

MYSTERY PICTURE

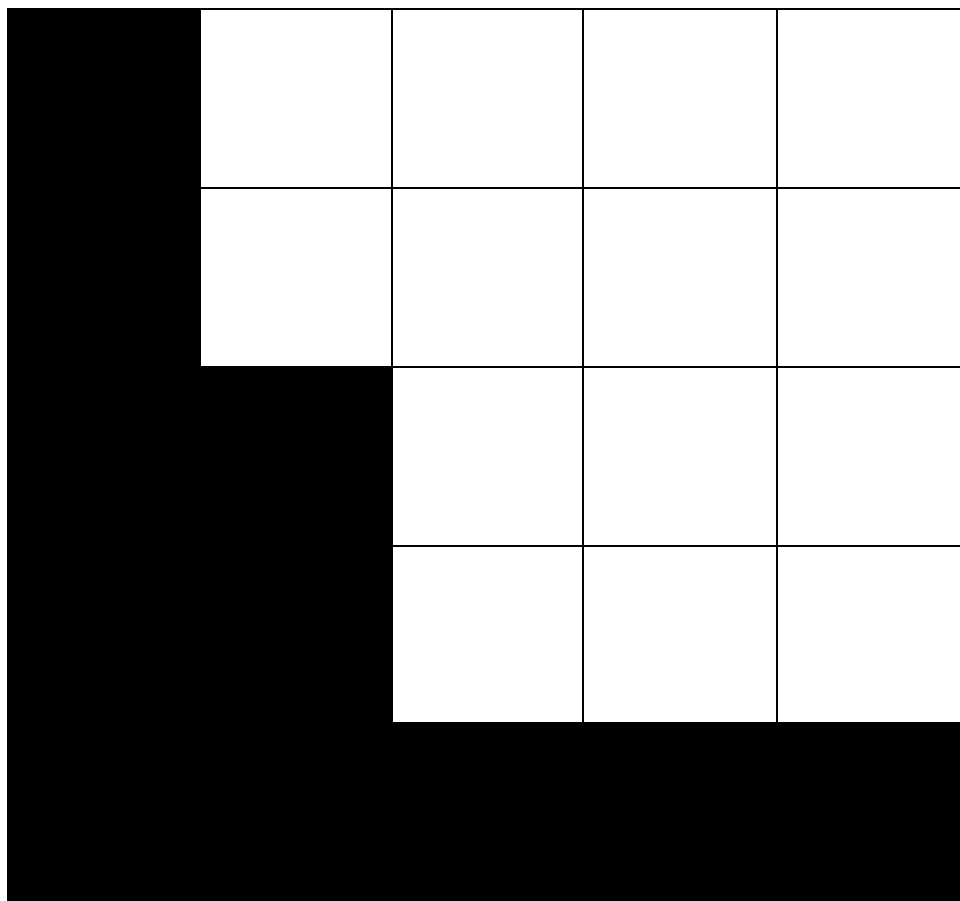


UNKNOWN ANGLES WITH PARALLEL LINES

Unknown Angles with Parallel Lines

No arithmetic · wrong answers show in the picture

FREE



1. **Hand out page 3.** That is the whole preparation.
2. **Say this once:** *“There are only two different numbers in each of these pictures, and they add to 180. Every square asks you which of the two you have.”*
3. **Fill the square if the two marked angles are equal. Leave it white if they add to 180° .** A picture appears. 11 of the 25 squares are filled.

Student sheet page 3, one per student. It carries the six reasons as pictures.
Answers page 4 — the finished picture and what every square is.

There is no arithmetic in this at all, and that is deliberate. Not one angle carries a measure. A chase on this lesson is two or three steps of *naming* with one subtraction at the end, and the naming is the part that goes wrong. This sheet is the chase with the subtraction taken out, twenty-five times.

9 of the twenty-five have both arcs at one crossing, where the answer is vertical angles or a linear pair and the parallel lines have nothing to do with it. Another 4 of them are pairs with no name at all: the only way through is two steps — *this one equals that one, and that one and the marked one make a straight line*. Those are the squares worth listening to a student think aloud about.

The picture is the marking, so you collect nothing to know who has it. One square wrong and the shape has a bite out of it, and the student sees that from their own desk before you do. The sheet tells them so, and tells them what to do about it.

Why the sheet says slanted lines and not “color it in”. 11 squares of pencil shading comes out pale grey, and pale grey is the one thing that does not survive a school copier. Hatching survives, it is faster, and the drawing stays readable underneath so a student can check a square again.

If a student is stuck on a square, do not name the relationship for them. Ask *“which of the six pictures at the top of your sheet is this one?”* If it is none of them, it is a two-step square, and the question becomes *“can you find an angle that you know is equal to one of the two marked ones?”* — after that the square is one of the 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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Mystery Picture

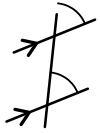
Unknown angles with parallel lines

Name _____

Period _____

Date _____

The two lines with arrowheads are parallel. Equal? Fill the square with slanted lines. Add to 180° ? Leave it white. Some take two steps. A picture appears. If it does not look right, one square is wrong.



Corresponding
equal



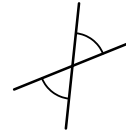
Alternate interior
equal



Alternate exterior
equal



Same-side interior
add to 180°



Vertical angles
equal



Linear pair
add to 180°

1 	2 	3 	4 	5
6 	7 	8 	9 	10
11 	12 	13 	14 	15
16 	17 	18 	19 	20
21 	22 	23 	24 	25

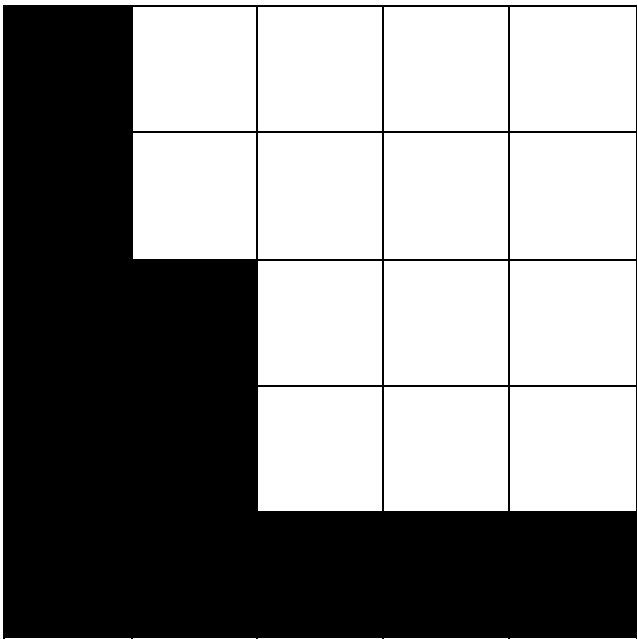


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Mystery Picture — answers

For the teacher

The finished sheet, and what every square is. The table reads left to right, the way the sheet is read; the squares are numbered on the student's sheet.



1–5	Corresponding angles <i>fill</i>	Linear pair <i>white</i>	Same-side interior angles <i>white</i>	Two steps <i>white</i>	Linear pair <i>white</i>
6–10	Vertical angles <i>fill</i>	Same-side interior angles <i>white</i>	Linear pair <i>white</i>	Two steps <i>white</i>	Linear pair <i>white</i>
11–15	Alternate interior angles <i>fill</i>	Corresponding angles <i>fill</i>	Same-side interior angles <i>white</i>	Two steps <i>white</i>	Linear pair <i>white</i>
16–20	Vertical angles <i>fill</i>	Alternate exterior angles <i>fill</i>	Same-side interior angles <i>white</i>	Two steps <i>white</i>	Linear pair <i>white</i>
21–25	Alternate interior angles <i>fill</i>	Corresponding angles <i>fill</i>	Vertical angles <i>fill</i>	Alternate exterior angles <i>fill</i>	Corresponding angles <i>fill</i>

Squares 4, 9, 14, 19 have no name, and they are the two-step ones. The marked pair is not corresponding, alternate or same-side: the route is one relationship across to the other crossing and then a linear pair, or a linear pair first and then the relationship. Either way the two marked angles add to 180°, and either way a student who says so has done the whole of what this lesson asks for.

Every one of the first four reasons on the student's strip says what it says only because the two lines are parallel. Take the arrowheads off any square on this sheet and it has no answer at all — except the ones that are vertical angles or a linear pair, which never needed them.