

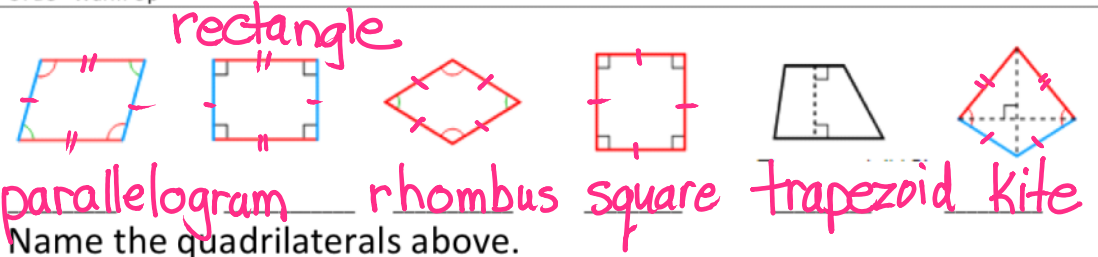
U7D5_T_Midpoints Diagonals Quadrilaterals (short)

Monday, May 7, 2018 12:59 PM



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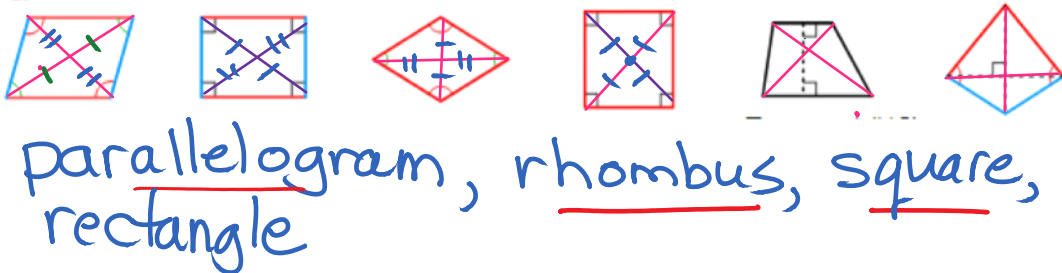
U7D5 Warm Up



Name the quadrilaterals above.

Using the diagrams (and geogebra if needed) explore the answers to the following questions:

- Which of the quadrilaterals above would have diagonals that bisect each other?



- Which of the quadrilaterals above would have diagonals that are perpendicular?

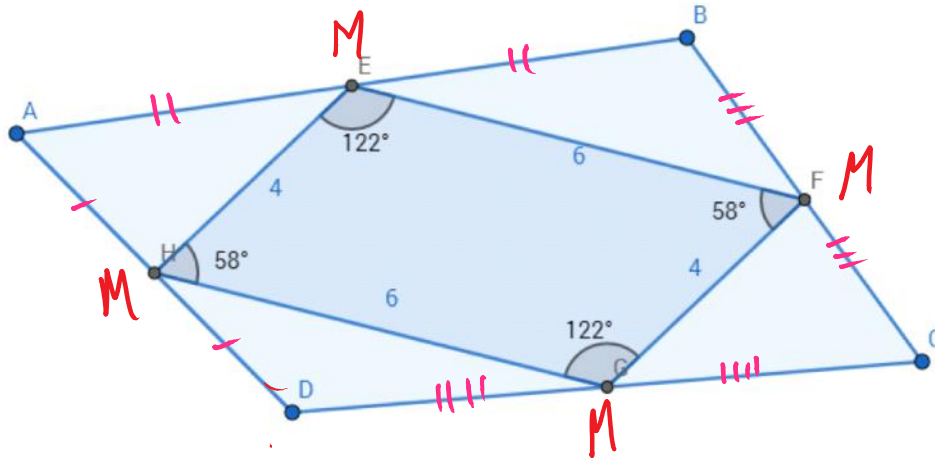
rhombus, square, kite

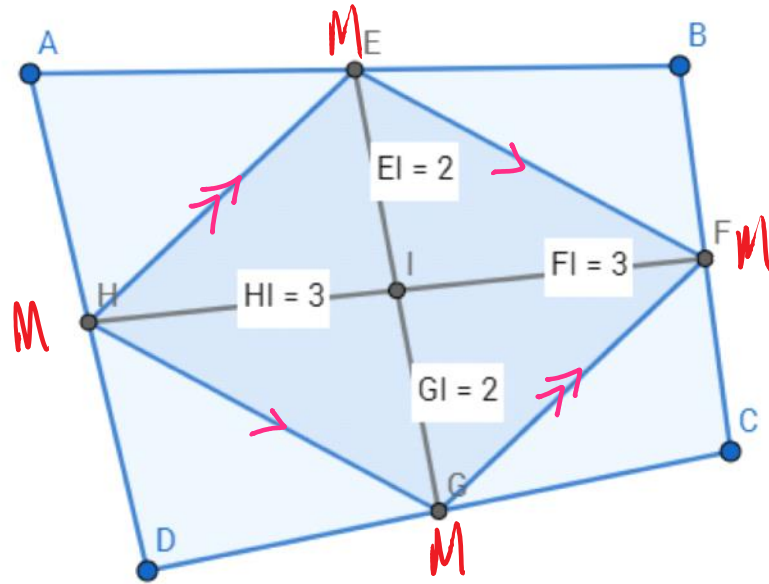
- Therefore, which quadrilaterals would have diagonals that are considered perpendicular bisectors (both bisect each other and intersect at 90° angles)?

rhombus, square

SUMMARY:

1. Joining the midpoints of the sides of any quadrilateral produces a parallelogram.





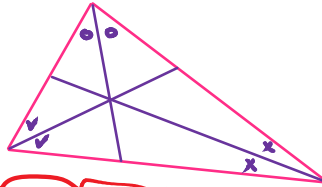
2. The diagonals of a parallelogram bisect each other.

Examples:

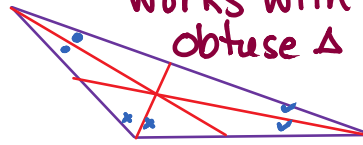
1. a.) Investigate whether the lines that bisect the angles of a triangle always intersect at a single point.

Describe your findings. • do NOT need to know this

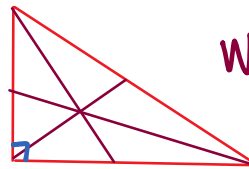
Works with acute Δ



Works with obtuse Δ



Angle bisectors appear to intersect at one point.

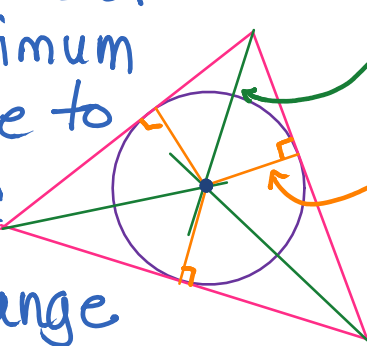


Works with right Δ

The intersection point is called the "incentre"

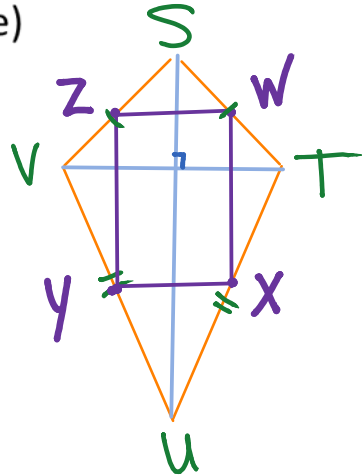
b.) Draw a triangle in which the angle bisectors intersect at a single point. Can you draw a circle that has this point as its centre and intersects the triangle at exactly three points? If so, describe the properties of the circle.

The radius of the circle is the minimum distance to each side of the triangle



'angle bisector'
'minimum' distance hits side at a right angle.

- 2.a) Draw a quadrilateral STUV with $ST = SV$ and $UT = UV$.
(A Kite)



- b.) At what angle do the diagonals of the quadrilateral intersect? 90°

- c.) Join the midpoints of the sides of the quadrilateral to form a smaller quadrilateral WXYZ. What type of quadrilateral is WXYZ?

WXYZ is a rectangle.

- d.) Make a conjecture about how the area of WXYZ is related to the area of STUV.

$$|WXYZ| = \frac{1}{2} |STUV|$$