

Geometry CC - Unit 9
Lesson 7: Rectangles
M1 L28

1. Given: $\overline{LI} \parallel \overline{UD}$,
 $\triangle LIU$ is isosceles,
 $\triangle IUD$ is isosceles.
Prove: $LUDI$ is a parallelogram.

S	R
① $\overline{LI} \parallel \overline{UD}$	① given
② $\triangle LIU$ is isosc.	② given
③ $\triangle IUD$ is isosc.	③ given
④ $\overline{LI} \cong \overline{IU}$; $\overline{IU} \cong \overline{UD}$	④ in an isosc. \triangle the legs are \cong
⑤ $\overline{LI} \cong \overline{UD}$	⑤ Subst. Property
⑥ $LUDI$ is a \parallel gram	⑥ $LUDI$ is a quad w/ one pair of opp. sides that are \parallel and \cong

2. Given: $ABCD$ is a parallelogram
Prove: $\triangle ABD \cong \triangle CDB$

S	R
① $ABCD$ is a \parallel gram	① given
② $AD \cong CB$; $AB \cong CD$	② In a \parallel gram, opp. sides are \cong
③ $BD \cong DB$	③ Reflexive Prop.
④ $\triangle ABD \cong \triangle CDB$	④ SSS \cong SSS

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3. Given: E is the midpoint of \overline{AC} and \overline{DB} .
Prove: $ABCD$ is a parallelogram.

S	R
① E is the midpoint of \overline{AC} and \overline{DB}	① given
② $AE \cong CE$; $BE \cong DE$	② a point divides a segment into 2 \cong segments
③ $ABCD$ is a \parallel gram	③ $ABCD$ is a quad whose diagonals bisect each other.

4. Given: $\angle 1 \cong \angle 2$,
 $\angle 3 \cong \angle 4$
Prove: $JOEY$ is a parallelogram

S	R
① $\angle 1 \cong \angle 2$	① given
② $\angle 3 \cong \angle 4$	② given
③ $JO \parallel EY$ and $JY \parallel EO$	③ If \angle then \parallel
④ $JOEY$ is a \parallel gram	④ $JOEY$ is a quad whose opp. sides are parallel.

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DO NOW:

List the five properties of a PARALLELOGRAM:

- Opposite sides are parallel
- Opposite sides are congruent
- Opposite angles are congruent
- Consecutive angles are supplementary
- Diagonals bisect each other

To prove that a quadrilateral is a parallelogram:

- Show that the quadrilateral has any one of the 5 properties.
- Or show that one pair of opposite sides are both Parallel AND Congruent

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What is a Rectangle?

- A rectangle has all of the properties of a parallelogram
- A rectangle contains one (and therefore 4) right angles
- The diagonals of a rectangle are congruent

To prove that a quadrilateral is a rectangle:

- First, show that the quadrilateral is a parallelogram
- Next, show that it has any one of the other properties of a rectangle.

Family of Quadrilaterals

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    Quad
    /  \
  Trapezoid  Isosc. Trapezoid
   /  \
  parallelogram
 /  \
rectangle rhombus
 /  \
  square
    
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1. Circle the person who is correct:

Dan: "If you are a rectangle, then you are automatically a parallelogram."
Nicole: "If you are a rectangle, then you can't be a parallelogram."

2. In rectangle $ABCD$, the diagonals meet at E . If $CB = 6$, $AB = 8$, $AC = 10$, find the missing lengths:

- $AD = 6$
- $CD = 8$
- $EC = 5$
- $AE = 5$
- $DE = 5$
- $EB = 5$
- $DB = 10$

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4. In parallelogram $ABCD$, diagonals AEC and DEB are drawn. If $AE = 7x - 1$ and $EC = 5x + 5$:

- Find the value of x .
 $7x - 1 = 5x + 5$
 $2x = 6$
 $x = 3$
- Find AC .
 $7(3) - 1 + 5(3) + 5 = 40$
- Find DB , if $DB = 10x + 10$.
 $10(3) + 10 = 40$
- What kind of parallelogram is $ABCD$? Why?
It is a rectangle b/c the diagonals are \cong .

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5. In each rectangle, fill in as many missing angle measures as possible.

a)

b)

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6. Each diagram below shows a rectangle. Fill in as many missing values as possible.

a)

b)

c)

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Rectangle Practice
 Directions: Each quadrilateral below is a rectangle. Find the missing measures.

1. Find $m\angle BCE$.

$7x + 5 = 11x - 3$
 $8 = 4x$
 $x = 2$
 $m\angle BCE = 71$

$11(2) - 3 = 19$

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2. Find $m\angle JHI$.

$m\angle JHI = 3(7) + 2 = 23$

$3x + 2 + 12x - 17 = 90$
 $15x - 15 = 90$
 $15x = 105$
 $x = 7$

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3. Solve for x .

$5x + 7 + 23 = 90$
 $5x + 30 = 90$
 $5x = 60$
 $x = 12$

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