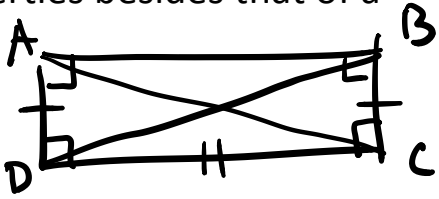
CCSS Goals:
You will use the precise definition of a rectangle and prove its properties.
You will recognize and apply properties of rectangles.
You will determine whether parallelograms are rectangles.
MP 1, 3, 6, 7

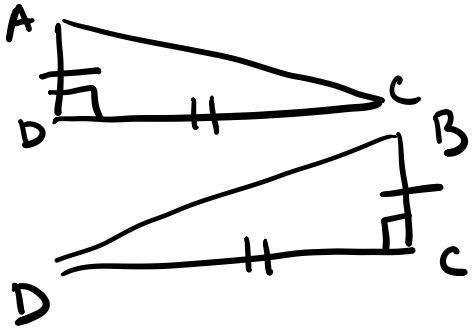
6.4 Rectangles

- Rectangle: a quadrilateral with 4 right ∠'s.

1. Given rectangle ABCD. Prove that rectangle ABCD is a parallelogram. Since all rt. ∠s are ≅, opp ∠'s are ≅, so it is a parallelogram.

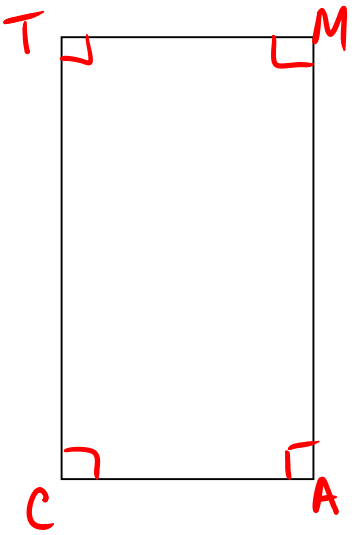
2. Since it is a parallelogram, then it has all of the parallelogram's properties. Look at the quadrilateral checklist and see if you can prove if a rectangle has any other properties besides that of a parallelogram.





rect ABCD	given
$\overline{BC} \cong \overline{AD}$	opp sides ≅ in a rect
$\overline{CD} \cong \overline{CD}$	reflexive
∠ADC, ∠BCD are rt ∠s	def of rect
∠ADC ≅ ∠BCD	all rt ∠s are ≅
△ADC ≅ △BCD	SAS
$\overline{AC} \cong \overline{BD}$	CPCTC

Rectangle Properties	Example
Opposite ∠'s are ≅	$\angle T \cong \angle A$ $\angle M \cong \angle C$
Consecutive ∠'s are supplementary	$m\angle T + m\angle M = 180$ $m\angle M + m\angle A = 180$ $m\angle A + m\angle C = 180$ $m\angle C + m\angle T = 180$
Opposite sides are ≅ & ∥	$\overline{TM} \cong \overline{CA}$ $\overline{TM} \parallel \overline{CA}$ $\overline{TC} \cong \overline{MA}$ $\overline{TC} \parallel \overline{MA}$
Diagonals are ≅ and bisect each other	$\overline{TL} \cong \overline{LA}$ $\overline{ML} \cong \overline{LC}$ $* \overline{TA} \cong \overline{CM}$
All 4 ∠'s are right ∠'s	



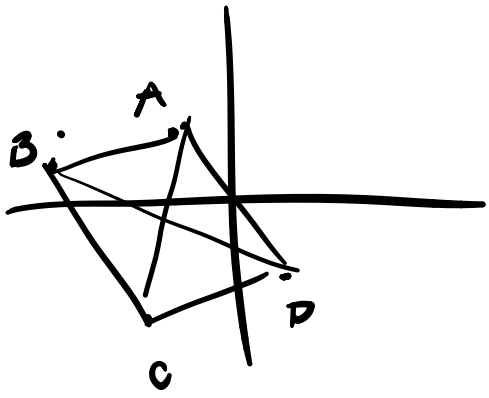
- If the quadrilateral has 4 right angles, then it is a rectangle.
- If the diagonals are ≅, the quadrilateral is a rectangle.

Prove whether or not the following parallelogram is a rectangle:
A(-1,2), B (-4,1), C(-2, -5), D(1, -4)

$BD = 5\sqrt{2}$ $AC = 5\sqrt{2}$ ($\sqrt{25\sqrt{2}}$)

Our diagonals are ≅

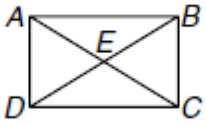
∴ it is a rectangle



or

Slope of BA → 1/3, CD → 1/3, AD → -3, BC → -3
Since the slopes are opp reciprocals, we have 4 rt. ∠s. ∴ it is a rectangle

ABCD is a rectangle.



Ex. 1

If $AC = 2x + 13$ and $DB = 4x - 1$, find x.

$2x + 13 = 4x - 1$

$14 = 2x$

$7 = x$

Ex. 2

If $AE = 3x + 3$ and $EC = 5x - 15$, find AC.

$3x + 3 = 5x - 15$

$18 = 2x$

$9 = x$

$AC = 30 + 30 = 60$

Ex. 3

If $m\angle DAC = 2x + 4$ and $m\angle BAC = 3x + 1$, find x.

$2x + 4 + 3x + 1 = 90$

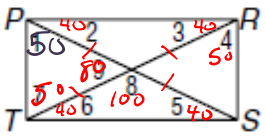
$5x + 5 = 90$

$5x = 85$

$x = 17$

Ex. 4

$PRST$ is a rectangle. Find each measure if $m\angle 1 = 50$.



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Homework:

6.4 pg. 422 #10, 12, 13-19odd, 20, 22, 23, 26-31