

CUT & GLUE SORT

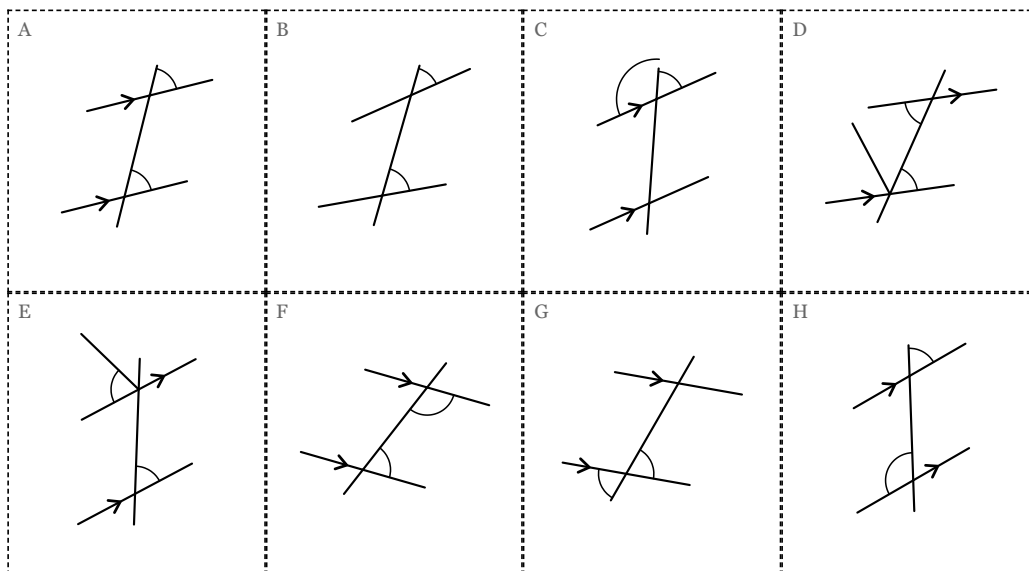


UNKNOWN ANGLES WITH PARALLEL LINES

Unknown Angles with Parallel Lines

Equal · adds to 180° · no way to tell

FREE



1. **Hand out both sheets, scissors and glue.** You cut nothing.
2. **Say this once:** *“Find the two lines with the arrowheads first. If one of your two angles is not made by those lines, the rules on your sheet tell you nothing at all.”*
3. **Cut out the twelve pieces.** Glue each one into its row: equal, adds to 180° , or no way to tell. **Every row gets exactly 4.**

Both sheets pages 3 and 4, one of each per student. Page 3 carries the six reasons as pictures.
Answers page 5.

The third row is the lesson, not a trick, and it has two different reasons in it. Pieces B and I are two lines that are *not* parallel: no arrowheads, and not one relationship says anything. Pieces E and L *are* parallel — and one of the two marked angles is made by a third line the arrowheads say nothing about. That second kind is the mistake that costs marks on a test, because the working looks exactly like correct working and the answer is confidently wrong.

Do not warn them about the third line. 4 of the twelve carry one and 2 of those have a perfectly good answer, so “three lines means no answer” is not a rule and a student who invents it will get those 2 wrong. What they have to do instead is the thing this lesson is for: look at *which* two lines their two angles are made by.

And the cue for the first kind is the missing arrowheads and nothing else. The two lines do not visibly run together — over this much paper they never meet — so a student looking for a picture of non-parallel lines will not find one.

What to say when they ask, and they will. “Could I measure it?” Yes — and then you would know about *that drawing*. The relationships tell you the answer without measuring, and they only do that when the two lines are parallel and both of your angles are on them.

Marking takes ten seconds a sheet. Every row holds 4 pieces. A row holding 3 or 5 is wrong before you read a single piece.

Twenty-five minutes, not fifteen. Cutting twelve pieces is five to eight minutes on its own for hands this age, before anybody has thought about an angle.



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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Where does each one go?

Unknown angles with parallel lines

Name _____

Period _____

Date _____

Cut out the twelve pieces. Glue each one into its row. Every row gets 4. **A name below works only if both of your angles are made by the two lines with the arrowheads.**



Corresponding
equal



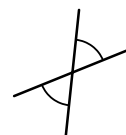
Alternate interior
equal



Alternate exterior
equal



Same-side interior
add to 180°



Vertical angles
equal



Linear pair
add to 180°

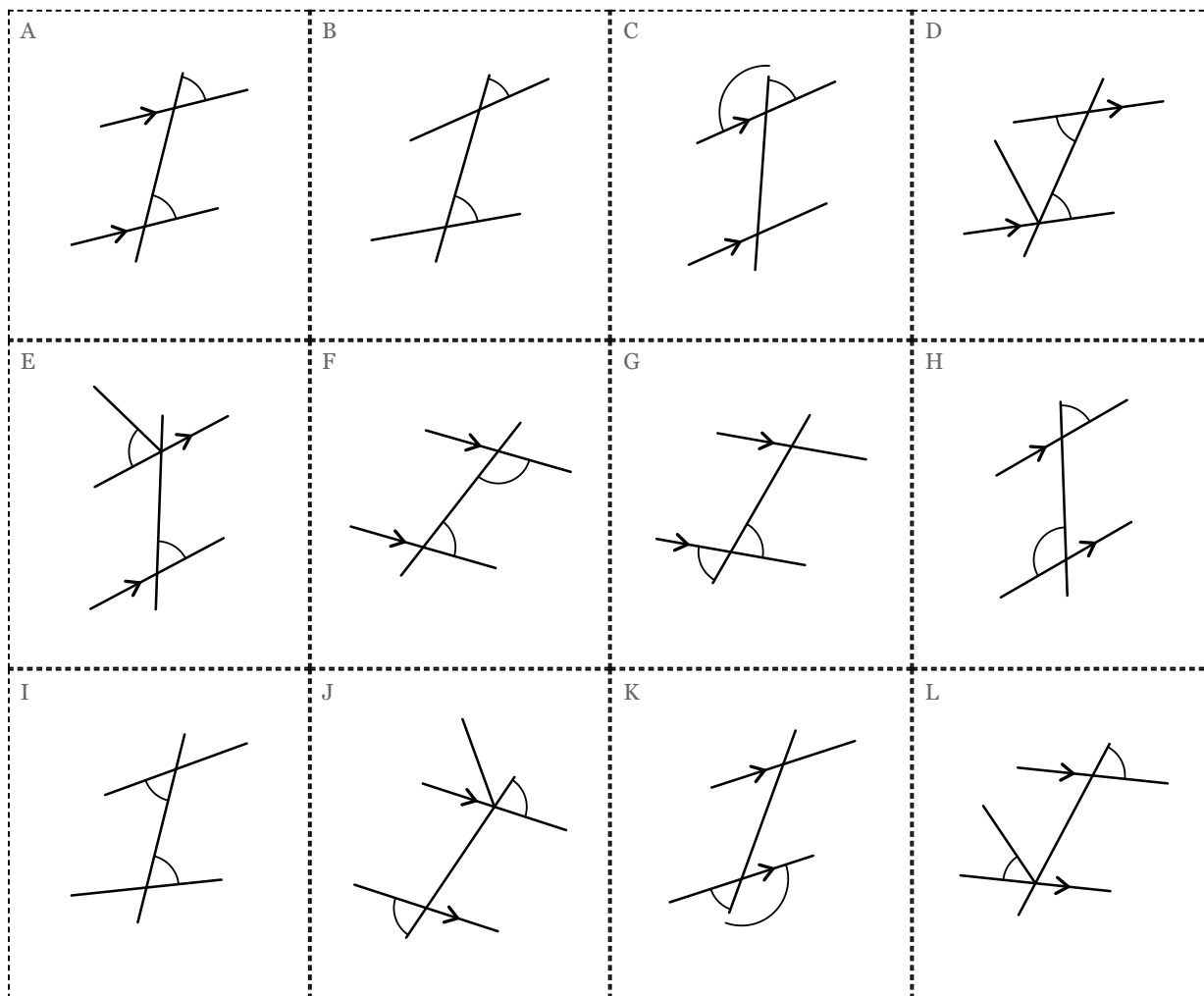
The two marked angles are EQUAL

The two marked angles ADD TO 180°

There is no way to tell *Some of the twelve pieces belong here.*

The twelve pieces

Cut along the dotted lines



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Cut & Glue Sort — answers

For the teacher

4 pieces to a row, always. A row holding 3 or 5 is wrong before any piece is read.

EQUAL **A** — corresponding angles
 D — alternate interior angles
 G — vertical angles
 J — alternate exterior angles

ADD TO 180° **C** — linear pair
 F — same-side interior angles
 H — two steps
 K — linear pair

There is no way to tell **B** — the two lines are not parallel
 E — one angle is made by the third line
 I — the two lines are not parallel
 L — one angle is made by the third line

Why "two steps" is a whole answer. On those pieces the marked pair is not corresponding, alternate or same-side — there is no single name for it. The route is one relationship across to the other crossing and then a linear pair at that crossing, and the two marked angles add to 180° . A student who can say those two steps out loud has done everything this lesson asks for, and the piece is in the right row.

Why the third row has no answer, in the words to use if you are asked. Every relationship on the student's sheet is a name for *where* two angles sit, and every one of them comes with a promise — equal, or adds to 180° . The first four make that promise on condition that the two cut lines are parallel *and that both angles are made by those two lines with one line crossing them*. Take away the arrowheads, or move one angle onto a third line, and the name still fits the picture while the promise is gone. Those four pieces can be described; they cannot be answered.