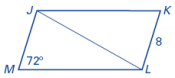
6.3 Showing Quadrilaterals are Parallelograms

Goal: To be able to show that a quadrilateral is a parallelogram

Warm up

***JKLM* is a parallelogram.**

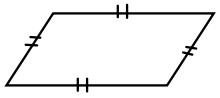


1. Find JM.
2. Find the measure of $\angle K$.
3. Find the measure of $\angle MJK$.
4. If $ML = 14$, find JK.
5. Suppose $\overline{MK}$ is added to the diagram, with the point of intersection with $\overline{JL}$ labeled as point Q. What can you conclude about $\overline{JQ}$ and $\overline{LQ}$?

Dec 9-7:10 PM

Ways to prove that a quadrilateral is a parallelogram:

1) If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.



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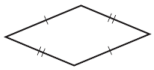
Use Opposite Sides

Tell whether the quadrilateral is a parallelogram. Explain your reasoning.

a. 

b. 

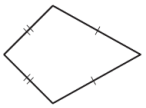
SOLUTION

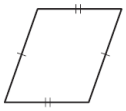
a. The quadrilateral is a parallelogram because both pairs of opposite sides are congruent.

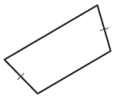
b. The quadrilateral is not a parallelogram. Both pairs of opposite sides are not congruent.

Dec 9-7:31 PM

Tell whether the quadrilateral is a parallelogram. Explain your reasoning.

1. 

2. 

3. 

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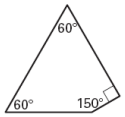
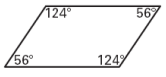
2) If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

Jan 10-9:42 PM

Use Opposite Angles

Tell whether the quadrilateral is a parallelogram. Explain your reasoning.

a. 

b. 

SOLUTION

a. The quadrilateral is not a parallelogram. Both pairs of opposite angles are not congruent.

b. The quadrilateral is a parallelogram because both pairs of opposite angles are congruent.

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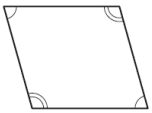
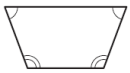
Tell whether the quadrilateral is a parallelogram. Explain your reasoning.

4. 

5. 

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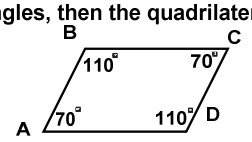
3) If an angle of a quadrilateral is supplementary to both of its consecutive angles, then the quadrilateral is a parallelogram.

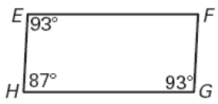


$m\angle A + m\angle B = 180^\circ$ and $m\angle A + m\angle D = 180^\circ$

$m\angle B + m\angle C = 180^\circ$ and $m\angle C + m\angle D = 180^\circ$

Dec 9-7:33 PM

Tell whether the quadrilateral is a parallelogram. Explain your reasoning.



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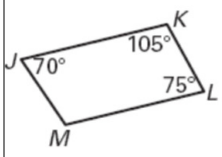
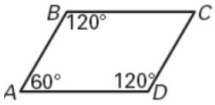
Tell whether the quadrilateral is a parallelogram. Explain your reasoning.





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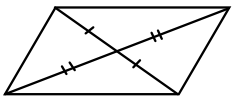
4) If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.



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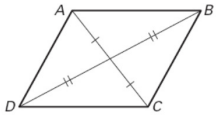
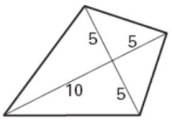
Tell whether the quadrilateral is a parallelogram. Explain your reasoning.





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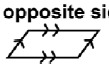
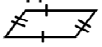
Summary

In order prove that a quadrilateral is a parallelogram, show <u>one</u> of the following:

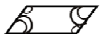
that both pairs of opposite sides are parallel



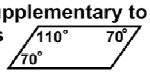
that both pairs of opposite sides are congruent



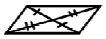
that both pairs of opposite angles are congruent



that one angle is supplementary to both of its consecutive angles



that the diagonals bisect each other.



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