

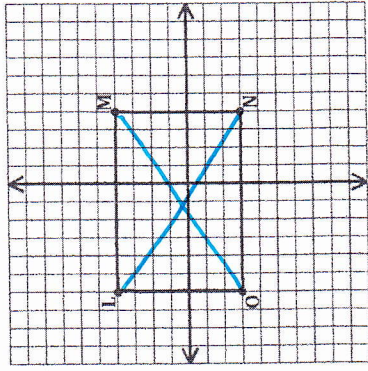
NOTES 7.4: RECTANGLES

Objective: I can use properties of rectangles to find segment lengths & measures.

RECTANGLE: A parallelogram with 4 right & s

Because a rectangle is a special type of parallelogram, it has all of the properties of a parallelogram. However, the diagonals of a rectangle have an additional special relationship.

Name the diagonals of rectangle LMNO:
LN & OM

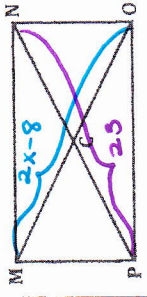


Find the lengths of these diagonals:
 $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

OM: $O(-6, -3) \quad M(4, 4) \quad L(-6, 4) \quad N(4, -3)$
 $OM = \sqrt{(-6-4)^2 + (-3-4)^2} = \sqrt{100+49} = \sqrt{149}$
 $LN = \sqrt{(-6-4)^2 + (4+3)^2} = \sqrt{100+49} = \sqrt{149}$

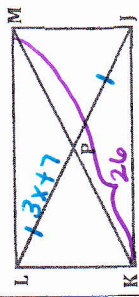
Thus, we can say that if a parallelogram is a rectangle, then its diagonals are congruent.

EXAMPLE 1: Quadrilateral MNOP is a rectangle. $MO = 2x - 8$ and $NP = 23$, find the value of 'x'.



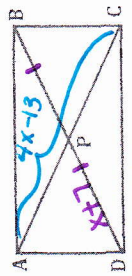
Diagonals are \cong !
 $2x - 8 = 23$
 $2x = 31$
 $x = \frac{31}{2}$

EXAMPLE 2: Quadrilateral JKLM is a rectangle. $LP = 3x + 7$ and $MK = 26$, find the value of 'x'.



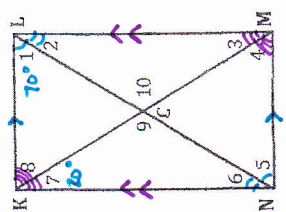
Diagonals are \cong !
 $LJ = MK$
 Diagonals bisect each other!
 $2LP = LJ \quad 2(3x+7) = 26$
 $2LP = MK \quad 6x+14 = 26$
 $x = 2$

EXAMPLE 3: Quadrilateral ABCD is a rectangle. $AC = 4x - 13$ and $DP = x + 7$. Find the value of 'x'.



Diagonals are \cong !
 $AC = DB$
 Diagonals bisect each other!
 $2DP = DB$
 $30, AC = 2DP$
 $4x - 13 = 2(x + 7)$
 $4x - 13 = 2x + 14$
 $2x = 27$
 $x = \frac{27}{2}$

EXAMPLE 4: Use the rectangle KLMN and the given information to find the following.



$m\angle 1 = 70^\circ$
 $m\angle 2 = 20^\circ$
 $m\angle 3 = 20^\circ$
 $m\angle 4 = 70^\circ$
 $m\angle 5 = 70^\circ$
 $m\angle 6 = 20^\circ$
 $m\angle 7 = 20^\circ$
 $m\angle 8 = 70^\circ$
 $m\angle 9 = 140^\circ$
 $m\angle 10 = 140^\circ$

Let's summarize...

A rectangle has the five properties of a parallelogram and two additional properties. They are:

- 1) Opposite sides are \parallel .
- 2) Opposite sides are \cong .
- 3) Opposite \angle s are \cong .
- 4) Consecutive \angle s are supplementary.
- 5) Diagonals bisect each other.
- 6) Diagonals are \cong .
- 7) 4 right \angle s.