M_{AC} = M_{BD}$

∴ Yes! They bisect each other.

Midsegments: line segments that connect midpoints of adjacent sides.



Ex 3: Show that the midsegments of quadrilateral with vertices P(-5,2), Q(-1,3), R(-2,-1) and S(-6,-2) form a rectangle.

GRAPH

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