

Content Objective: I will be able to apply properties of parallelograms and rectangles to determine the measures of sides, diagonals, and/or angles.

TERM	DESCRIPTION	EXAMPLE
QUADRILATERAL	A closed figure formed by segments intersecting at their endpoints.	
PARALLELOGRAM	A quadrilateral in which opposite sides are <u>parallel & congruent</u> .	
RECTANGLE	A parallelogram with four <u>right</u> angles.	
DIAGONAL	Segment joining <u>opposite</u> vertices in a polygon.	

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EXAMPLE 1: Refer to the figure on the right to identify or name each of the following:

- The four vertices are Q, R, S, T.
- The name of the rectangle is QRST.
- The opposite sides are QR + TS, QT + RS.
- The opposite angles are ∠Q + ∠S, ∠R + ∠T.
- The consecutive angles are ∠T + ∠Q, ∠Q + ∠R, ∠R + ∠S, ∠S + ∠T.
- The diagonals are QS + RT.

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EXAMPLE 2:

- Name the diagonals of rectangle LMNO: LN and MO.
- Use the distance formula to find the lengths of these diagonals:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$LN = \sqrt{(0+6)^2 + (-4+3)^2}$$

$$LN = \sqrt{36+1}$$

$$LN = \sqrt{37}$$

$$MO = \sqrt{(0+6)^2 + (4+3)^2}$$

$$MO = \sqrt{36+49}$$

$$MO = \sqrt{85}$$

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The diagonals of a rectangle are congruent.

Label the figure to represent each of the properties listed below:

PROPERTIES OF RECTANGLES

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

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For Examples # 3 – 5, set up and solve an equation to determine the value of x.

EXAMPLE 3: Quadrilateral MNOP is a rectangle. $MO = 2x - 8$ and $NP = 23$.

$$2x - 8 = 23$$

$$2x = 31$$

$$x = 15.5$$

QUICK CHECK: Quadrilateral QRST is a rectangle. $QS = 3x - 2$ and $RT = 48 - 2x$.

$$3x - 2 = 48 - 2x$$

$$5x = 50$$

$$x = 10$$

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EXAMPLE 4: Quadrilateral ABCD is a rectangle. $AC = 4x - 13$ and $DP = x + 7$.

$$4x - 13 = 2(x + 7)$$

$$4x - 13 = 2x + 14$$

$$2x = 27$$

$$x = 13.5$$

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Notes: RECTANGLES

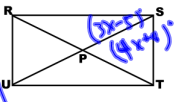
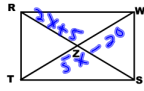
QUICK CHECK: Quadrilateral RWST is a rectangle. If $RZ = 2x + 5$ and $TW = 5x - 20$.

$2(2x+5) = 5x-20$
 $4x+10 = 5x-20$
 $30 = x$

$x = 30$

EXAMPLE 5: Quadrilateral RSTU is a rectangle. If $m\angle RSU = (3x - 5)^\circ$ and $m\angle UST = (4x + 4)^\circ$.

$3x-5 + 4x+4 = 90$
 $7x-1 = 90$
 $7x = 91$
 $x = 13$



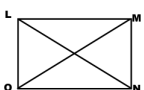
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$x =$

QUICK CHECK: Quadrilateral LMNO is a rectangle. If $\angle LMN = (11x + 35)^\circ$.

$11x+35 = 90$

$x = 5$



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