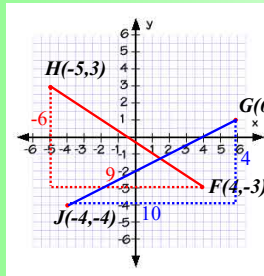


Unit 5.4 - Properties of Parallelograms

Mental Floss: Mon, Jan 31st



Find the distance between points **H and F** and points **G and J**. Leave your answer in radical form (square root).

Hint: Use the distance formula!

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

$$D = \sqrt{(Run)^2 + (Rise)^2}$$

Answers

\overline{HF}	\overline{JG}
$\sqrt{(-6)^2 + 9^2}$	$\sqrt{10^2 + 5^2}$
$\sqrt{117}$	$\sqrt{125}$



Diagonal = Segment connecting 2 non-adjacent vertices

Opposite Angles = Angles across from each other in a quadrilateral. They do not share any common sides.

1 and 3, 2 and 4

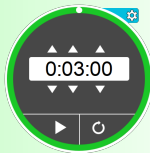
Consecutive Angles = Angles next to each other in a quadrilateral. They share one common side.

1 and 2, 2 and 3, 3 and 4, 4 and 1

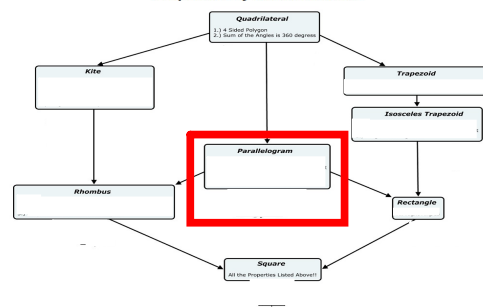
Different types of 4-sided polygons

1. Quadrilateral
2. Kite
3. Trapezoid
4. Isosceles Trapezoid
5. Parallelogram
6. Rhombus
7. Rectangle
8. Square

How many can you come up with?



Properties of Quadrilaterals



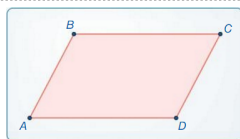
Parallelogram Properties Exploration

(Activities - Parallelogram Exploration Image - Student Copy)

- Using a ruler, measure the lengths of all 4 sides.
- Using a protractor, measure all 4 angles.
- Draw the 2 diagonals, labeling the point of intersection as E. Now use a ruler to measure the distance from E to each of the 4 vertices.

Questions to discuss in your groups:

- 1.) What did you observe about the sides?
- 2.) What did you observe about the angles?
- 3.) What did you observe about the diagonals?



Parallelogram

- 1.) Both Pairs of Opposite Sides Parallel
- 2.) Both Pairs of Opposite Sides Congruent
- 3.) Opposite Angles Congruent
- 4.) Consecutive Angles Supplementary
- 5.) Diagonals Bisect Each Other

5.4 #1,2,5,8,10,12,19

Unit 5.4 - Properties of Parallelograms

Parallelogram

- 1.) Both Pairs of Opposite Sides Parallel
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SIDES
ANGLES
DIAGONALS

Homework
5.4 #1,2,5,8,10,12,19

Given: $\square WSTV$,
 $WS = x + 5$,
 $WV = x + 9$,
 $VT = 2x + 1$

Find the perimeter of WSTV.

$x + 5 = 2x + 1$
 $-x = -4$
 $x = 4$

$4 + 5 = 9$
 $4 + 9 = 13$
 $2(4) + 1 = 9$

$P = 2 + 13 + 9 + 13$
 $P = 44$

EXAMPLE Using Parallelograms in the Coordinate Plane

Find the coordinates of the intersection of the diagonals of $\square LMNO$ with vertices $L(1, 4)$, $M(7, 4)$, $N(6, 0)$, and $O(0, 0)$.

$LN \rightarrow \left(\frac{1+6}{2}, \frac{4+0}{2} \right)$
 $\quad \quad \quad (3.5, 2)$

$MO \rightarrow \left(\frac{7+0}{2}, \frac{4+0}{2} \right)$
 $\quad \quad \quad (3.5, 2)$

$(3.5, 2)$

EXAMPLE Using Parallelograms in the Coordinate Plane

Three vertices of $\square WXYZ$ are $W(-1, -3)$, $X(-3, 2)$, and $Z(4, -4)$. Find the coordinates of vertex Y .

$Y(2, 1)$

Slope $-\frac{5}{2}$