

Description

- Develop and apply a formula for the area of a parallelogram.
- Understand the relationship between base and height of a 2-D shape.

Materials

- grid paper
- geoboards
- *The Geometer's Sketchpad*[®]
- BLM 13.1

Assessment Opportunities

Minds On ...

Whole Class → Brainstorm

On the board, create a list (with diagrams) of different kinds of triangles and quadrilaterals. Discuss the characteristics of each, using questions: What are the distinguishing features of each kind of triangle? Is every square a rectangle? Is every rectangle a parallelogram? Is every parallelogram a rectangle? Are the words “side” and “height” interchangeable?

What’s the difference between area and perimeter? Outline the perimeter and shade the area for several shapes, using colour to help visual learners.

Action!

Pairs → Teacher Guided

Using geoboards, students create a variety of rectangles, orally calculate their areas and perimeters and explain how they selected appropriate units and distinguish between the two measures. Show their responses on an overhead.

Using grid paper, students create a rectangle, cut it out, and calculate the area, using colour to mark the measurements. They draw a line from a vertex to a point on the opposite side and cut along the line. They slide one piece over the other until sides that used to be opposite are on top of each other. Ask: What shape has been formed? Has the total area changed? Where are the original measurements?

Discuss how to determine where the base and height are in the new shape.

Think/Pair/Share → Practice

On grid paper, students create five very different parallelograms. They trade with a partner who uses colour to mark the base and the height and then calculate the area of each. Students exchange papers and check their partner’s work.

Whole Class → Teacher Guided

Curriculum Expectations/Question & Answer/Mental Note: Using an overhead of BLM 13.1, check for understanding. Uncover a diagram, ask students to make mental decisions about base and height, and after sufficient wait time, draw in the base and height in colour. Ask students to mentally calculate, then write the final area calculation. Provide oral feedback as students answer questions. Use the last few examples to demonstrate acceptable form in written solution.

Whole Class → Notemaking

Construct a Venn diagram together as shown on Answer sheet 13.1.

Orient parallelograms, rectangles, squares, and rhombi in various ways on an overhead transparency and invite students to identify a base and height for each shape. (There will be two base-height pairs for each shape.)

Draw a visual reminder of the equality of areas of parallelograms and rectangles on the same base and between the same parallel lines.

Home Extension or Further Classroom Consolidation

Identify different quadrilaterals found in your home. Take necessary measurements; draw a sketch for each one; and calculate its area.

In your math journal, answer the questions and give examples to justify your response: Can quadrilaterals with the same perimeter have different areas? Can quadrilaterals with the same area have different perimeters?

The dynamic parallelogram and rectangle in *The Geometer's Sketchpad*[®] demo provide powerful visual confirmation and counter-examples of relationships between and among shapes.

See the content-based package – *Developing Perimeter and Area Formulas*.

Stress that the base and the height of any polygon are at right angles to each other.

Make transparency cut-outs of the shapes on BLM 13.1.

Select a student to add vocabulary to the Word Wall.

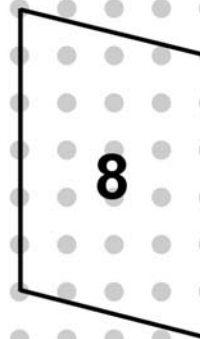
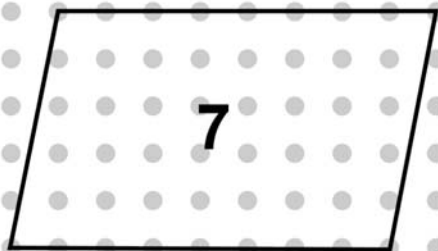
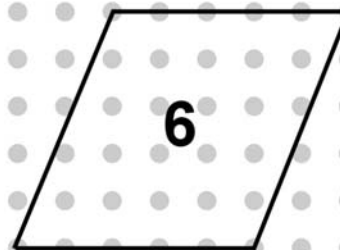
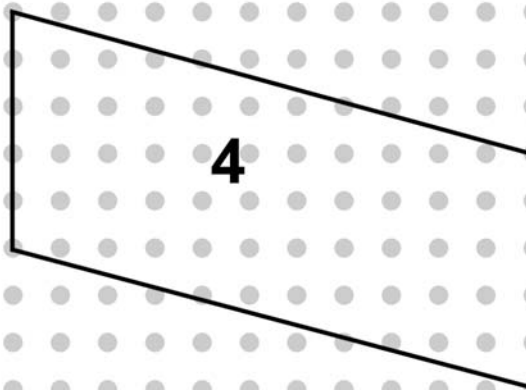
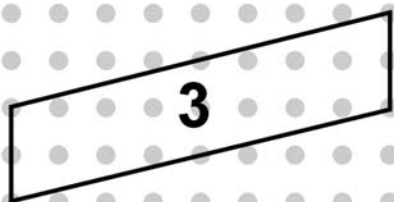
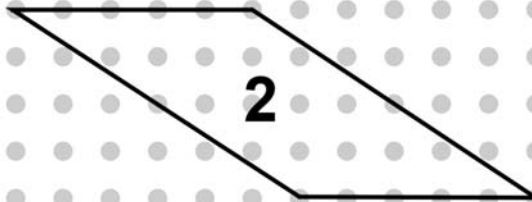
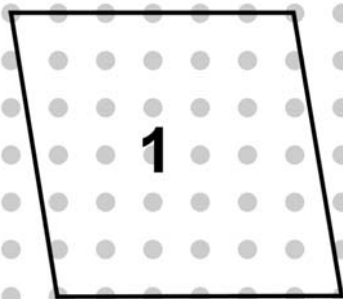
Consolidate Debrief

Exploration Skill Drill

13.1: Parallelograms

Name:

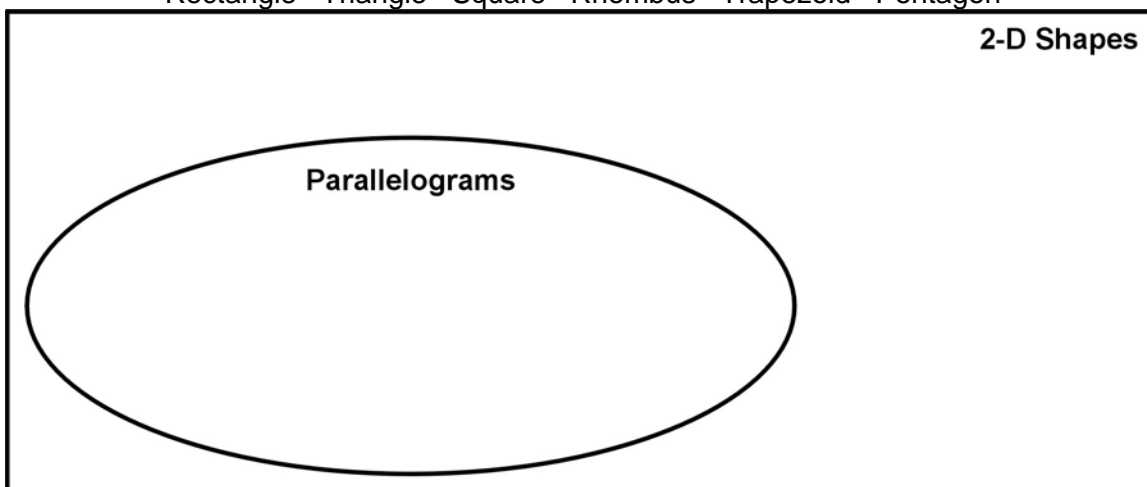
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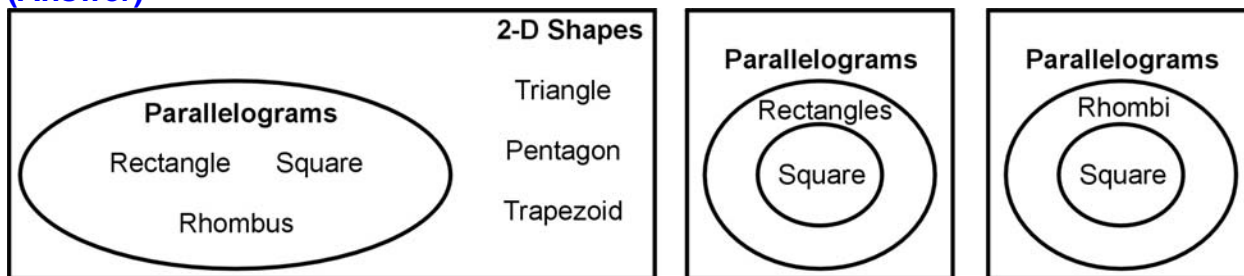
13.1 Two-Dimensional Shapes Answer Sheet (continued)

(Question)

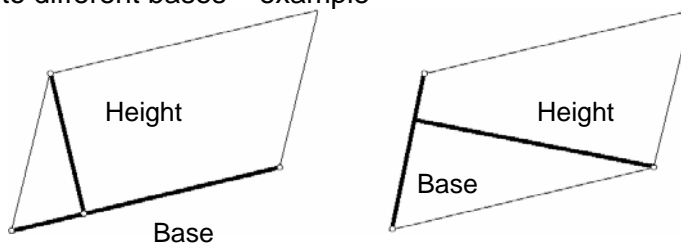
Rectangle Triangle Square Rhombus Trapezoid Pentagon



(Answer)



Constructing heights to different bases – example



Visual representation of the equality of areas of a parallelogram and rectangle

