

CUT & GLUE SORT

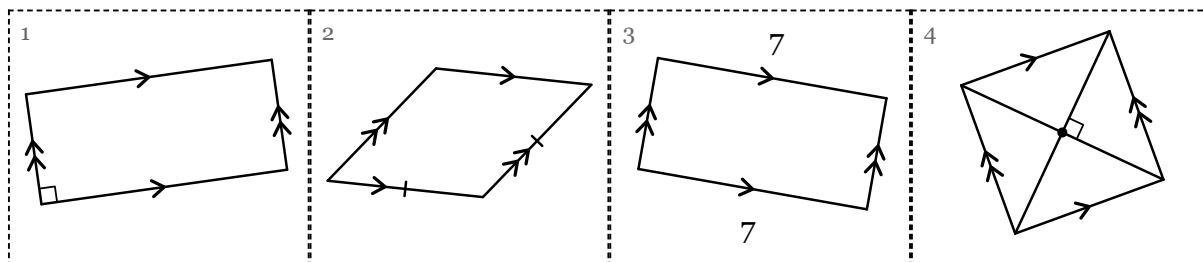


RECTANGLES, RHOMBUSES AND SQUARES

What Does One More Mark Add?

Rectangle, rhombus, or nothing new · 12 parallelograms

FREE



Cut & Glue Sort — how to run it

25 minutes, including the cutting

1. **Hand out pages 3 and 4**, one of each per student, with scissors and glue. Nothing else is needed.
2. **Say this once:** *“Every shape is already a parallelogram. Ask what the one extra mark adds. If every parallelogram has it, it adds nothing.”*
3. **Check a sheet in ten seconds:** every row gets four pieces.

Student sheets	pages 3 and 4, one of each per student. Page 3 shows a rectangle and a rhombus side by side, with what is true of each and what proves each.
Answers	page 5.

What the three rows test. A parallelogram becomes a rectangle with one right angle, with two angles next to each other equal, or with equal diagonals. It becomes a rhombus with two sides next to each other equal, with perpendicular diagonals, or with a diagonal that cuts a corner in half. Both kinds are mixed together on the sheet, as they are on tests.

The last row is the hardest, and it is the point of the lesson. Every mark in it is true, but every parallelogram already has it: opposite sides equal, opposite angles equal, diagonals that cut each other in half, and the equal angles a diagonal makes with two parallel sides. Students check that a statement is true and then choose it. The question is whether it *adds* anything. These pieces are drawn to look like rectangles or rhombuses on purpose.

Four pieces in the first two rows are drawn as squares, which is correct, because a square is both a rectangle and a rhombus. Only the mark decides the row. A student who simply trusts the drawing places at most six of the twelve pieces correctly.



This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.
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What does one more mark add?

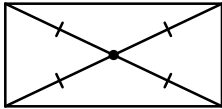
Rectangle, rhombus, or nothing

Name _____

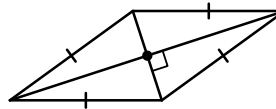
Period _____

Date _____

Cut out the twelve pieces on the next page. Every shape on them is a parallelogram: the arrowheads show it. Each one has **one more mark**. **Decide what that mark makes the parallelogram, and glue the piece in that row.**



Rectangle: four right angles. Its diagonals are **equal**. They cut each other in half. A parallelogram is a rectangle if it has **one right angle**, if **two angles next to each other** are equal, or if its **diagonals are equal**.



Rhombus: four equal sides. Its diagonals are **perpendicular**. They cut each other in half. Each diagonal cuts the two corners it joins in half. A parallelogram is a rhombus if **two sides next to each other** are equal, if its **diagonals are perpendicular**, or if a diagonal **cuts a corner in half**.

A square is both a rectangle and a rhombus. Everything true of a rectangle and everything true of a rhombus is true of a square.

Use only the marks and the numbers. Do not measure. A shape that looks like a square proves nothing. If every parallelogram has the marked fact, it adds nothing.

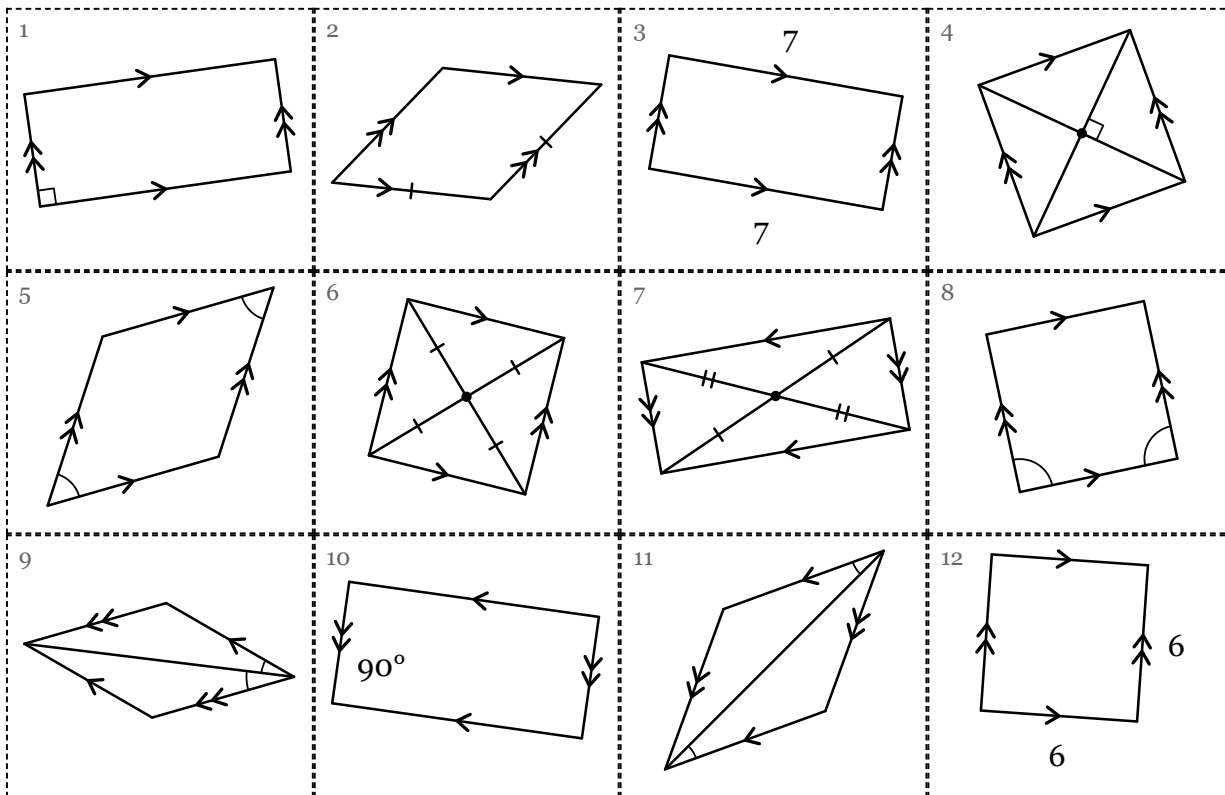
The mark makes it a rectangle.

The mark makes it a rhombus.

The mark adds nothing. Every parallelogram has it.

The twelve pieces

Cut along the dotted lines



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Cut & Glue Sort — answers

For the teacher

Rectangle	1 — A parallelogram with one right angle is a rectangle. The angles next to it add to 180° , so they are right angles too.	6 — All four pieces of the diagonals are equal, so the diagonals are equal. A parallelogram with equal diagonals is a rectangle. It looks like a square, but nothing shows the sides equal.	8 — The two marked angles are next to each other, so they add to 180° . They are also equal, so each is 90° . That makes a rectangle.	10 — The corner printed 90° is a right angle. A parallelogram with one right angle is a rectangle.
Rhombus	2 — The ticks are on two sides next to each other. Opposite sides are equal too, so all four sides are equal. That is a rhombus.	4 — The right-angle mark is where the diagonals cross, so they are perpendicular. A parallelogram with perpendicular diagonals is a rhombus. It looks like a square, but nothing shows a right angle at a corner.	9 — The two arcs are in the same corner, one on each side of the diagonal. So the diagonal cuts that corner in half. A parallelogram like that is a rhombus.	12 — The two sides printed 6 are next to each other. Opposite sides are equal too, so all four sides are 6. That is a rhombus.
Adds nothing	3 — The two sides printed 7 are opposite each other. Opposite sides of every parallelogram are equal, so this adds nothing. It looks like a rectangle, but no mark shows a right angle.	5 — The arcs are in opposite corners. Opposite angles of every parallelogram are equal, so this adds nothing.	7 — Each diagonal is cut in half, but the two diagonals are marked differently. The diagonals of every parallelogram cut each other in half, so this adds nothing.	11 — The arcs are in opposite corners, between the diagonal and two parallel sides. These alternate angles are equal in every parallelogram, so this adds nothing.

Every row holds four pieces. To check a piece with a student, ask first: “Does every parallelogram have this?” If yes, it adds nothing. If no, ask: “Is the mark about the angles or the diagonals being equal, or about the sides or a right angle at the crossing?” Equal angles next to each other, a right corner and equal diagonals make a rectangle. Equal sides next to each other, perpendicular diagonals and a halved corner make a rhombus.