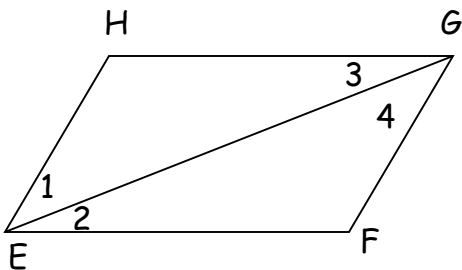


Definition: A parallelogram is a _____

This is one way to prove that a parallelogram exists.

Theorem 5-1: _____

Proof:



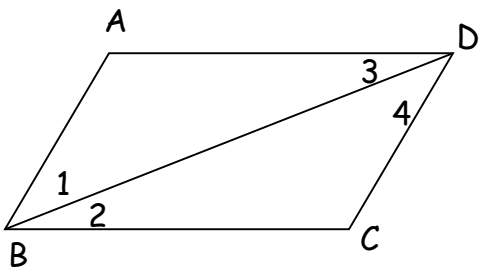
1. HGEF is a parallelogram
2. $GH \parallel EF$; $EH \parallel FG$
2. _____
4. _____
5. Δ _____ \cong Δ _____
6. $HG \cong EF$; $HE \cong GF$

1. Given
2. _____
3. If two parallel lines are cut by a transversal, then alternate interior angles are congruent.
4. _____
5. _____
6. _____

Converse of Theorem 5-4: _____

~This is a way to prove that a parallelogram exists.

Theorem 5-2: _____



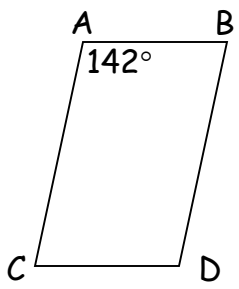
1. ABCD is a parallelogram
2. _____
3. _____
4. _____
5. Δ _____ \cong Δ _____
6. $\angle A \cong \angle C$

1. Given
2. Definition of a _____
3. _____
4. _____
5. _____
6. _____

Converse of Theorem 5-6: _____

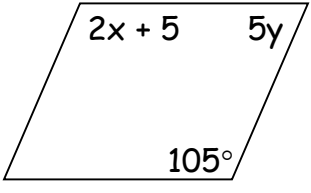
~ This is a way to prove that a parallelogram exists.

Example 1: (all figures are parallelograms)



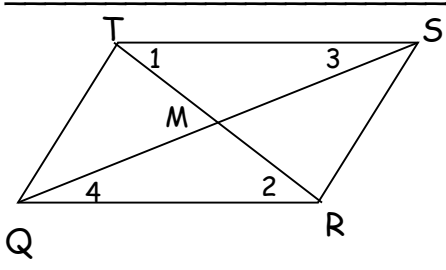
$m\angle B = \underline{\hspace{2cm}}$
 $m\angle C = \underline{\hspace{2cm}}$
 $m\angle D = \underline{\hspace{2cm}}$
 $m\angle A + m\angle B = \underline{\hspace{2cm}}$
 $m\angle A + m\angle B + m\angle C + m\angle D = \underline{\hspace{2cm}}$

Example 2:



$x = \underline{\hspace{2cm}}$
 $y = \underline{\hspace{2cm}}$

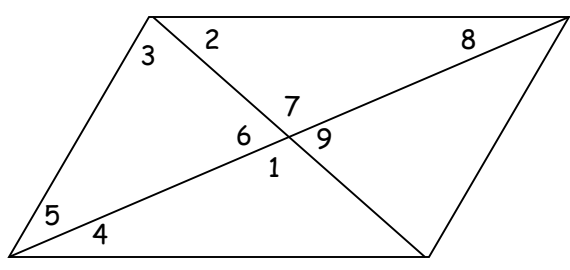
Theorem 5-3: _____



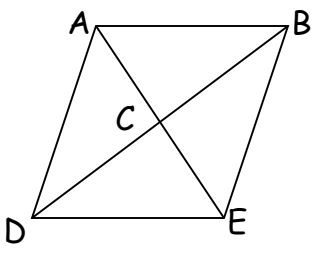
Converse of Theorem 5-7: _____

~This is one way to prove that a parallelogram exists.

Examples (all figures are parallelograms):



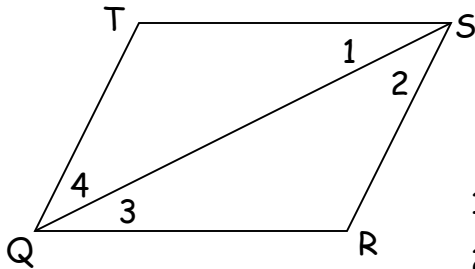
$m\angle 1 = \underline{\hspace{2cm}}$ $m\angle 2 = \underline{\hspace{2cm}}$ $m\angle 3 = \underline{\hspace{2cm}}$
 $m\angle 4 = \underline{\hspace{2cm}}$ $m\angle 5 = \underline{\hspace{2cm}}$ $m\angle 6 = \underline{\hspace{2cm}}$
 $m\angle 7 = \underline{\hspace{2cm}}$ $m\angle 8 = \underline{\hspace{2cm}}$ $m\angle 9 = \underline{\hspace{2cm}}$



$AC = 3x - 1$
 $CE = \frac{1}{2}x + 9$
 $CD = \frac{3}{4}y$
 $CB = y - 4$

$x = \underline{\hspace{2cm}}$ $AC = \underline{\hspace{2cm}}$ $CE = \underline{\hspace{2cm}}$ $AE = \underline{\hspace{2cm}}$
 $y = \underline{\hspace{2cm}}$ $CD = \underline{\hspace{2cm}}$ $CB = \underline{\hspace{2cm}}$ $DB = \underline{\hspace{2cm}}$

Theorem 5-5: _____



Given: $TS \cong QR$; $TS \parallel QR$

Prove: $TSRQ$ is a parallelogram

Hint: The definition of a parallelogram is a quadrilateral with both pair of opposite parallel sides. If you prove that both $TS \parallel QR$ and $TQ \parallel SR$, then you can say it is a parallelogram, based on the definition of a parallelogram.

1. $TS \cong RQ$; $TS \parallel RQ$

2. $\angle 1 \cong \angle 3$

3. _____

4. _____

5. $\angle 4 \cong \angle 2$

6. _____

7. $TSRQ$ is a parallelogram

1. Given

2. If two parallel lines are cut by a transversal, then alternate interior angles are congruent.

3. _____

4. _____

5. _____

6. If two lines are cut by a transversal and alternate interior angles are congruent, then the lines are parallel.

7. Definition of a parallelogram

Review - Name the five ways to prove that a quadrilateral is a parallelogram.

1. If _____, then the quadrilateral is a parallelogram.

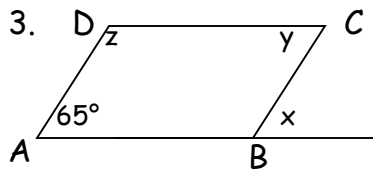
2. If _____, then the quadrilateral is a parallelogram.

3. If _____, then the quadrilateral is a parallelogram.

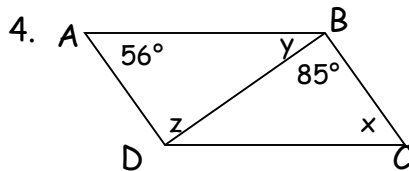
4. If _____, then the quadrilateral is a parallelogram.

5. If _____, then the quadrilateral is a parallelogram.

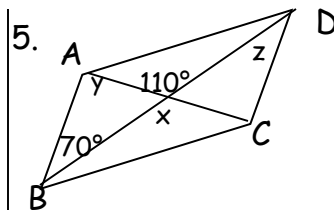
In exercises 3-5 quadrilateral ABCD is a parallelogram. Find the values of x, y, and z.



x = _____
y = _____
z = _____

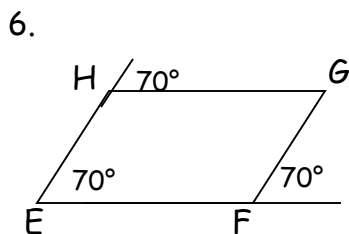


x = _____
y = _____
z = _____

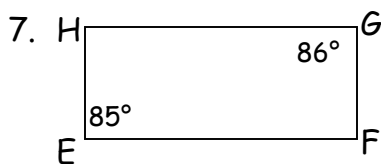


x = _____
y = _____
z = _____

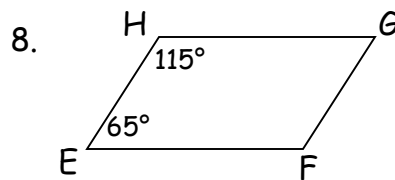
Is quadrilateral EFGH definitely a parallelogram? Explain.



Yes/No _____
Why: _____



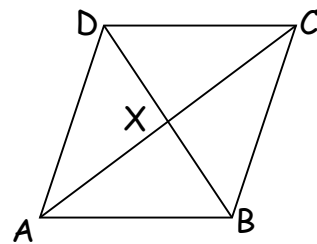
Yes/No _____
Why: _____



Yes/No _____
Why: _____

ABCD is a parallelogram. Name the theorem or definition that justifies each statement.

9. $AD \parallel BC$ _____
10. $\angle ADX \cong \angle CBX$ _____
11. $m\angle ABC = m\angle CDA$ _____
12. $AD \cong BC$ _____
13. $AX = \frac{1}{2}AC$ _____
14. $DX = BX$ _____



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1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

7. _____
8. _____
9. _____