

CUT & GLUE SORT

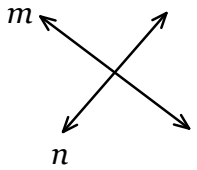
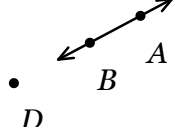
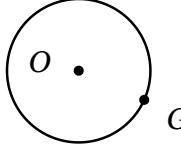
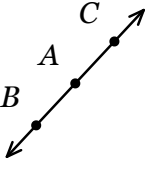


POINTS, LINES, PLANES AND DEFINITIONS

What Does a Figure Actually Tell You?

True · false · impossible to tell

FREE

A  Line m is perpendicular to line n.	B  D is on line AB.	C  O is on the circle.	D  Ray AB and ray AC are the same ray.
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Cut & Glue Sort — how to run it

25 minutes, including the cutting

1. **Hand out pages 3 and 4**, one of each per student. Also hand out scissors and glue.
2. **Say this once:** *“A figure shows you which points are on which lines. It never shows you a right angle, a parallel pair, or an equal length. Only a mark can show you that.”*
3. **Every row gets 4 pieces.** A row with more or fewer has a piece in the wrong place.

Student sheets pages 3 and 4, one of each per student.

Answers page 5.

The third row is the hard one. A figure can be trusted to show which points lie on which lines, and which point is between two others. It cannot be trusted to show a right angle, a parallel pair, or an equal length. Only a mark can show those. So the four pieces in *impossible to tell* have no mark: two crossings with no square, a pair of lines with no parallel marks, and a pair of segments with no tick marks.

The same sentences also appear in the other rows. There, a mark decides them. A perpendicular sentence is TRUE when a small square marks the crossing. A parallel sentence is FALSE when the two lines clearly cross, because parallel lines never meet. A length sentence is TRUE when both segments carry a tick mark. So the words of the sentence alone never decide the row.

The TRUE and FALSE rows test the definitions. A point past the arrowhead is on the line. A point past a segment's endpoint is not on the segment. The center of a circle is not on the circle. Ray AB and ray AC are the same ray when B and C are on the same side of A. They are opposite rays when A is between B and C. A student who simply trusts the drawing gets only five of the twelve pieces right.



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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True, false, or impossible to tell?

Points, lines and planes

Name _____

Period _____

Date _____

Cut out the twelve pieces on the next page. Read each sentence. Check it against its figure. Decide if the sentence is true, false, or impossible to tell. Glue it into the matching row. **A figure tells you which points are on which lines and in what order. It does not tell you that lines are perpendicular or parallel. It does not tell you that lengths are equal, unless a mark says so.** Every row gets 4 pieces.

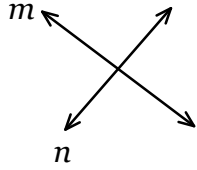
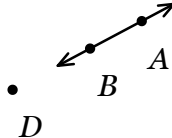
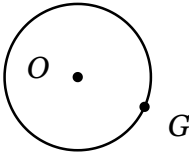
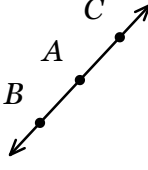
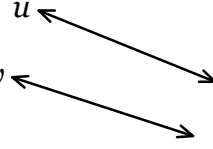
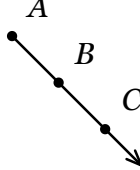
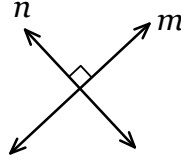
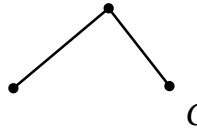
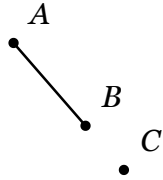
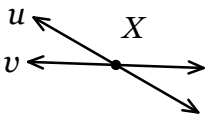
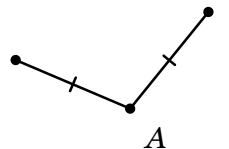
TRUE: the figure shows the sentence is true

FALSE: the figure shows the sentence is false

IMPOSSIBLE TO TELL: the figure does not show either

The twelve pieces

Cut along the dotted lines

A  Line m is perpendicular to line n.	B  D is on line AB.	C  O is on the circle.	D  Ray AB and ray AC are the same ray.
E  Line u is parallel to line v.	F  Ray AB and ray AC are the same ray.	G  Line m is perpendicular to line n.	H  AB and AC are the same length.
J  C is on segment AB.	K  Line m is perpendicular to line n.	L  Line u is parallel to line v.	M  AB and AC are the same length.



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Cut & Glue Sort — answers

For the teacher

TRUE	B — The arrowhead means the line goes on.	F — B and C are on the same side of A.	G — The square mark says so.	M — The tick marks say so.
FALSE	C — The center is inside the circle, not on it.	D — A is between B and C, so the rays are opposite.	J — A segment stops at its endpoint B.	L — They meet at X. Parallel lines never meet.
IMPOSSIBLE TO TELL	A — There is no square mark. Looking square is not enough.	E — There are no parallel marks.	H — There are no tick marks. A drawing is not a measurement.	K — There is no square mark. Looking square is not enough.

The pieces in IMPOSSIBLE TO TELL are drawn close to what their sentence says, but never exactly. The two crossings are drawn at 86° and 94° . The two lines are 4° away from parallel. The two segments differ by 3.5 mm. So a student who measures a piece will never find that this key is wrong.