Lesson 7.2/7.3 Parallelograms

Monday, February 27, 2023 4:29 PM

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Lesson 7.2 and 7.3

Lesson 7.2/7.3 Parallelograms

Content Objective

Students apply and prove theorems about the properties of parallelograms.

Content Objective

Students use the properties of parallelograms to determine whether quadrilaterals are parallelograms and to solve problems.

Florida's B.E.S.T. Standards for Mathematics

MA.912.GR.1.4

Prove relationships and theorems about parallelograms. Solve mathematic and real-world problems involving postulates, relationships and theorems parallelograms.

MA.912.GR.3.2

Given a mathematical context, use coordinate geometry to classify or justif definitions, properties and theorems involving circles, triangles or quadrilaterals.

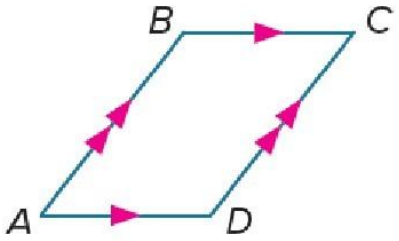
MA.912.GR.3.3

Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.

Learn
Parallelograms

A **parallelogram** is a quadrilateral with both pairs of opposite sides parallel. To name a parallelogram, use the symbol $\square$. In $\square ABCD$, $\overline{BC} \parallel \overline{AD}$ and $\overline{AB} \parallel \overline{DC}$ by definition.

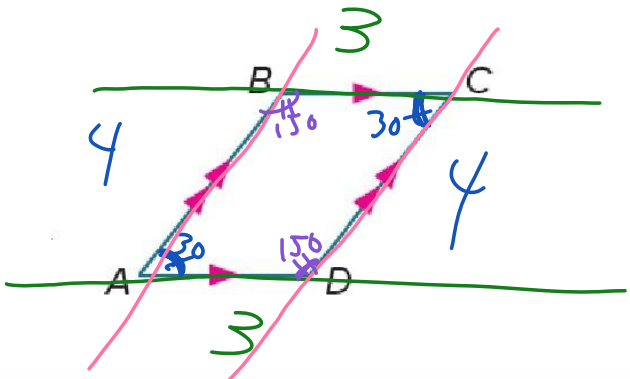
Other properties of parallelograms are given in the theorems on the next slides.



Learn
Parallelograms

If a quadrilateral is a parallelogram, then its opposite sides are congruent.

If a quadrilateral is a parallelogram, then its opposite angles are congruent.

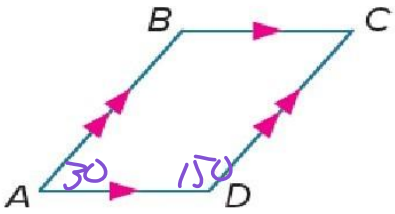


Learn
Parallelograms

Theorems: Properties of Parallelograms

If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.

If a parallelogram has one right angle, then it has four right angles.



rectangles

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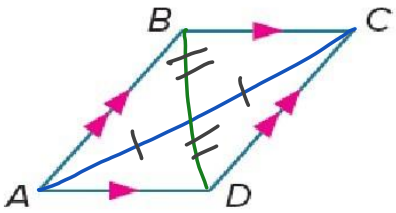
Learn
Diagonals of Parallelograms

Theorems: Diagonals of Parallelograms

If a quadrilateral is a parallelogram, then its diagonals bisect each other.



If a quadrilateral is a parallelogram, then each diagonal separates the parallelogram into two congruent triangles.

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Example 1
Use Properties of Parallelograms

Given ▱ *ABDC*, find *CD*.
Find angles A, B, And D.

4ft
135
45
135°

Find side AC.

1.5 ft

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Example 1

Use Properties of Parallelograms

Check

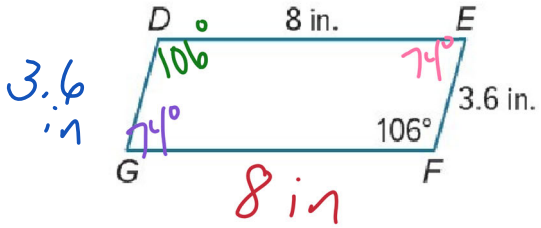
Given $\square DEFG$, find each measure.

a. $m\angle D$, $\angle E$, $\angle G$

106°, 74°, 74°

b. FG and DG

8 in, 3.6 in



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Example 3

Use Properties of Parallelograms and Algebra

Find the values of x and z in $\square ABCD$ if $m\angle ADC = 4x°$ and $m\angle DAB = (2x - 6)°$.

$4x + 2x - 6 = 180$

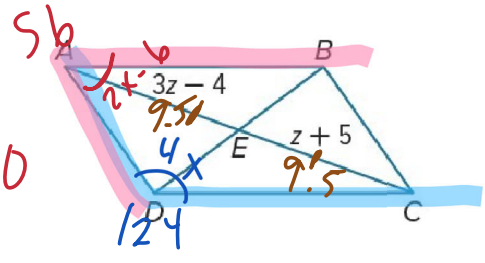
$6x - 6 = 180$

$+6 \quad +6$

$\frac{6x}{6} = \frac{186}{6}$

$x = 31$

Part A Find the value of x.



Part B Find the value of z.

$3z - 4 = z + 5$

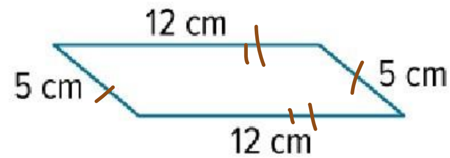
$-z \quad -z$

$2z = 9$

$3z = z + 9$ ... z ... 2 ($t = 4.$)

Example 1
Identify Parallelograms

Determine whether the quadrilateral is a parallelogram. Justify your answer.



yes - both opp sides =

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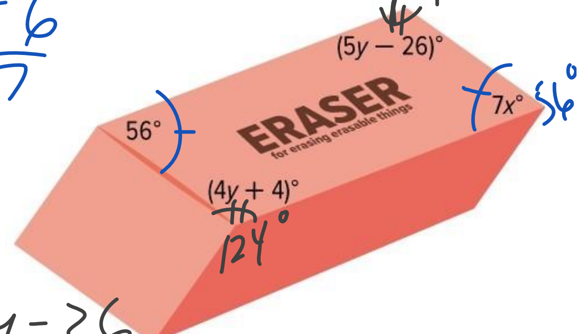
Example 2
Use Parallelograms to Find Values

SCHOOL SUPPLIES The top of the eraser appears to be a parallelogram. Find the values of *x* and *y* so that the side of the eraser is a parallelogram.



$7x = 56$

$x = 8$

$4y + 4 = 5y - 26$

$4 = y - 26$

$30 = y$

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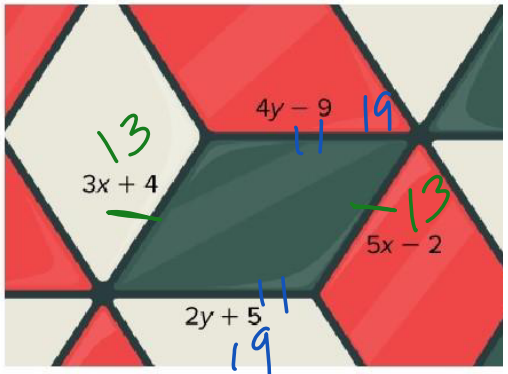
Example 2
Use Parallelograms to Find Values

Check

MOSAICS The mosaic pattern of the floor is made up of different tiles.



Part A

Find the values of x and y so that the tile is a parallelogram.

$3x + 4 = 5x - 2$, $+2 \quad +2$, $3x + 6 = 5x$, $-3x \quad -3x$, $6 = 2x$, $\frac{6}{2} = \frac{2x}{2}$, $3 = x$

$4y - 9 = 2y + 5$, $+9 \quad +9$, $4y = 2y + 14$, $-2y \quad -2y$, $2y = 14$, $\frac{2y}{2} = \frac{14}{2}$, $y = 7$

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Example 3

Identify Parallelograms on the Coordinate Plane

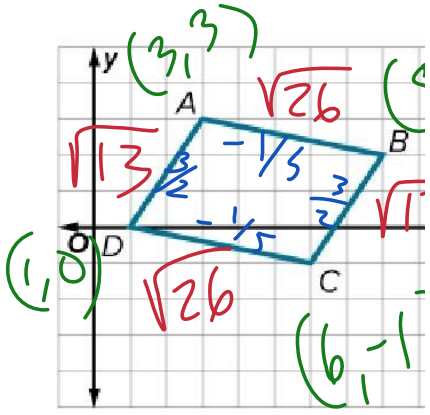
Check

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

Determine whether quadrilateral $ABCD$ is a parallelogram. If it is a parallelogram, write a narrative proof. If it is not, justify your reasoning.

Slopes are = opp sides ||

opp sides = ||



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