

Name: _____ Date: _____

Introduction to Quadrilaterals NOTES - #1

A **parallelogram** is a quadrilateral (4 sides) whose opposite sides are **parallel**.

Property 1: Opposite sides of parallelograms are congruent.

Use this property to solve for x in each example. (Congruent means the same...what do we do when things are the same?)

1)

$$7 = 6x + 1$$

$$\begin{array}{r} -1 \\ \hline 6 = 6x \\ \frac{6}{6} = \frac{6x}{6} \\ \hline x = 1 \end{array}$$

2)

$$24 = 5x + 4$$

$$\begin{array}{r} -4 \\ \hline 20 = 5x \\ \frac{20}{5} = \frac{5x}{5} \\ \hline x = 4 \end{array}$$

3)

$$2x - 2 = x + 7$$

$$\begin{array}{r} -x \\ \hline x - 2 = 7 \\ +2 \\ \hline x = 9 \end{array}$$

4)

$$2x + 3 = x + 9$$

$$\begin{array}{r} -x \\ \hline x + 3 = 9 \\ -3 \\ \hline x = 6 \end{array}$$

Property 2: Opposite angles are congruent.

Use this property to solve for x in each example.

1)

$$42 = 2x + 42$$

$$\begin{array}{r} -42 \\ \hline 0 = 2x \\ \frac{0}{2} = \frac{2x}{2} \\ \hline 0 = x \end{array}$$

2)

$$61 = 13x - 4$$

$$\begin{array}{r} +4 \\ \hline 65 = 13x \\ \frac{65}{13} = \frac{13x}{13} \\ \hline 5 = x \end{array}$$

3)

$$4x - 8 = 36$$

$$\begin{array}{r} +8 \\ \hline 44 = 4x \\ \frac{44}{4} = \frac{4x}{4} \\ \hline x = 11 \end{array}$$

4)

$$96 = 7x + 12$$

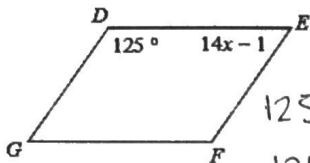
$$\begin{array}{r} -12 \\ \hline 84 = 7x \\ \frac{84}{7} = \frac{7x}{7} \\ \hline 12 = x \end{array}$$

Property 3: Consecutive angles (the angles next to each other) are supplementary.

(angle + angle = 180)

Use this property to solve for x in each example.

1)

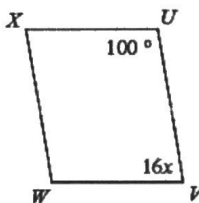


$$125 + 14x - 1 = 180$$

$$\begin{array}{r} 124 + 14x = 180 \\ -124 \quad -124 \\ \hline 14x = 56 \\ \frac{14x}{14} = \frac{56}{14} \end{array}$$

$x = 4$

2)



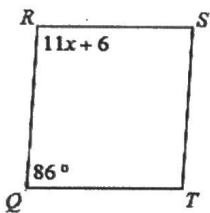
$$100 + 16x = 180$$

$$\begin{array}{r} -100 \quad -100 \\ \hline 16x = 80 \end{array}$$

$16x = 80$

$x = 5$

3)



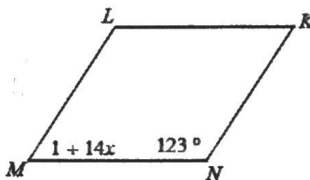
$$86 + 11x + 6 = 180$$

$$\begin{array}{r} 92 + 11x = 180 \\ -92 \quad -92 \\ \hline 11x = 88 \end{array}$$

$x = 8$

$\frac{11x}{11} = \frac{88}{11}$

4)



$$1 + 14x + 123 = 180$$

$$\begin{array}{r} 14x + 124 = 180 \\ -124 \quad -124 \\ \hline 14x = 56 \end{array}$$

$\frac{14x}{14} = \frac{56}{14}$

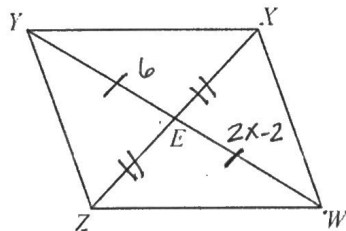
$x = 4$

Property 4:

Diagonals (the lines that connect opposite angles) bisect each other (cut in half!).

Example:

$YE = 6$
 $EW = 2x - 2$



$$6 = 2x - 2$$

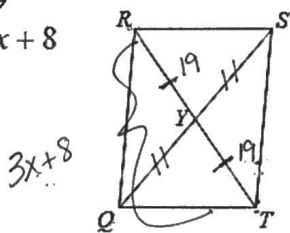
$$\begin{array}{r} +2 \quad +2 \\ \hline 8 = 2x \\ \frac{8}{2} = \frac{2x}{2} \end{array}$$

$x = 4$

Use the property to solve for x in each example:

1) $YT = 19$

$RT = 3x + 8$



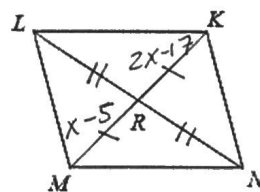
$2(19) = 3x + 8$

$$\begin{array}{r} 38 = 3x + 8 \\ -8 \quad -8 \\ \hline 30 = 3x \\ \frac{30}{3} = \frac{3x}{3} \end{array}$$

$x = 10$

2) $MR = x - 5$

$RK = 2x - 17$



$$x - 5 = 2x - 17$$

$$\begin{array}{r} -x \quad -x \\ \hline -5 = x - 14 \\ +14 \quad +14 \\ \hline 9 = x \end{array}$$

$x = 9$