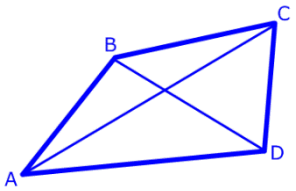
Name:_____ Date:_____ Period: _____

**Chapter 10: Quadrilaterals**
**Topic 1: Family Tree & Parallelograms**

A _____ is a polygon with _____ sides. Figure ABCD is an example of a quadrilateral. Refer to ABCD as the parts of a quadrilateral that are defined below.

*Diagram:*

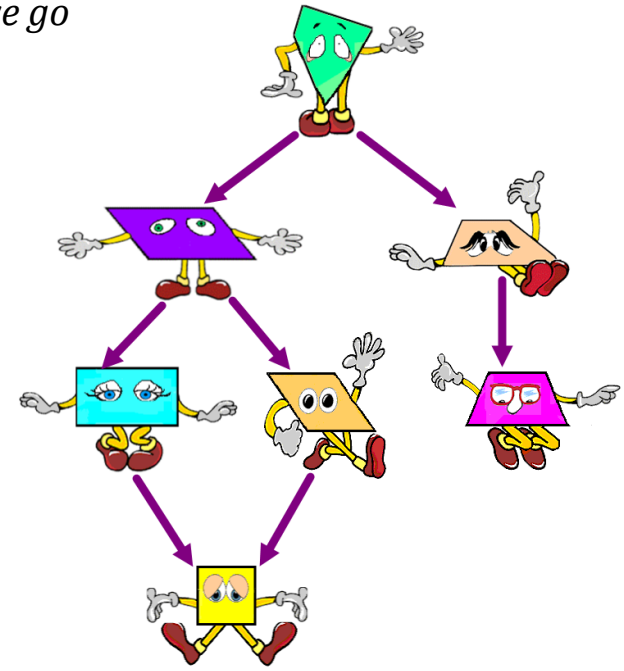



Parts of a Quadrilateral:

- **Opposite sides** are sides that *do not* share a common endpoint.
- **Consecutive (adjacent)** sides share a common endpoint.
- **Opposite Angles** are angles whose vertices are not right next to each other.
- **Consecutive Angles** are angles that are right next to each other, either clockwise or counter-clockwise.
- **Diagonals** of a quadrilateral are line segments whose endpoints are pairs of opposite vertices.

## Quadrilateral Family Tree:

*Label the figures as we go*



True/False Examples:

1) All trapezoids are quadrilaterals. _____

2) All rectangles are parallelograms. _____

3) All squares are rhombuses. _____

4) All rhombuses are rectangles. _____

5) All parallelograms are trapezoids. _____

6) All quadrilaterals are squares. _____

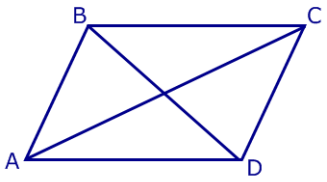
7) All isosceles trapezoids are quadrilaterals. _____

8) All quadrilaterals are rhombuses. _____

# Parallelogram:

- A **parallelogram** is a quadrilateral in which both pairs of opposite sides are parallel and congruent.

*Diagram*:




**Properties:**

- Opposite sides are congruent and parallel.
- Opposite angles are congruent.
- Consecutive angles are supplementary.
- Diagonals bisect each other.
- Diagonals divide the parallelogram into two congruent triangles.

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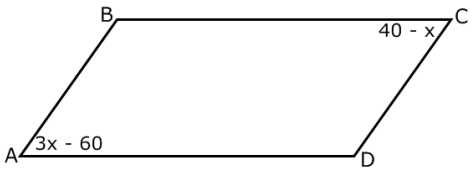
Word Problems:

1) In parallelogram *ABCD*, m<A = 3x - 60 and m<C = 40 - x. Find the value of x and the measures of each of the angles.




2) In parallelogram ABCD, if the measure of <A exceeds the measure of <B by 30, what is the measure of <B?

3) In parallelogram DAWN, the measure of <D is represented by 3x+10 and the measure of <A is represented by 2x + 20. What is the value of x?

4) In a parallelogram, the measures of two consecutive angles are 2x-5 and 3x + 10. Find the measure of each angle and the value of x.

5) The measure of <A and <B in parallelogram ABCD are in the ratio 6:3. Find the measure of each angle of the parallelogram.

6) In parallelogram WXYZ, WX = 9x - 2 and YZ = 4x + 33. What is the value of x?

7) In parallelogram ABCD, the measure of <ABC = 6x - 3 and the measure of <CDA = 4x + 23. Find the value of <ABC.

8) Quadrilateral RSPQ is a parallelogram. The diagonals RP and SQ intersect at T. If QT = 5y and TS = 2y + 12, find the value of y. What is the length of QS?

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## Topic 1 Homework: Family Tree & Parallelograms

***Directions:*** *Answer the following questions completely. If needed, include a diagram with your answer.*

*For questions 1-6, answer the following with the response of True or False:*

1) The diagonals of a parallelogram bisect each other. _____

2) In a parallelogram, opposite sides are parallel. _____

3) A square is a rhombus. _____

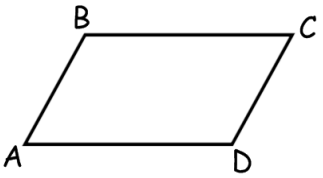
4) A rectangle is a trapezoid. _____

5) A quadrilateral is a rectangle. _____

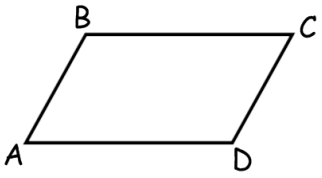
6) A rectangle is a rhombus. _____

7) In parallelogram $PQRS$, the ratio of the measure of $< Q$ to the measure of $< R$ is 1: 5. Find $m < Q$.

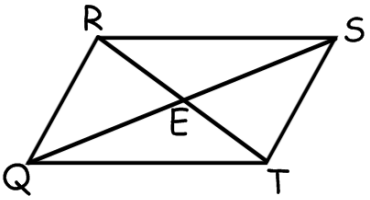
8) In parallelogram $ABCD$, $AB = 5x - 6$ and $CD = 3x + 8$. Find the value of $x$.



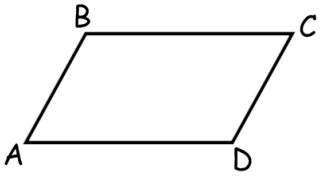

9) In parallelogram $ABCD$, $m < D = 6x + 40$ and $m < B = 4x + 70$. Find the value of $x$. Find $m < C$.
*(Hint: First find $m < D$ or $m < B$).*



10) In parallelogram $QRST$, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at point $E$. If $QE = 4x + 3$ and $ES = 23$, find the value of $x$.




11) In parallelogram $ABCD$, $m < A = 3x - 40$ and $m < C = 7x - 100$. Find the measure of all of the angles in this parallelogram.

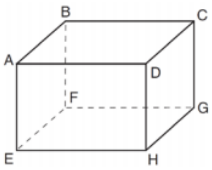



***Review Section:***

____ 12) A rectangle right prism is shown. Which pair of edges are not coplanar?

(1) BF and CG (2) BF and DH

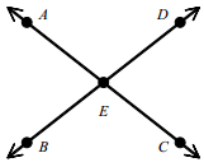
(3) EF and CD (4) EF and BC




____ 13) In the figure, m<AED = 104. Which of the following statements is false?

(1) m<AEB = 76 (2) <BEC and <CED are adjacent angles

(3) m<BEC = 104 (4) <AEB and <DEC are supplementary angles




14) The vertex angle of an isosceles triangle measures 15 degrees more than one of its base angles. How many degrees are there in a base angle of the triangle?

15) In the diagram of $\Delta ABC$, DE//BC. What is the length of BC?