

ANSWER MAZE



ISOSCELES AND EQUILATERAL TRIANGLES

Which Angles Are Equal?

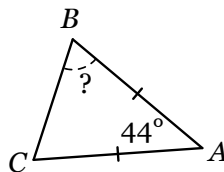
One page · 10–15 minutes · nothing to prepare

FREE

5

Two sides have ticks.
 $m\angle A = 44^\circ$. What is
 $m\angle B$?

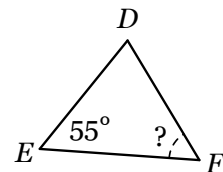
$92^\circ \rightarrow$ go to 7
 $68^\circ \rightarrow$ go to 2



Find the corner where the two sides with ticks meet.

2

$m\angle E = 55^\circ$. What is
 $m\angle F$?
Cannot tell. No sides
have ticks. $\rightarrow$ go to 8
 $55^\circ \rightarrow$ go to 4



Count the ticks on the sides.

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Start at box 5. Look at the ticks and arcs before you choose. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **5 2 8 1 6 3**: six boxes, then out.

Student sheet	page 3, one per student. It shows the base angles theorem and its converse as two small drawings.
Answers	page 4.

Every wrong answer comes from one of two mistakes. The first is taking the two angles at the bottom of the page as the equal pair. In these boxes the triangle rests on one of its two equal sides, so the equal angles are not the two at the bottom. The equal angles are always the two opposite the sides with ticks. These wrong answers send the student to box 7.

The second mistake is trusting the look of the triangle instead of its marks. One box shows a triangle that looks like it has two equal sides but has no ticks, so its angles cannot be found. Another has ticks on all three sides and no angle printed, and each angle is still 60° . Another has two equal angles marked with arcs, so the sides opposite them are equal by the converse. These wrong answers send the student to box 4. That box has no ticks, and its missing angle can still be found from the angle sum. Boxes 7 and 4 both lead back to the route.

The row at the bottom is the check. A clean run is six numbers. Each wrong answer adds at least one more. Guessing does not get a student out: every simple guessing rule, such as always taking the first answer, goes wrong within the first three boxes.



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.

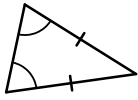
Answer Maze

Start at box 5 · which angles are equal?

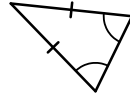
Name _____

Period _____

Date _____



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



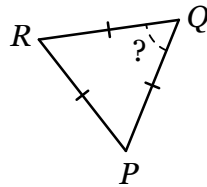
Two angles are equal. So the two sides **opposite** them are equal.

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

Each box shows one triangle. The angle with a dashed arc and a “?” is the one asked for. Choose an answer, and go to the box it names.

1

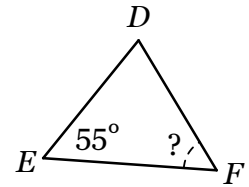
All three sides have ticks.
What is $m\angle Q$?
Cannot tell. No angle is given. → go to 4
 $60^\circ \rightarrow$ go to 6



All three sides carry ticks. Take the angles two at a time.

2

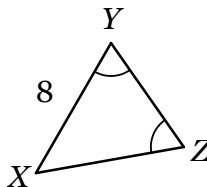
$m\angle E = 55^\circ$. **What is $m\angle F$?**
Cannot tell. No sides have ticks. → go to 8
 $55^\circ \rightarrow$ go to 4



Count the ticks on the sides.

3

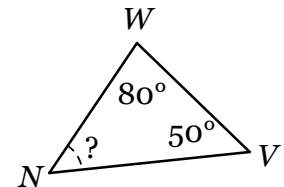
Two angles have arcs. $XY = 8$. **How long is XZ ?**
Cannot tell. No sides have ticks. → go to 4
 $XZ = 8 \rightarrow$ you are out



Two angles carry arcs. Which sides are across from them?

4

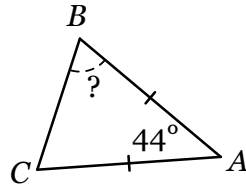
$m\angle V = 50^\circ$. $m\angle W = 80^\circ$. **What is $m\angle N$?**
 $50^\circ \rightarrow$ go to 8
Cannot tell. No sides have ticks. → go to 2



Two angles are known. What do the three angles of a triangle add to?

5

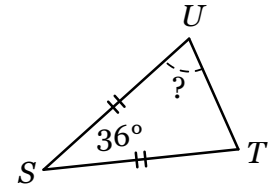
Two sides have ticks.
 $m\angle A = 44^\circ$. **What is $m\angle B$?**
 $92^\circ \rightarrow$ go to 7
 $68^\circ \rightarrow$ go to 2



Find the corner where the two sides with ticks meet.

6

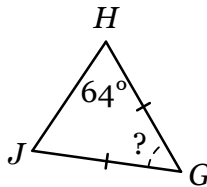
Two sides have ticks.
 $m\angle S = 36^\circ$. **What is $m\angle U$?**
 $72^\circ \rightarrow$ go to 3
 $108^\circ \rightarrow$ go to 7



Put a finger on each side with ticks. Name the angle across from it.

7

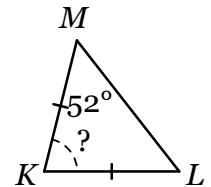
Two sides have ticks. $m\angle H = 64^\circ$. **What is $m\angle G$?**
 $58^\circ \rightarrow$ go to 5
 $52^\circ \rightarrow$ go to 2



The bottom of the page does not decide the pair. The ticks do.

8

Two sides have ticks. $m\angle M = 52^\circ$. **What is $m\angle K$?**
 $76^\circ \rightarrow$ go to 1
 $64^\circ \rightarrow$ go to 7



Which angle is across from each side with a tick?

Write each box number as you reach it:

--	--	--	--	--	--	--	--	--



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Answer Maze — answers

For the teacher

The route, in order. Boxes 7 and 4 are not on it. A student reaches them only by a wrong answer. They are the last two rows of the table.

5 → 2 → 8 → 1 → 6 → 3 → out

	Box	Right answer, and why	Wrong answer, and why a student picks it
1	Box 5	68° AB and AC have ticks, so the angles opposite them, $\angle B$ and $\angle C$, are equal. $180 - 44 = 136$, and half of that is 68.	"92°" goes to box 7. A student who takes $\angle A$ and $\angle C$, the two angles at the bottom, as the equal pair picks this.
2	Box 2	Cannot tell. No sides have ticks. No side has a tick, so nothing says the triangle has two equal sides. It only looks that way. $\angle F$ could be many sizes.	"55°" goes to box 4. A student who trusts the look of the triangle picks this.
3	Box 8	76° KL and KM have ticks, so the angles opposite them, $\angle L$ and $\angle M$, are equal. So $m\angle L$ is also 52° , and $180 - 52 - 52 = 76$.	"64°" goes to box 7. A student who takes $\angle K$ and $\angle L$, the two angles at the bottom, as the equal pair picks this.
4	Box 1	60° All three sides have ticks. Using the theorem with each pair of sides, all three angles are equal. They add to 180° , so each is $180 \div 3 = 60^\circ$.	"Cannot tell. No angle is given." goes to box 4. A student who uses the theorem once and stops, or who believes an equilateral triangle is not isosceles, picks this.
5	Box 6	72° ST and SU have ticks, so the angles opposite them, $\angle T$ and $\angle U$, are equal. $180 - 36 = 144$, and half of that is 72.	"108°" goes to box 7. A student who takes $\angle S$ and $\angle T$, the two angles at the bottom, as the equal pair picks this.
6	Box 3	XZ = 8 $\angle Y$ and $\angle Z$ have arcs, so the sides opposite them are equal (the converse). XZ is opposite $\angle Y$ and XY is opposite $\angle Z$, so $XZ = XY = 8$.	"Cannot tell. No sides have ticks." goes to box 4. A student who does not use the converse, and thinks only ticks can show equal sides, picks this.
	Box 7	52° GH and GJ have ticks, so the angles opposite them, $\angle H$ and $\angle J$, are equal. So $m\angle J$ is also 64° , and $180 - 64 - 64 = 52$.	"58°" goes to box 5. A student who still takes $\angle G$ and $\angle J$, the two angles at the bottom, as the equal pair picks this.
	Box 4	50° The three angles of every triangle add to 180° . So $m\angle N = 180 - 50 - 80 = 50^\circ$. No ticks are needed for this.	"Cannot tell. No sides have ticks." goes to box 2. A student who thinks no ticks means nothing can be found picks this. The angle sum works for every triangle.

How to check any box. Point to each side with ticks and name the angle across from it. Those two angles are equal. The third angle, where the two ticked sides meet, is the odd one. If there are no ticks and no arcs, only the angle sum can help.

A student can find the last four boxes of the route by following the arrows backward from "you are out." So ask a student with a clean row to explain one box.