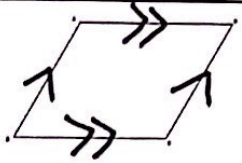
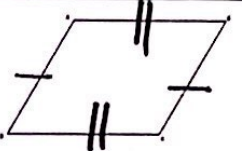
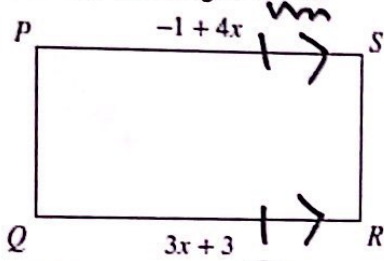


GUIDED NOTES: Properties of Parallelograms

Sides	A parallelogram is a quadrilateral with both pairs of opposite sides parallel. <i>defn of \square</i>	
	If a quadrilateral is a parallelogram, the 2 pairs of opposite sides are congruent.	

EX1. Solve for the length of PS.

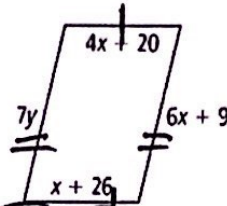


$$\begin{aligned} \cancel{-1} + 4x &= \cancel{3x} + 3 \\ +1 - 3x & \quad -3x + 1 \end{aligned}$$

$$x = 4$$

$$-1 + 4(4) = \boxed{15}$$

EX2. Solve for x and y.



$$\begin{aligned} 4x + 20 &= x + 26 \\ -x - 20 & \quad -x - 20 \end{aligned}$$

$$3x = 6$$

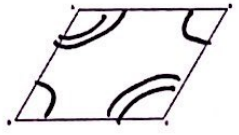
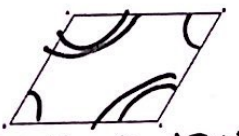
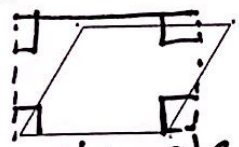
$$x = 2$$

$$7y = 6x + 9$$

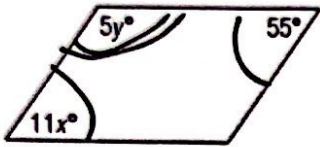
$$7y = 6(2) + 9$$

$$7y = 21$$

$$y = 3$$

Angles	If a quadrilateral is a parallelogram, the 2 pairs of opposite angles are congruent.	
	If a quadrilateral is a parallelogram, the consecutive angles are supplementary.	 <i>big + small = 180°</i>
	If a quadrilateral is a parallelogram and one angle is a right angle, then all angles are right angles.	 <i>*rectangle</i>

EX3. Solve for x.



$$11x = 55$$

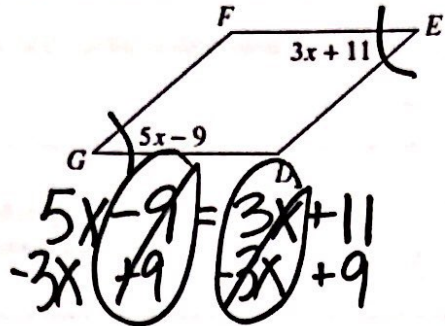
$$x = 5$$

$$11x + 5y = 180$$

$$\begin{array}{r} 11(5) + 5y = 180 \\ -55 \\ \hline 5y = 125 \end{array}$$

$$y = 25$$

EX4. Find the measure of $\angle FED$.



$$5x - 9 = 3x + 11$$

$$\begin{array}{r} 5x - 9 = 3x + 11 \\ -3x \quad +9 \quad -3x \quad +9 \\ \hline 2x = 20 \end{array}$$

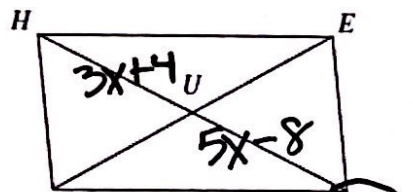
$$\frac{2x}{2} = \frac{20}{2}$$

$$x = 10$$

$$3(10) + 11 = 41^\circ$$

Diagonals	If a quadrilateral is a parallelogram, the diagonals bisect each other.	
	If a quadrilateral is a parallelogram, the diagonals form two congruent triangles.	

EX5. Given $UH = 3x + 4$ and $UF = 5x - 8$, solve for x.

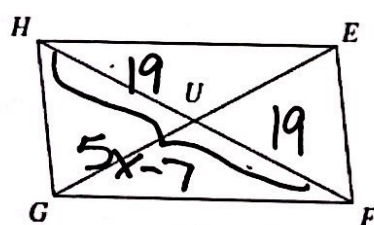


$$3x + 4 = 5x - 8$$

$$\begin{array}{r} 3x + 4 = 5x - 8 \\ -3x \quad +8 \quad -3x \quad +8 \\ \hline 12 = 2x \end{array}$$

$$x = 6$$

EX6. Given $UH = 19$ and $FH = 5x - 7$, solve for x.



$$19 + 19 = 5x - 7$$

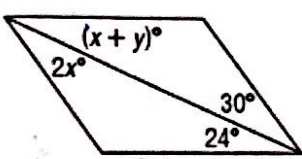
$$38 = 5x - 7$$

$$+7$$

$$45 = 5x$$

$$x = 9$$

EX7. Solve for x and y.



$$2x = 30$$

$$x = 15$$

$$x + y = 24$$

$$15 + y = 24$$

$$y = 9$$

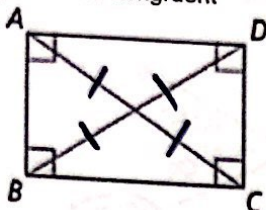
GUIDED NOTES: Properties of Rectangles, Rhombus, and Squares

Rectangle

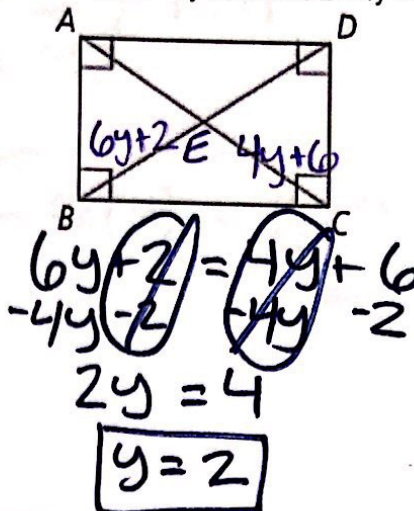
A rectangle is a parallelogram with four right angles.

A rectangle has all the properties of a parallelogram PLUS:

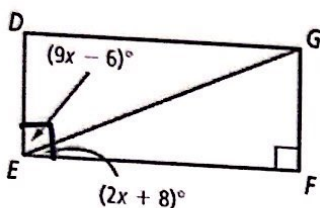
- 4 right angles
- Diagonals are congruent



EX1: $\square ABCD$ is a rectangle whose diagonals intersect at point E. If $BE = 6y + 2$ and $CE = 4y + 6$, find y.

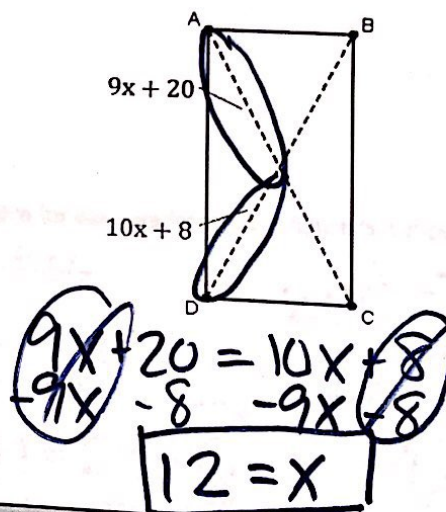


EX2: Solve for x if $\square DGFE$ is a rectangle.



$$\begin{aligned}
 9x - 6 + 2x + 8 &= 90 \\
 11x + 2 &= 90 \\
 -2 & \quad -2 \\
 \hline
 11x &= 88 \\
 \boxed{x} &= 8
 \end{aligned}$$

EX3: Find the value of x given rectangle ABCD below.

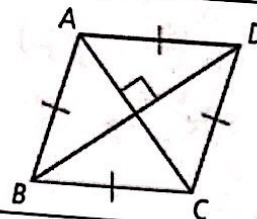


Rhombus

A rhombus is a parallelogram with four congruent sides.

A rhombus has all the properties of a parallelogram PLUS:

- 4 congruent sides
- Diagonals bisect angles
- Diagonals are perpendicular



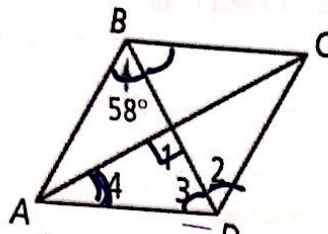
EX4: If $\square ABCD$ is a rhombus, find $m\angle 1$, $m\angle 2$, $m\angle 3$, and $m\angle 4$.

$$m\angle 1 = 90^\circ$$

$$m\angle 2 = 58^\circ$$

$$m\angle 3 = 58^\circ$$

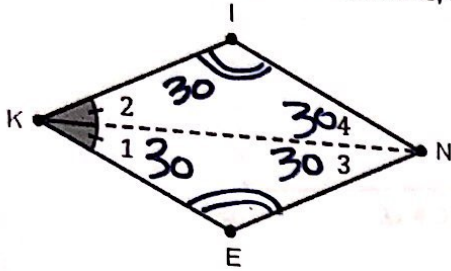
$$m\angle 4 = 32^\circ$$



$$180 = 90 + 58 + \angle 4$$

$$m\angle 4 = 32$$

EX5: If The following figure is a rhombus, and $m\angle 2$ is 30° , what is the $m\angle E$?



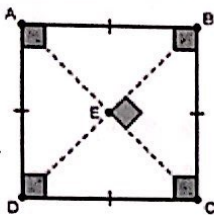
$$360 - 30(4) = \frac{240}{2} = \boxed{120^\circ}$$

Square

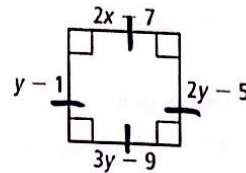
A square is a parallelogram with four congruent sides and four right angles.

A square has all the properties of a parallelogram PLUS:

- All the properties of a rectangle
- All the properties of a rhombus



EX6: Solve for each variable if the figure is a rhombus.



$$2(x-7) = 3(4) - 9$$

$$2x - 7 = 12 - 9$$

$$2x - 7 = 3$$

$$2x = 10$$

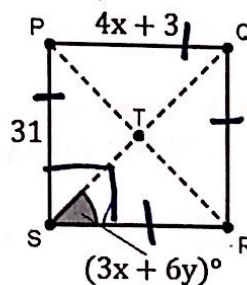
$$\boxed{x = 5}$$

$$y+1 = 2y-5$$

$$-y+5 = -y+5$$

$$\boxed{y = 4}$$

EX7: What must the value of y be in order for rhombus PQRS to be a square?



$$4x + 3 = 31$$

$$4x = 28$$

$$x = 7$$

$$3(7) + 6y = 90$$

$$\frac{21}{2} + 3y = 45$$

$$21 + 6y = 90$$

$$-21 \quad 6y = 69$$

$$y = 11.5$$

$$\boxed{y = 11.5}$$