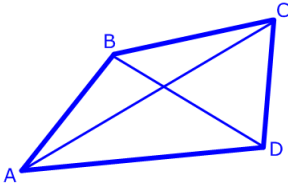


Chapter 10: Quadrilaterals

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.

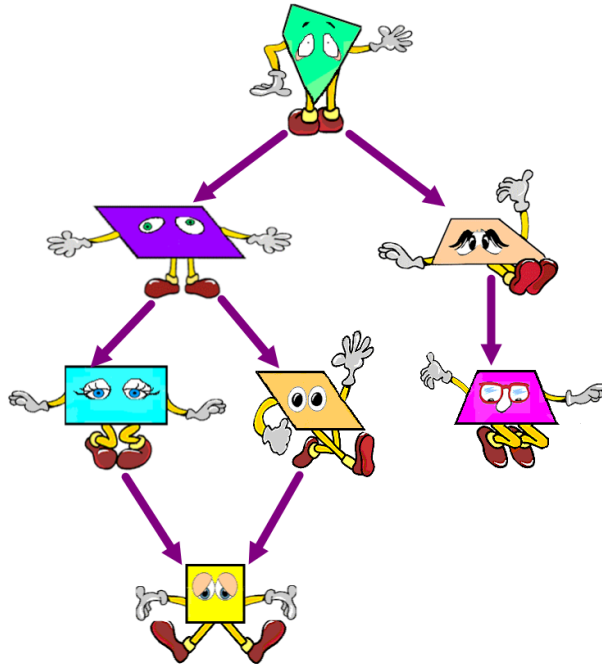
Diagram:



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:



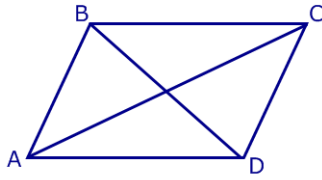
True/False Examples:

- | | |
|---|---|
| 1) All trapezoids are quadrilaterals. _____ | 5) All parallelograms are trapezoids. _____ |
| 2) All rectangles are parallelograms. _____ | 6) All quadrilaterals are squares. _____ |
| 3) All squares are rhombuses. _____ | 7) All isosceles trapezoids are quadrilaterals. _____ |
| 4) All rhombuses are rectangles. _____ | 8) All quadrilaterals are rhombuses. _____ |

Parallelogram:

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

Diagram:

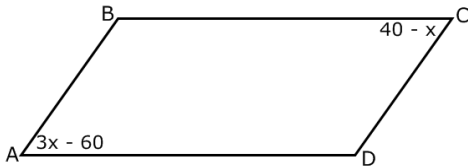


Properties:

- 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.

Word Problems:

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



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

3) In parallelogram $DAWN$, the measure of $\angle D$ is represented by $3x + 10$ and the measure of $\angle A$ 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 $\angle A$ and $\angle B$ 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 $\angle ABC = 6x - 3$ and the measure of $\angle CDA = 4x + 23$. Find the value of $\angle ABC$.

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?

Name: _____

Date: _____

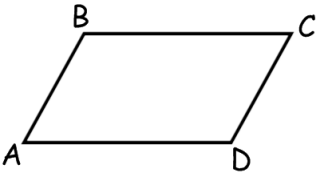
Family Tree & Parallelograms Homework

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

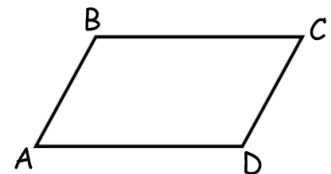
For questions 1-6, answer the following with the response of True or False:

- 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 $\angle Q$ to the measure of $\angle R$ is 1:5. Find $m\angle Q$.

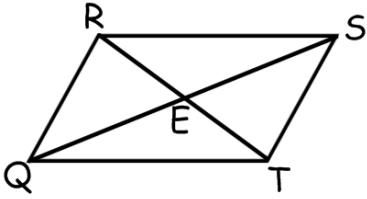
- 8) In parallelogram $ABCD$, $AB = 5x - 6$ and $CD = 3x + 8$. Find the value of x .



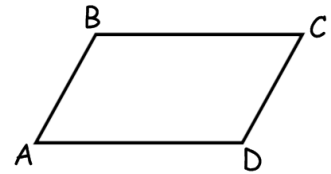
- 9) In parallelogram $ABCD$, $m\angle D = 6x + 40$ and $m\angle B = 4x + 70$. Find the value of x . Find $m\angle C$.
(Hint: First find $m\angle D$ or $m\angle B$).



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 .



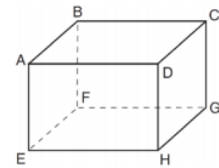
11) In parallelogram $ABCD$, $m\angle A = 3x - 40$ and $m\angle C = 7x - 100$. Find the measure of all of the angles in this parallelogram.



Review Section:

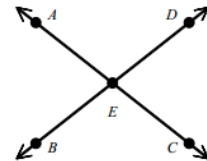
___ 12) A rectangle right prism is shown. Which pair of edges are not coplanar?

- (1) BF and CG
- (2) BF and DH
- (3) EF and CD
- (4) EF and BC



___ 13) In the figure, $m\angle AED = 104$. Which of the following statements is false?

- (1) $m\angle AEB = 76$
- (2) $\angle BEC$ and $\angle CED$ are adjacent angles
- (3) $m\angle BEC = 104$
- (4) $\angle AEB$ and $\angle DEC$ 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 $\triangle ABC$, $DE \parallel BC$. What is the length of BC ?

