Lesson 7.4 Rectangles

Monday, February 27, 2023 6:46 PM

Click Link Below for Interactive Pear Deck Powerpoint

https://app.peardeck.com/student/tdqyynomi

Lesson 7.4 Rectangles

Lesson 7.4 Rectangles

Content Objective

Students use the properties of rectangles to determine whether a parallelogram is a rectangle and to write proofs.

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

MA.912.GR.1.4

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

MA.912.GR.3.2

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

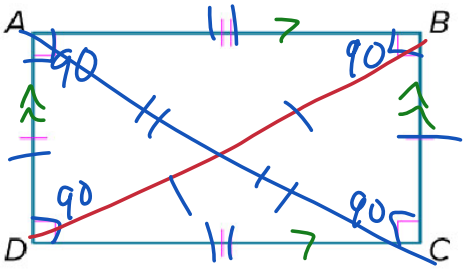
MA.912.GR.3.3

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

Learn
Properties of Rectangles

A **rectangle** is a parallelogram with four right angles. To name a rectangle, use the symbol ▭. From the definition, you know that a rectangle has the following properties:

- All four angles are right angles.
- Opposite sides are parallel and congruent.
- Opposite angles are congruent.
- Consecutive angles are supplementary.
- Diagonals bisect each other.



McGraw Hill | Rectangles

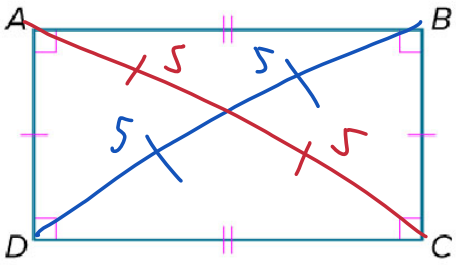
This material may be reproduced for licensed classro only and may not be further reproduced or distr

Learn
Properties of Rectangles

Diagonals of a Rectangle

If a parallelogram is a rectangle, then its diagonals are congruent.

AC = DB
10 = 10

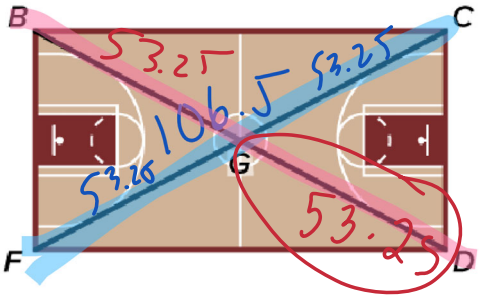


McGraw Hill | Rectangles

This material may be reproduced for licensed classro only and may not be further reproduced or distr

Example 1
Use Properties of Rectangles

PRACTICE A basketball team is running a drill along the diagonals of the court. Given $\square BCDF$, if $FC = 106.5$ feet, find DG.



$FC = BD$

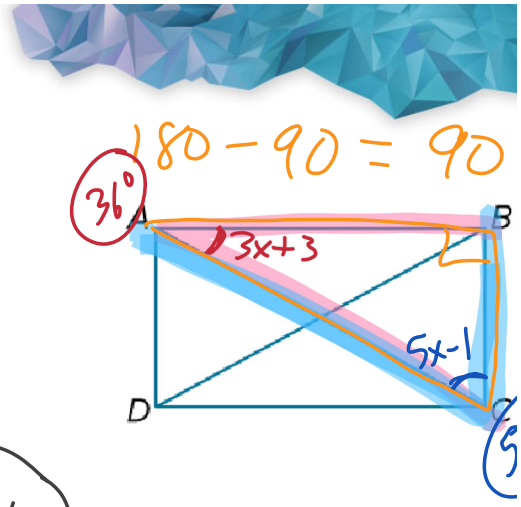
$106.5 = \frac{106.5}{2}$

Example 2

Use Properties of Rectangles and Algebra

Quadrilateral *ABCD* is a rectangle.

If $m\angle BAC = (3x + 3)°$ and $m\angle ACB = (5x - 1)°$, find the value of *x*.



$3x+3+5x-1=90$

$8x+2=90$

$-2 \quad -2$

$\frac{8x}{8} = \frac{88}{8}$

$x = 11$

Example 2

Use Properties of Rectangles and Algebra

$6(1.75)+2=12.5$

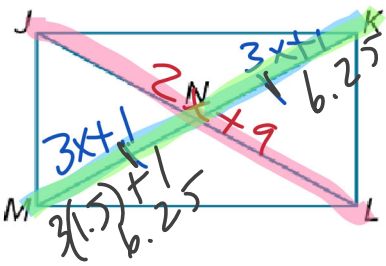
Check $6x+2=2x+9$

$-2x \quad -2x$

Quadrilateral *JKLM* is a rectangle.

Part A $mK = JL$

If $MN = 3x + 1$ and $JL = 2x + 9$, find MK. Round



12.5

to the nearest tenth if necessary.

$4x + 2 = 9$
$-2 \quad -2$
$4x = 7$

$\frac{4x}{4} = \frac{7}{4}$ $x = 1.75$

.

Example 2

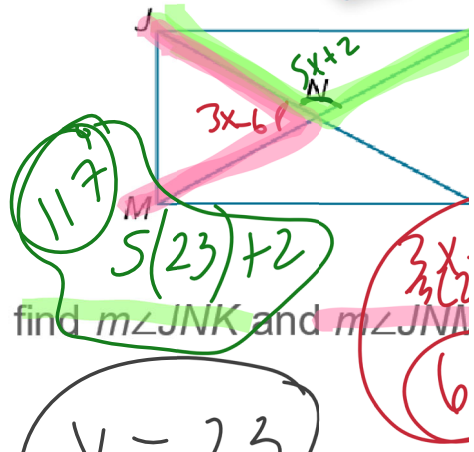
Use Properties of Rectangles and Algebra

Check

Quadrilateral *JKLM* is a rectangle.

Part B

If $m\angle JNK = (5x + 2)°$ and $m\angle JNM = (3x - 6)°$, find $m\angle JNK$ and $m\angle JNM$



$5x + 2 + 3x - 6 = 180$
$8x - 4 = 180$
$+4 \quad +4$
$\frac{8x}{8} = \frac{184}{8}$

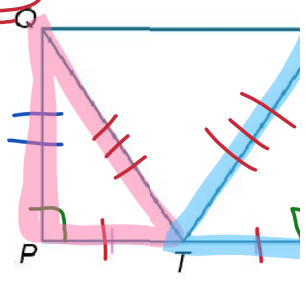
$x = 23$

Example 3

Prove Rectangular Relationships

Complete the proof with the correct statements.

Given: *PQRS* is a rectangle; $\overline{PT} \cong \overline{ST}$. **Prove:** $\overline{QT} \cong \overline{RT}$



Statements	Reasons
1. *PQRS* is a rectangle; $\overline{PT} \cong \overline{ST}$	1. Given
2. *PQRS* is a parallelogram	2. Definition of rectangle
3. $QP = RS$	3. Opp. sides of a ▱ are ≅.
4. $\angle P = 90° \quad \angle S = 90°$	4. Definition of rectangle
5. $\angle S \cong \angle P$	5. All right angles are congruent.
6. $\triangle QPT \cong \triangle RST$	6. SAS
7. $QT = RT$	7. CPCTC

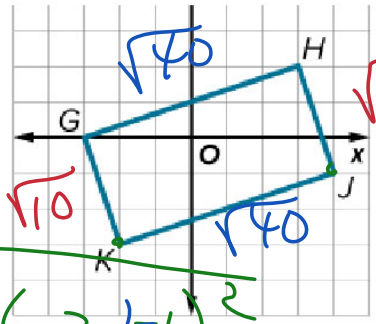
Example 4

Identify Rectangles on the Coordinate Plane

Quadrilateral *GHJK* has vertices *G*(−3, 0), *H*(3, 2), *J*(4, −1), and *K*(−2, −3). Determine whether *GHJK* is a rectangle by using the Distance Formula for the sides and diagonals. Also prove using slope.

Distance formula

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



√40 √10

Distance of Sides: GH and KJ = √40 √40 $\sqrt{(-2-4)^2+(-3+1)^2}$

$-6^2 + -2^2$

$36 + 4$

$\sqrt{40}$

Distance of Sides GK and HJ = √10 √10

Example 4

Identify Rectangles on the Coordinate Plane

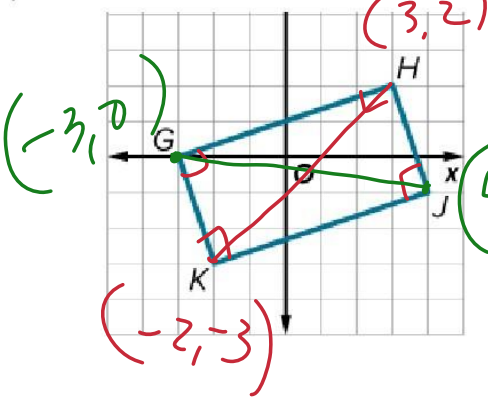
Distance formula

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

Distance of the diagonals:

KH = √50

GJ = √50



Slope of GH and GK $\frac{1}{3}$ $-\frac{3}{1}$ neg. recip. perp 90°

Slope of KJ and HJ $\frac{1}{3}$ $-\frac{3}{1}$

Example 4

Identify Rectangles on the Coordinate Plane

A quadrilateral has vertices *A*(2, 6), *B*(3, 7), and *C*(6, 4). Which of the following points would make *ABCD* a rectangle?

A. $D(5, 3)$

B. $D(5, 2)$

C. $D(4, 3)$

D. $D(6, 3)$