

MYSTERY PICTURE

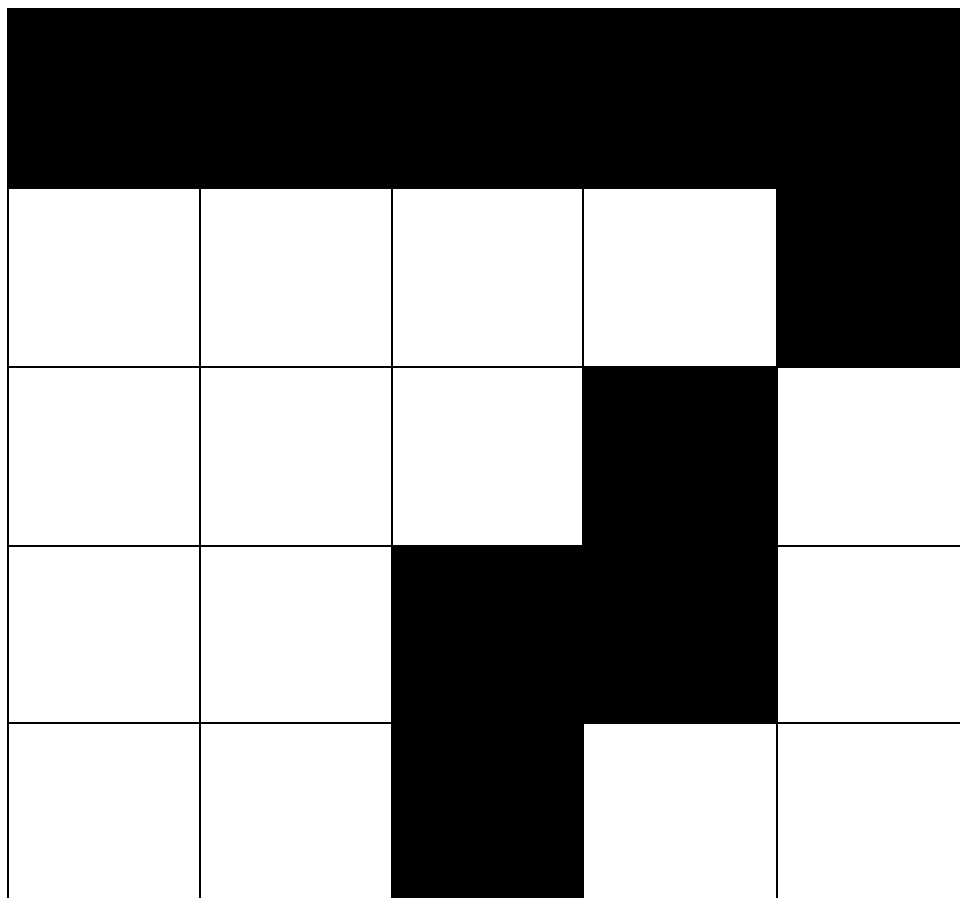


ISOSCELES AND EQUILATERAL TRIANGLES

Must These Two Angles Be Equal?

25 triangles · read the ticks, not the look

FREE



1. **Hand out page 3**, one per student. Pencils. Nothing else is needed.
2. **Say this once:** *“Two sides with the same ticks are equal. Then the two angles opposite those sides are equal. If the two dashed angles must be equal, fill the square. If not, leave it white.”*
3. **When a student finishes, look at the picture.** If it is not the number 7, a square is wrong. The student finds it and checks it again.

Student sheet	page 3, one per student. It shows the base angles theorem and its converse as two small drawings.
Answers	page 4: the finished picture and the reason for every square.

This sheet practices one skill: which two angles does the theorem make equal? If two sides of a triangle are equal, the angles *opposite* those sides are equal. The third angle, where the two equal sides meet, is usually different. The triangles are turned every way: resting on an equal side, upside down, tall and narrow, wide. So the two equal angles are often not the two at the bottom.

The white squares are the three common mistakes. In ten of them, one dashed angle is where the two ticked sides meet. In four, the triangle looks like it has two equal sides, but no side has a tick. The marks say nothing, so nothing must be equal. In one, one side has one tick and another has two, so those sides are not marked equal. The two triangles with three ticks are filled: any two of their angles must be equal. Students often miss this, because they believe an equilateral triangle is not isosceles.

Ten squares are filled and fifteen are white. Guessing does not work. Every simple guessing rule, such as filling the square when the two dashed angles look the same size, gets at least ten squares wrong.



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.
chooseyourlesson.com — 135 free geometry lessons.

Mystery Picture

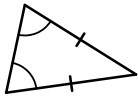
Must the two angles be equal?

Name _____

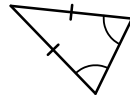
Period _____

Date _____

Each square shows one triangle. Two of its angles have a dashed arc. Must those two angles be equal? If yes, fill the square with slanted lines. If no, leave it white. Use only the ticks. Do not measure. A triangle can look even and have no ticks.



Two sides are equal. So the two angles **opposite** them are equal.



Two angles are equal. So the two sides **opposite** them are equal.

Sides with the same number of ticks are equal. Angles with the same number of arcs are equal.

When you finish, look at the picture. If part of it is missing, or one square does not fit, check that square again.

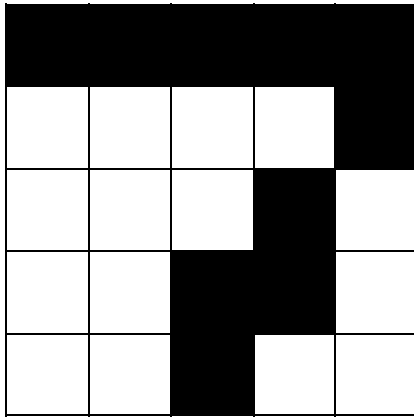
1 	2 	3 	4 	5
6 	7 	8 	9 	10
11 	12 	13 	14 	15
16 	17 	18 	19 	20
21 	22 	23 	24 	25



135 free geometry lessons — worksheets, worked answers and lesson plans.
chooseyourlesson.com

Mystery Picture — answers

For the teacher



The finished picture is **the number 7**: a bar along the top, and a stroke from its right end down to the bottom.

A square is filled when each dashed angle is opposite a side with a tick, and the two ticked sides have the same number of ticks. A triangle with three ticked sides has all three angles equal.

To check a square with a student, point to each dashed angle and ask which side is across from it.

1–5	1 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.	2 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.	3 · FILL All three sides have ticks, so all three angles are equal. Any two of them must be equal.	4 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.	5 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.
6–10	6 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	7 · white No side has a tick. The triangle looks even, but the marks say nothing, so the angles need not be equal.	8 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	9 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	10 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.
11–15	11 · white One side has one tick and the other has two. Those sides are not marked equal, so the angles opposite them need not be.	12 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	13 · white No side has a tick. The triangle looks even, but the marks say nothing, so the angles need not be equal.	14 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.	15 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.
16–20	16 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	17 · white No side has a tick. The triangle looks even, but the marks say nothing, so the angles need not be equal.	18 · FILL All three sides have ticks, so all three angles are equal. Any two of them must be equal.	19 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.	20 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.
21–25	21 · white No side has a tick. The triangle looks even, but the marks say nothing, so the angles need not be equal.	22 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	23 · FILL Each dashed angle is opposite a side with ticks, and the two sides have the same ticks. So the two angles must be equal.	24 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.	25 · white One dashed angle is where the two ticked sides meet. The equal angles are the two opposite the ticked sides, and this is not that pair.