15.2 Draw Quadrilaterals

Essential Question How can you draw quadrilaterals?

the 5 Es ENGAGE

GO DIGITAL Lesson Opener

Making Connections

Invite students to tell you what they know about quadrilaterals.

What quadrilaterals do you know? (Possible answers: square, rectangle, rhombus, etc.)
What everyday objects are quadrilaterals? (Answers will vary. Possible answers: sheet of paper, street signs, etc.)

Using the Digital Lesson

Show students different flat figures with cutouts or drawings. Have them identify the quadrilaterals and describe the differences between the quadrilaterals and the other figures.

Learning Task

What is the problem the students are trying to solve? Connect the story to the problem.

- **What figure does Doc see first?** (a rectangle)
- **How many sides does a rectangle have?** (4) **How many sides does a square have?** (4)
- **What are the characteristics of a rectangle?** (two pairs of parallel opposite sides, two pairs of sides that are of equal length, and four right angles)
- **What are the characteristics of a square?** (two pairs of parallel opposite sides, four sides of equal length, and four right angles)

Literacy and Mathematics

Choose one or more of the following activities.

- Write the word *quadrilateral* on the board and underline the prefix *quadr-*. Explain to students that the prefix means "four." Write the words *quadruple* and *quadruplet* on the board. Have students guess the meaning of the words. Have students use the dictionary to find other words with the prefix *quadr-* and their meanings.
- Have students walk around the classroom and identify quadrilaterals in the room.

Texas Essential Knowledge and Skills

TEKS Geometry and Measurement—3.6.B
Use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories *Also 3.6.A*

MATHEMATICAL PROCESSES
3.1.D Communicate mathematical ideas and reasoning
3.1.G Display, explain, and justify mathematical ideas and arguments

Are You Ready?

Access Prior Knowledge

Use the *Are You Ready?* 15.2 in the *Assessment Guide* to assess students' understanding of the prerequisite skills for this lesson.

Materials

ruler

Vocabulary

GO DIGITAL Multimedia eGlossary at *thinkcentral.com*

GO DIGITAL Resources

For the student

- **Interactive Student Edition** *provides students with an interactive learning environment!*
- Math on the Spot Video Tutor
- *i*Tools Virtual Manipulatives
- Soar to Success Math Online Intervention

For the teacher

- **Digital Management Center** *organizes program resources by TEKS!*
- eTeacher Edition
- Online Assessment System

Unlock the Problem

Draw a square, a rectangle, a parallelogram, a trapezoid, and a rhombus on the board.

- **How many sides does each figure have?** 4

Remind students how all the figures are quadrilaterals, even though they do not look alike.

Connect Read through the paragraph with students. Draw a rectangle on the board and ask students to identify pairs of opposite sides that are parallel. Also, make sure students are able to identify the pairs of sides of equal length and the number of right angles.

Activity 1

Before students draw the quadrilateral, have them list names of quadrilaterals on the board. Possible answers: rectangle, square, rhombus, parallelogram, trapezoid Then have students draw the quadrilateral.

- **Describe the quadrilateral you drew. How many pairs of opposite sides are parallel?** 1 pair
- **Can you eliminate any of the quadrilaterals from the list?** Possible answer: since there is only 1 pair of opposite sides that are parallel, the figure cannot be a square, rectangle, rhombus, or parallelogram.
- **Describe the opposite sides and angles of the quadrilateral you drew.** Possible answer: the quadrilateral has one pair of opposite sides that are parallel and there are two right angles.

Activity 2

Have students compare the attributes of the parallelograms. Lead them to understand that a parallelogram is a quadrilateral, but not all quadrilaterals have 2 pairs of opposite sides that are parallel.

ELL English Language Learners

Leveled Activities	ELPS
Beginning: Activity 20	1.A.1, 3.G.2, 4.C.3
Intermediate: Activity 10	1.B.1, 4.E, 4.F.9
Advanced: Activity 41	4.F.3, 4.F.8
Advanced High: Activity 6	2.I.5, 3.G.2, 4.G.2

GO DIGITAL Go to *thinkcentral.com* for the **ELL Activity Guide** containing these leveled activities.

Name _____

15.2 Draw Quadrilaterals

TEKS Geometry and Measurement—3.6.B *Also 3.6.A*
MATHEMATICAL PROCESSES 3.1.D, 3.1.G

Essential Question How can you draw quadrilaterals?

Unlock the Problem

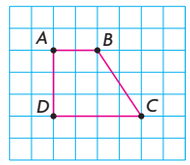
Hands On

Connect You have learned to classify quadrilaterals by the number of pairs of opposite sides that are parallel, by the number of pairs of sides of equal length, and by the number of right angles.

How can you draw quadrilaterals?

Activity 1 Use grid paper to draw quadrilaterals.

Materials ■ ruler



- Use a ruler to draw line segments from points *A* to *B*, from *B* to *C*, from *C* to *D*, and from *D* to *A*.
- Write the name of your quadrilateral.

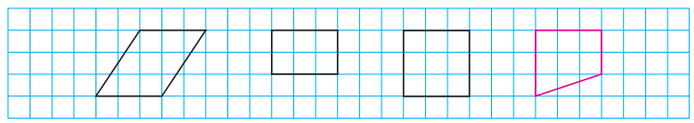
trapezoid

Activity 2 Draw a figure that does not belong.

Materials ■ ruler

A–D Check students' drawings. Possible drawings are shown.

A Here are three examples of a parallelogram. Draw an example of a quadrilateral that is not a parallelogram.



- **Explain** why your quadrilateral is not a parallelogram.

Possible explanation: my quadrilateral is not a parallelogram because it has only 1 pair of opposite sides that are parallel.

Differentiated Instruction

ELL Language Support

Visual
Small Group

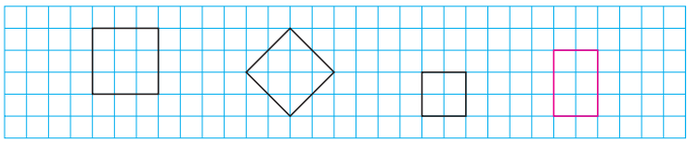
ELPS 4.C.1, 4.D, 4.F.3

Strategy: Draw

Materials: index cards

- Students can learn to identify quadrilaterals by studying and making drawings of each figure.
- Draw on an index card each type of quadrilateral (rhombus, square, rectangle, trapezoid, parallelogram). Write the name of the figure on the opposite side of the card.
- Lay the cards down with the side with the drawing face up. Have students try to name each figure. Then turn the cards over and have students read the name of the quadrilateral aloud.
- Have pairs work together to draw and name quadrilaterals like those on the cards.

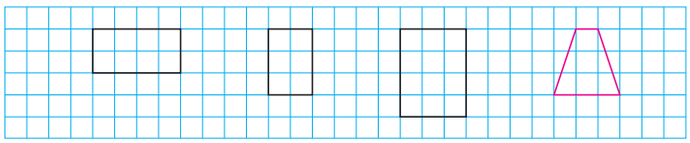
B Here are three examples of a square.
Draw a quadrilateral that is not a square.



- **Explain** why your quadrilateral is not a square.

Possible explanation: my quadrilateral is not a square because it does not have 4 sides of equal length.

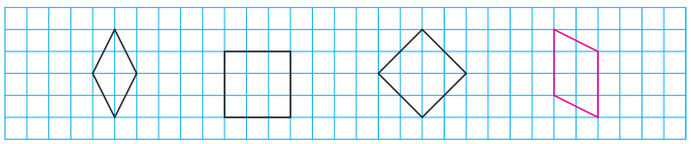
C Here are three examples of a rectangle.
Draw a quadrilateral that is not a rectangle.



- **Explain** why your quadrilateral is not a rectangle.

Possible explanation: my quadrilateral does not have 4 right angles, 2 pairs of sides of equal length, and 2 pairs of opposite sides that are parallel.

D Here are three examples of a rhombus.
Draw a quadrilateral that is not a rhombus.



- **Explain** why your quadrilateral is not a rhombus.

Explanations will vary.

Possible explanation: my quadrilateral is not a rhombus because it does not have 4 sides of equal length.

Math Talk Mathematical Processes
Compare your drawings with your classmates. **Explain** how your drawings are alike and how they are different.

Enrich

Visual
Small Group

- Have students write a description of a quadrilateral without naming the figure. Remind them to include enough details so that anyone reading their description can draw the quadrilateral.
- Ask students to pass their papers to the next person in the group.
- Have students take turns going to the board and drawing the figure described on the paper they received.
- Students should discuss how the details they were given affected their drawings, and whether enough details were included.

GO DIGITAL Go to *thinkcentral.com* for additional enrichment activities in the **Enrich Activity Guide**.

3 the 5 Es EXPLAIN

For Part B, make sure students can describe the key attributes of a square.

- **A square has how many pairs of opposite sides that are parallel?** 2 pairs
- **How many sides of equal length does a square have?** 4 sides
- **How many right angles does a square have?** 4 right angles

For Part C, make sure students can describe the key attributes of a rectangle.

- **How is a rectangle different from a square?** Only opposites sides are equal length.

For Part D, make sure students can describe the key attributes of a rhombus.

- **How is a rhombus different from a square?** The angles do not have to be right angles.

Go Deeper

To compare the properties of rectangles, squares, and rhombuses, have students discuss why a square can also be named a rectangle and a rhombus, but a rectangle and a rhombus cannot always be named a square. Draw a square, a rectangle, and a rhombus on the board. The rhombus should not have right angles.

- **What attributes make the square and the rectangle both a rectangle?** four sides, four right angles, 2 pairs of opposite sides that are parallel, 2 pairs of sides that are of equal length
- **Why can't you call this rhombus a square?** It does not have 4 right angles.

Math Talk Mathematical Processes

Use Math Talk to focus on students' understanding of how quadrilaterals can look different and still be classified the same.

COMMON ERRORS

Error Students may draw a rhombus incorrectly.

Example When drawing a rhombus, students may draw a figure with 2 pairs of opposite sides that are parallel, but the 4 sides are not of equal length.

Springboard to Learning Review the attributes of a rhombus with students. Have them list each attribute. After students have drawn their quadrilaterals, they should check that their drawing fits each attribute.

Share and Show

The first problem connects to the learning model. Have students use the MathBoard to explain their thinking.

Use the checked exercises for **Quick Check**. Students should show their answers for the Quick Check on the MathBoard.

RtI Quick Check

IF a student misses the checked exercises

THEN **Differentiate Instruction** with RtI Tier 1 Lesson 75

Problem Solving

H.O.T. Problem

Problem 5 requires students to analyze models and use their knowledge of quadrilateral attributes to identify all possible ways to solve a problem.

Math on the Spot Video Tutor

Through the ***Math on the Spot Video Tutor***, students will be guided through an interactive solving of this type of H.O.T. problem. Use this video to also help students solve the H.O.T. problem in the Interactive Student Edition. With these videos and the H.O.T. problems, students will build skills needed in the TEXAS assessment.

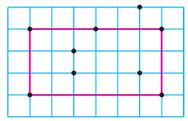
GO DIGITAL **Math on the Spot** videos are in the Interactive Student Edition and at *thinkcentral.com*.

Name _____

Share and Show

MATH BOARD

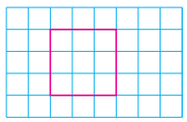
1. Choose four endpoints that connect to make a rectangle. **Check students' drawings.**



Think: A rectangle has 2 pairs of opposite sides that are parallel, 2 pairs of sides of equal length, and 4 right angles.

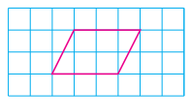
Draw a quadrilateral that is described. Name the quadrilateral you drew. **Check students' drawings. Possible drawings and answers are given.**

2. 4 right angles



Name square

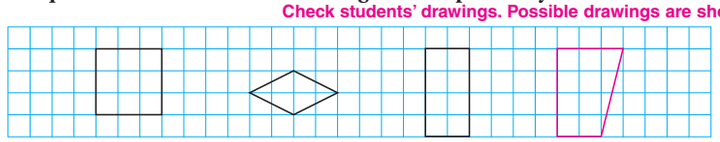
3. 2 pairs of opposite sides that are parallel



Name parallelogram

Draw a quadrilateral that does not belong. Then explain why. **Check students' drawings. Possible drawings are shown.**

4.



Possible explanation: the 3 quadrilaterals shown have 2 pairs of opposite sides that are parallel. The trapezoid I drew has 1 pair of opposite sides that are parallel.

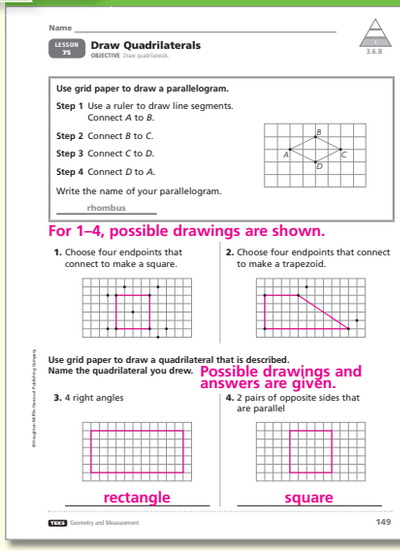
Problem Solving Real World

5. H.O.T. **Multi-Step** Amy has 4 straws of equal length. Name the quadrilaterals she can make using these 4 straws. **parallelogram, square, rhombus**

Amy cuts one of the straws in half. She uses the two halves and two of the other straws to make a quadrilateral. Name a quadrilateral she can make using these 4 straws. **Possible answer: parallelogram, rectangle**

Differentiated Instruction

RtI RtI Tier I Lesson 75



Name

LESSON 75 **Draw Quadrilaterals** OBJECTIVE Draw quadrilaterals. 3.6.B

Use grid paper to draw a parallelogram.

Step 1 Use a ruler to draw line segments. Connect *A* to *B*.

Step 2 Connect *B* to *C*.

Step 3 Connect *C* to *D*.

Step 4 Connect *D* to *A*.

Write the name of your parallelogram.

rhombus

For 1–4, possible drawings are shown.

1. Choose four endpoints that connect to make a square.

2. Choose four endpoints that connect to make a trapezoid.

Use grid paper to draw a quadrilateral that is described. Name the quadrilateral you drew. **Possible drawings and answers are given.**

3. 4 right angles

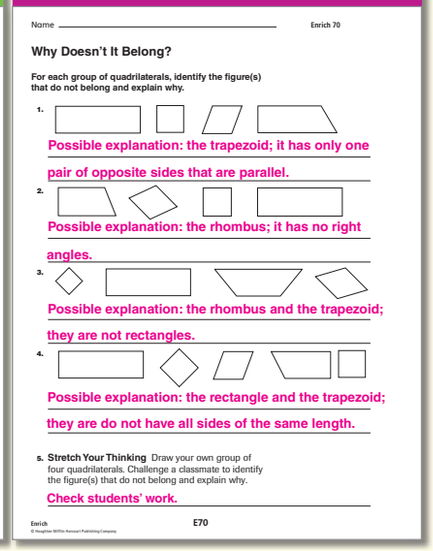
rectangle

4. 2 pairs of opposite sides that are parallel

square

TEKS Geometry and Measurement 149

Enrich 70



Name Enrich 70

Why Doesn't It Belong?

For each group of quadrilaterals, identify the figure(s) that do not belong and explain why.

1. **Possible explanation: the trapezoid; it has only one pair of opposite sides that are parallel.**

2. **Possible explanation: the rhombus; it has no right angles.**

3. **Possible explanation: the rhombus and the trapezoid; they are not rectangles.**

4. **Possible explanation: the rectangle and the trapezoid; they are do not have all sides of the same length.**

5. **Stretch Your Thinking** Draw your own group of four quadrilaterals. Challenge a classmate to identify the figure(s) that do not belong and explain why.

Check students' work.

Enrich E70

Mathematical Processes
Model • Reason • Communicate

Daily Assessment Task

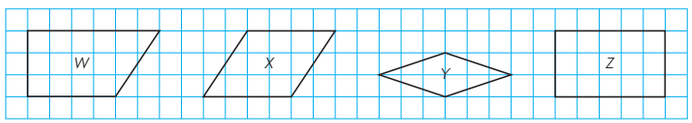
Fill in the bubble for the correct answer choice.

6. **Reasoning** Clara is building a frame for a doghouse wall using four wooden boards. Two of the boards are the same length. Each of the other two boards is a different length. What shape can she build?

Ⓐ rectangle ● trapezoid

Ⓑ square Ⓓ rhombus

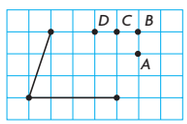
7. **Use Diagrams** The pieces of a pattern for a mosaic are drawn on grid paper. The pattern shows four quadrilaterals. Which quadrilateral is not a parallelogram?



● Shape *W* Ⓒ Shape *X*

Ⓑ Shape *Y* Ⓓ Shape *Z*

8. **Multi-Step** Ethan wants the figure on the grid paper to be a parallelogram. At which point should he place the fourth vertex?

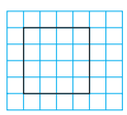
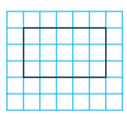
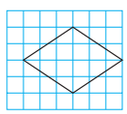
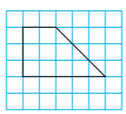


Ⓐ Point *D* Ⓒ Point *C*

● Point *B* Ⓓ Point *A*

TEXAS Test Prep

9. Jordan drew a quadrilateral with 2 pairs of opposite sides that are parallel. Which figure could NOT be the quadrilateral Jordan drew?

Ⓐ 
Ⓑ 
Ⓒ 
● 

Grab-and-Go!™ Ready-Made Independent Activities

Differentiated Centers Kit

Literature

Figure It Out

Students complete blue Activity Card 18 by identifying two-dimensional figures by their attributes.

Activities

Classification Act

Students complete orange Activity Card 18 by classifying two-dimensional figures based on their attributes.

5 the 5 Es EVALUATE

Daily Assessment Task RtI

Can students draw quadrilaterals?

IF	THEN
NO	• Soar to Success Math Warm-Up 38.31
YES	• Enrich 70 • Homework and Practice Lesson 15.2

TEXAS Test Prep Coach

Test Prep Coach helps teachers to identify common errors that students can make.

In the Test Prep exercise, if students selected:

A, B, or **C** They may have missed the word NOT.

Essential Question

Write Math

How can you draw quadrilaterals? Possible answer: I always draw four sides, but I can change the types of angles, the number of pairs of parallel sides, and the number of sides of equal length for each kind of quadrilateral.

Homework and Practice

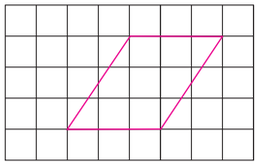
TEKS Geometry and Measurement—3.6.B
Also 3.6.A
MATHEMATICAL PROCESSES 3.1.D, 3.1.G

Name _____

15.2 Draw Quadrilaterals

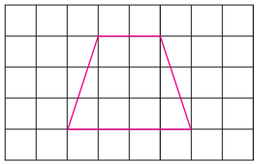
Draw a quadrilateral that is described.
Name the quadrilateral you drew.

1. 2 pairs of opposite sides that are parallel and no right angles



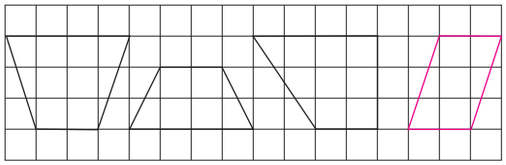
Name parallelogram

2. 1 pair of opposite sides that are parallel



Name trapezoid

3. Draw a quadrilateral that does not belong. Then explain why.



Check students' drawings. Possible drawing is shown.
Possible explanation: the quadrilaterals are all trapezoids with exactly one pair of parallel sides. I drew a parallelogram that has two pairs of parallel sides.

Problem Solving Real World

4. Enrique has the craft sticks shown. Name the possible polygons Enrique can make.

quadrilateral

Lesson Check

TEXAS Test Prep

Fill in the bubble completely to show your answer.

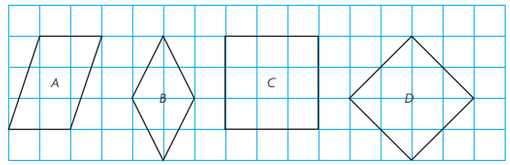
5. Midori uses wooden sticks to make a quadrilateral. She has 2 equal-length long sticks and 2 equal-length short sticks. If she places the sticks so there are 4 right angles, which figure does Midori make?

Ⓐ rhombus Ⓒ square
● rectangle Ⓓ trapezoid

6. Han has 2 long pencils of equal length and 2 short pencils of equal length. If he arranges them so that the long pencils and short pencils are opposite and parallel, which figure does he make?

Ⓐ trapezoid Ⓒ square
Ⓑ rhombus ● parallelogram

7. Rex draws four quadrilaterals on grid paper. Which quadrilateral is NOT a rhombus?



● Shape A Ⓒ Shape C
Ⓑ Shape B Ⓓ Shape D

8. **Multi-Step** Gigi wants to make a figure with four craft sticks. She has the three craft sticks shown and needs one more. Which size of craft stick does Gigi need to make the figure?

● 5-in. craft stick; rectangle Ⓒ 5-in. craft stick; square
Ⓑ 3-in. craft stick; rectangle Ⓓ 6-in. craft stick; square

Homework and Practice

Use the Homework and Practice pages to provide students with more practice on the concepts and skills of this lesson.