

ANSWER MAZE



CLASSIFYING TRIANGLES ON THE COORDINATE PLANE

Name the Triangle in Two Words

Classifying triangles from their corners · one page · 10–15 minutes ·
nothing to prepare

FREE

3 Corners $A(-2, 3)$, $B(4, 5)$ and $C(0, -3)$

scalene right → **go to box 2**

isosceles right → **go to box 6**

Hint: Find the squares of all three sides. Then compare them two at a time.

6 Corners $J(-3, -2)$, $K(3, 0)$ and $L(-5, 2)$

scalene obtuse → **go to box 1**

scalene acute → **go to box 5**

Hint: Find the longest side first. Compare its square with the sum of the other two squares.

1. **Hand out page 3**, one per student, and scrap paper. No calculator is needed.
2. **Say this once:** *“Start at box 3. Find the squares of the three sides. Name the triangle in two words: one for the sides, one for the angles. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **3 6 1 8 4 7**: six boxes, then out.

Student sheet page 3, one per student. A box at the top shows the six names and how to decide them.
Answers page 4.

Every box gives a triangle by its three corners. The student finds the square of each side, (across)² + (up)². Two equal squares mean two equal sides. Then the student takes the largest square and compares it with the sum of the other two: smaller means acute, equal means right, larger means obtuse.

Each wrong name is wrong in one word. A wrong side word sends the student to box 2. It comes from calling a right triangle scalene when two of its sides match, or from taking two opposite slopes to mean two equal sides. A wrong angle word sends the student to box 5. It comes from adding the first two squares instead of the two smaller ones, or from thinking two equal sides make a right angle. Boxes 2 and 5 ask the same kind of question again, and both of their answers 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, and the extra box number tells you which word went wrong. Guessing does not get a student out: every simple guessing rule, such as always taking the answer printed first, 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.
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Answer Maze — name the triangle

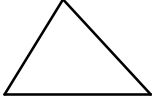
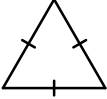
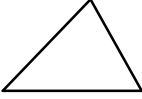
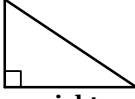
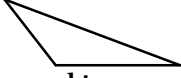
Start at box 3

Name _____

Period _____

Date _____

Start at box 3. **Each box gives the three corners of a triangle. Name the triangle in two words: one for its sides, then one for its angles.** Pick one answer and go to the box it names. Write each box number in the row at the bottom as you go.

 scalene no two sides the same length	 isosceles at least two sides the same length	 equilateral all three sides the same length	 acute $c^2 < a^2 + b^2$	 right $c^2 = a^2 + b^2$	 obtuse $c^2 > a^2 + b^2$
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A full name is two words, one for the sides and one for the angles: *isosceles right*, *scalene obtuse*.
Sides: find the squares of the three side lengths, (across)² + (up)². Two equal squares mean two equal sides.
Angles: *c* is the longest side, and *a* and *b* are the other two. Compare c^2 with $a^2 + b^2$.

1 Corners V(0, 5), A(-2, 1) and B(3, -1) isosceles acute → go to box 2 scalene acute → go to box 8 <i>Hint: Slopes show directions, not lengths. Compare the squares of the three sides.</i>	2 Corners M(0, 0), N(-2, -1) and P(4, -2) isosceles obtuse → go to box 3 scalene obtuse → go to box 6 <i>Hint: Slopes tell only directions. Find the squares of the three sides and compare them.</i>
3 Corners A(-2, 3), B(4, 5) and C(0, -3) scalene right → go to box 2 isosceles right → go to box 6 <i>Hint: Find the squares of all three sides. Then compare them two at a time.</i>	4 Corners X(-2, 1), Y(-1, 4) and Z(-5, 2) isosceles right → go to box 7 scalene right → go to box 2 <i>Hint: Write the three squares in a row. Then check each pair of them.</i>
5 Corners D(-3, 3), E(5, -1) and F(-3, -1) scalene right → go to box 1 scalene acute → go to box 6 <i>Hint: Find the largest square first. Then compare it with the sum of the other two.</i>	6 Corners J(-3, -2), K(3, 0) and L(-5, 2) scalene obtuse → go to box 1 scalene acute → go to box 5 <i>Hint: Find the longest side first. Compare its square with the sum of the other two squares.</i>
7 Corners G(-4, 2), H(2, 4) and K(0, -2) isosceles right → go to box 5 isosceles acute → you are out <i>Hint: Matching sides alone do not settle the angles. Compare the largest square with the sum of the other two.</i>	8 Corners R(1, 5), S(-7, -3) and T(-1, -1) isosceles obtuse → go to box 4 isosceles acute → go to box 5 <i>Hint: The longest side is not always the side named last. Find all three squares first.</i>

Write every box number here, in order.

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The route, in order. Boxes 2 and 5 are not on it. A student reaches them only by a wrong answer. They are the last two rows of the table. This sheet calls a triangle isosceles when at least two sides are the same length. Some textbooks use other definitions, so tell the class which ones this sheet uses.

3 → 6 → 1 → 8 → 4 → 7 → out

	The box's question	Right answer, and why	Wrong answer, and why a student picks it
1	Box 3 Triangle with corners A(-2, 3), B(4, 5) and C(0, -3). Name it in two words.	isosceles right. $AB^2 = 40$, $BC^2 = 80$, $CA^2 = 40$. Two squares match, so two sides are the same length: isosceles. The longest side is BC. $80 = 40 + 40 = 80$: right.	"scalene right" goes to box 2. A student who believes a right triangle cannot be isosceles stops after the angle. Two sides still match.
2	Box 6 Triangle with corners J(-3, -2), K(3, 0) and L(-5, 2). Name it in two words.	scalene obtuse. $JK^2 = 40$, $KL^2 = 68$, $LJ^2 = 20$. The three squares are all different: scalene. The longest side is KL. $68 > 20 + 40 = 60$: obtuse.	"scalene acute" goes to box 5. A student who adds the first two squares, $JK^2 + KL^2$, and compares the sum with LJ^2 gets "acute". The longest side has to be found first.
3	Box 1 Triangle with corners V(0, 5), A(-2, 1) and B(3, -1). Name it in two words.	scalene acute. $VA^2 = 20$, $AB^2 = 29$, $BV^2 = 45$. The three squares are all different: scalene. The longest side is BV. $45 < 20 + 29 = 49$: acute.	"isosceles acute" goes to box 2. The slopes of VA and VB are 2 and -2, which are opposites. That says nothing about their lengths.
4	Box 8 Triangle with corners R(1, 5), S(-7, -3) and T(-1, -1). Name it in two words.	isosceles obtuse. $RS^2 = 128$, $ST^2 = 40$, $TR^2 = 40$. Two squares match, so two sides are the same length: isosceles. The longest side is RS. $128 > 40 + 40 = 80$: obtuse.	"isosceles acute" goes to box 5. A student who adds the first two squares, $RS^2 + ST^2$, and compares the sum with TR^2 gets "acute". The longest side has to be found first.
5	Box 4 Triangle with corners X(-2, 1), Y(-1, 4) and Z(-5, 2). Name it in two words.	isosceles right. $XY^2 = 10$, $YZ^2 = 20$, $ZX^2 = 10$. Two squares match, so two sides are the same length: isosceles. The longest side is YZ. $20 = 10 + 10 = 20$: right.	"scalene right" goes to box 2. A student who believes a right triangle cannot be isosceles stops after the angle. Two sides still match.
6	Box 7 Triangle with corners G(-4, 2), H(2, 4) and K(0, -2). Name it in two words.	isosceles acute. $GH^2 = 40$, $HK^2 = 40$, $KG^2 = 32$. Two squares match, so two sides are the same length: isosceles. The longest side is HK. $40 < 32 + 40 = 72$: acute.	"isosceles right" goes to box 5. Two sides of the same length do not make a right angle.
	Box 2 Triangle with corners M(0, 0), N(-2, -1) and P(4, -2). Name it in two words.	scalene obtuse. $MN^2 = 5$, $NP^2 = 37$, $PM^2 = 20$. The three squares are all different: scalene. The longest side is NP. $37 > 5 + 20 = 25$: obtuse.	"isosceles obtuse" goes to box 3. The slopes of MN and MP are $1/2$ and $-1/2$, which are opposites. That says nothing about their lengths.
	Box 5 Triangle with corners D(-3, 3), E(5, -1) and F(-3, -1). Name it in two words.	scalene right. $DE^2 = 80$, $EF^2 = 64$, $FD^2 = 16$. The three squares are all different: scalene. The longest side is DE. $80 = 16 + 64 = 80$: right.	"scalene acute" goes to box 6. A student who adds the first two squares, $DE^2 + EF^2$, and compares the sum with FD^2 gets "acute". The longest side has to be found first.

How to check any box. Find the square of each side: (across)² + (up)². Two equal squares mean an isosceles triangle. Then compare the largest square with the sum of the other two.

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.