

CUT & GLUE SORT

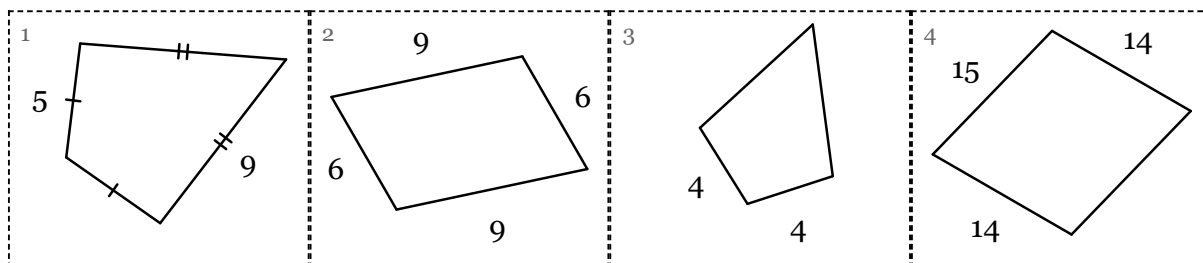


PROPERTIES OF KITES

Is It a Kite?

Yes, no, or cannot tell · ticks and side lengths

FREE



1. **Hand out pages 3 and 4**, one of each per student, with scissors and glue. Nothing else is needed.
2. **Say this once:** *“A kite has two pairs of equal sides, and the two sides of each pair meet at a corner. Use only the marks and the numbers. A shape that looks like a kite proves 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 marked kite as a small drawing.
Answers page 5.

What the three rows test. A kite is a quadrilateral with two pairs of equal sides, where the two sides of each pair are next to each other and no side is in both pairs. A piece goes in the first row when the ticks or the printed lengths show exactly that. A rhombus goes there too: on this sheet a rhombus counts as a kite. So does a dart, a kite that caves in. Some textbooks use other definitions, so tell the class which ones this sheet uses. A piece goes in the second row when its printed lengths make a kite impossible. The most common case is equal sides across from each other, which makes a parallelogram, not a kite.

The last row is the hardest, and it is the point of the lesson. Its pieces show only part of what a kite needs: one pair of equal sides, or three, or nothing at all. They are drawn to look like kites on purpose, because many students take side lengths from the drawing instead of from the marks.

Pieces 4 and 12 in the second row also look like kites, but their numbers rule it out: piece 4 is marked 14, 15 and 14, and piece 12 is marked 12 and 13. A student who simply trusts the drawing places only six of the twelve pieces correctly, and no simple guessing rule places more than six.



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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Is it a kite?

Yes, no, or cannot tell

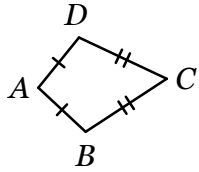
Name _____

Period _____

Date _____

Cut out the twelve pieces on the next page. Each piece shows a quadrilateral with marks or numbers.

Decide which row the piece belongs in, and glue it there.



A **kite** has two pairs of equal sides. The two sides of each pair **meet at a corner**.

In this lesson a **rhombus** counts as a kite. A **dart**, a kite that caves in, counts as a kite too. If one diagonal cuts the other **in half** and they meet at a **right angle**, the shape is a kite.

Use only the marks and the numbers. Do not measure. Sides with the same ticks are equal. Sides with the same number are equal. A shape that looks like a kite proves nothing.

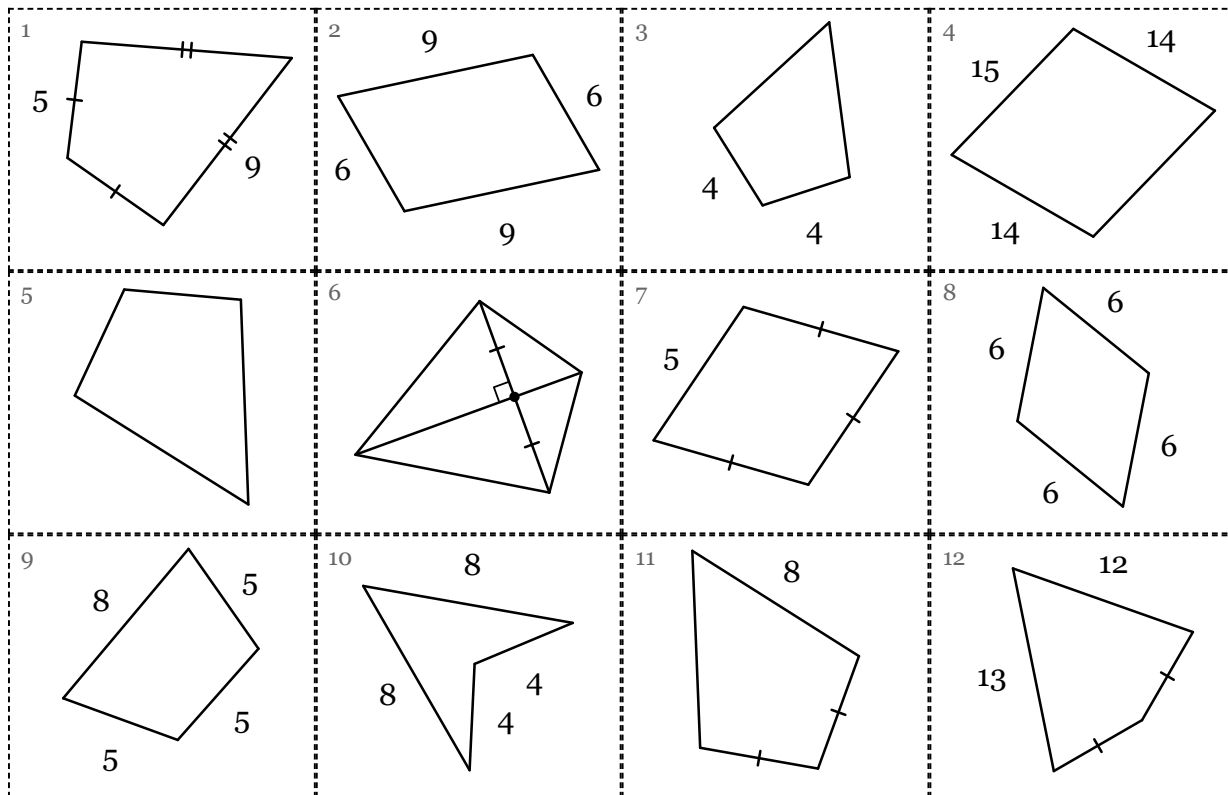
Yes. The marks prove it is a kite.

No. The numbers show it is not a kite.

Cannot tell. The marks are not enough.

The twelve pieces

Cut along the dotted lines



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Cut & Glue Sort — answers

For the teacher

Yes	1 — The ticks show two pairs of equal sides, and the two sides of each pair meet at a corner. That is a kite. The 5 and the 9 are only the sizes of the two pairs.	6 — The diagonals meet at a right angle, and the ticks show one diagonal cut in half. So the other diagonal is its perpendicular bisector. Each of its two ends is the same distance from both ends of the cut diagonal. That gives two pairs of equal sides, so it is a kite.	8 — All four sides are 6, so it is a rhombus. Its sides make two pairs of equal sides next to each other, so a rhombus counts as a kite.	10 — The two sides of 4 meet at a corner, and the two sides of 8 meet at a corner. The shape caves in, but it is still a kite. This kind of kite is called a dart.
No	2 — The two sides of 6 are across from each other, and so are the two sides of 9. No two sides next to each other are equal, so it is not a kite. It is a parallelogram.	4 — In a kite every side has an equal partner next to it. The side of 15 has a side of 14 on each side of it, so it has no partner. It is not a kite, even though it looks close.	9 — A kite needs two separate pairs of equal sides. The side of 8 must be in a pair, but both sides next to it are 5. So it is not a kite.	12 — The two ticked sides meet at a corner. For a kite the other two sides must be equal too, but they are 12 and 13. It is not a kite, even though it looks close.
Cannot tell	3 — The two sides of 4 meet at a corner, but the other two sides have no marks. Nothing says they are equal, so the marks are not enough.	5 — Nothing is marked. It looks like a kite, but a drawing proves nothing.	7 — Three sides are marked equal and the fourth side is 5. It is a kite only if the three ticked sides are 5 too, and nothing marks that.	11 — The two ticked sides are equal, and one other side is 8. Nothing says the last side is 8, so the marks are not enough.

Every row holds four pieces. To check a piece with a student, ask first: “Which sides are marked equal, and do the two sides of each pair meet at a corner?” If there are two such pairs, it is Yes. Then ask: “Do the printed lengths make two such pairs impossible?” If so, it is No. Otherwise it is Cannot tell, and the student should say which side is not marked.