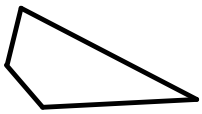
2.9 Investigate Properties of Quadrilaterals

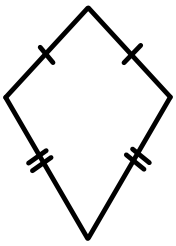
Quadrilaterals

A polygon with 4 sides.



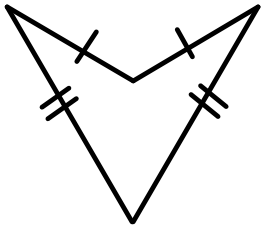
Kite

Pairs of adjacent sides are equal.



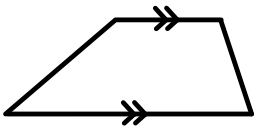
Chevron

Pairs of adjacent sides are equal.
One angle is concave.

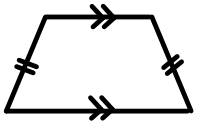


Trapezoid

One pair of parallel sides.



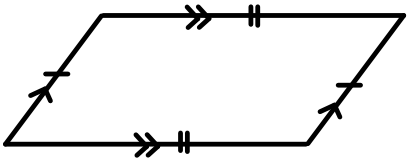
right trapezoid



isosceles trapezoid

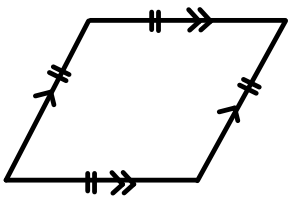
Parallelogram

Both pairs of opposite sides are parallel.
Opposite sides are equal length.



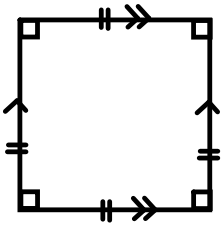
Rhombus

All sides equal length



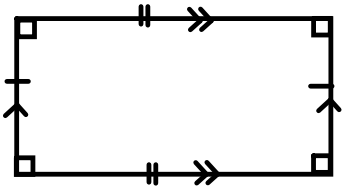
Square

All sides equal.
All angles 90 °.



Rectangle

All angles 90°.

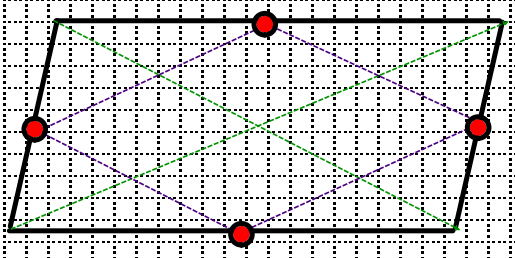


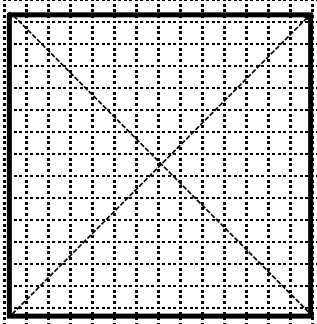
Quadrilaterals- Draw all diagonals and midsegments

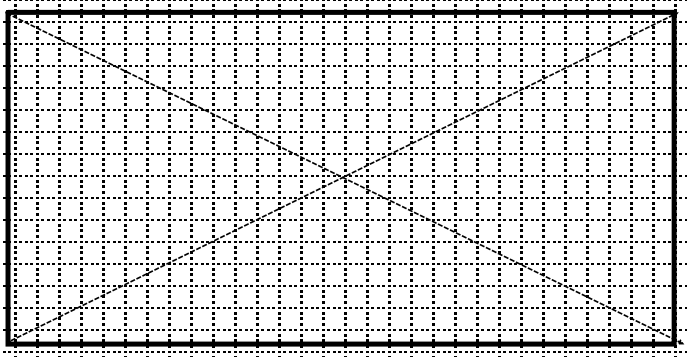
Midpoints

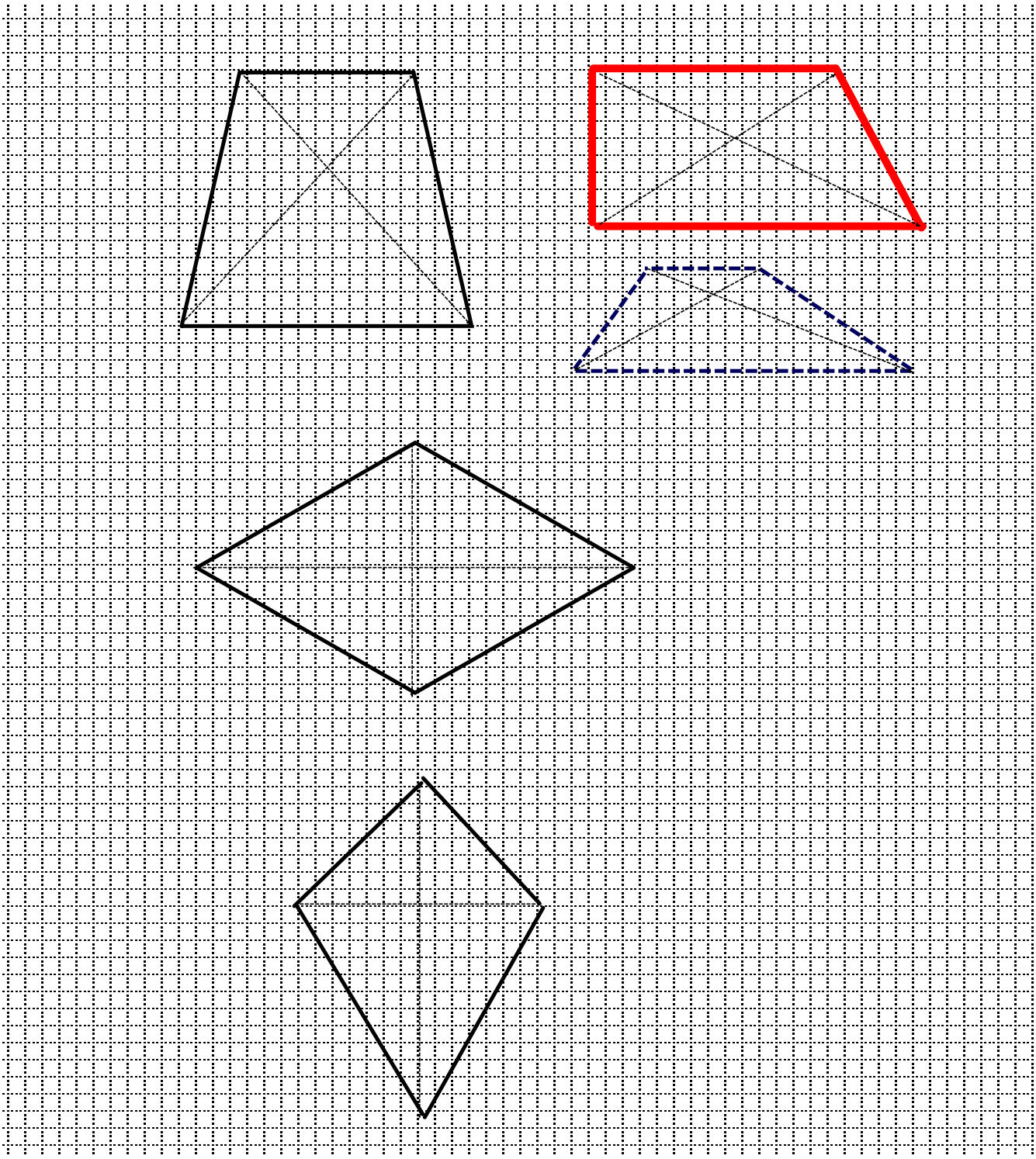
Midsegment

Diagonal









Investigate!

QUADRILATERALS

Diagonals:

- Determine properties of the diagonals of all 6 quadrilaterals:
  - Are the diagonals equal in length?
  - Do the diagonals bisect each other?
  - Do the diagonals intersect at a right angle?

Midsegments (join adjacent midpoints)

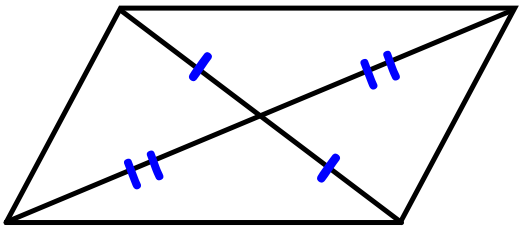
- Mark the midpoint of each side.
- Draw the midsegments of a quadrilateral.
- What shape do the midsegments make?

Trapezoid

- Fold it in half so that the parallel sides line up.
- What do you notice about the fold line?
- How does the length of the fold line compare to the lengths of the parallel sides?
- How could you draw the fold line without folding?

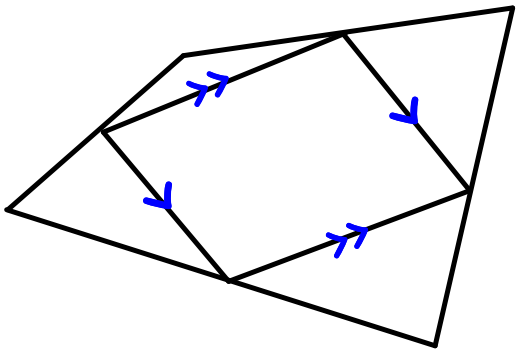
Conclusions for Diagonal Properties:

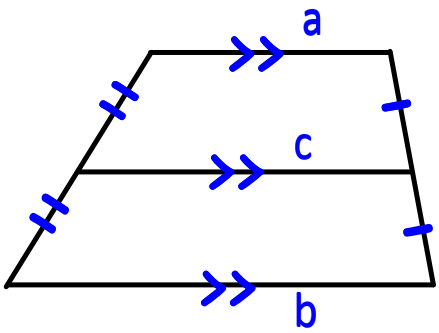
Shape	Equal Lengths?	Perpendicular?	Bisect Each Other?
Square	Yes		
Rectangle			
Parallelogram			
Rhombus			
Trapezoid			
Kite			



The diagonals of a parallelogram _____ each other.

The midsegments of any quadrilateral form a _____.





The line joining the midpoints of the non-parallel sides of a trapezoid is _____ to the parallel sides.

Its length is the _____ of the lengths of the two parallel sides.

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

kite	
trapezoid	
parallelogram	
rhombus	
square	
rectangle	

Attachments

2.9 diagonals of parallelogram.gsp

2.9 Varignon Parallelogram.gsp

2.9 Midsegment of Trapezoid.gsp