

ANSWER MAZE



PERIMETER AND AREA ON THE COORDINATE PLANE

Area, Then Perimeter, of the Same Figures

Figures on the coordinate plane · exact perimeters · one page · nothing to prepare

FREE

4 Triangle ABC has corners $A(6, 3)$, $B(10, 3)$ and $C(3, 7)$.
Find its area, in square units.

Area = 10 → go to box 6
Area = 8 → go to box 7

Hint: Find the side along a grid line. Count straight up from that line to the top corner.

7 Triangle ABC has corners $A(6, 3)$, $B(10, 3)$ and $C(3, 7)$.
Find its perimeter, in units.

Perimeter = $9 + \sqrt{65}$ → go to box 2
Perimeter = $10 + \sqrt{65}$ → go to box 1

Hint: Find each slant side with the distance formula, from its across and its up.

1. **Hand out page 3**, one per student, and scrap paper. No calculator is needed.
2. **Say this once:** *“Start at box 4. Read what each box asks: the area or the perimeter. A perimeter is exact, like $12 + 2\sqrt{13}$. An area is in square units. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **4 7 2 5 8 3**: six boxes, then out.

Student sheet page 3, one per student, and scrap paper for working.
Answers page 4.

The route uses three figures and asks both questions of each one. First it asks for the area, then for the perimeter of the same figure. The perimeter adds every side: a side along a grid line is a subtraction, and a slant side needs the distance formula. The area uses a base and a height along the grid lines, so it never needs a square root.

Every wrong answer comes from a common mistake. For an area: using a slant side as the height, giving the perimeter instead, forgetting the $\frac{1}{2}$, or counting grid lines instead of the spaces between them. These send the student to box 6. In box 4 the slant side is a whole number long, so the wrong area has no square root in it. In box 2 the wrong answer is the perimeter, and it is smaller than the area. For a perimeter: leaving out a side, or counting a slant side by the squares it passes through. These send the student to box 1. Boxes 6 and 1 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. Guessing does not get a student out: every simple guessing rule, such as always taking the smaller number, 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 — area, then perimeter

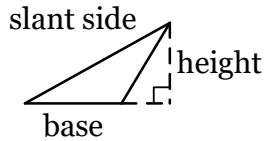
Start at box 4

Name _____

Period _____

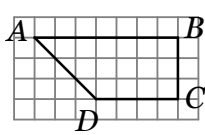
Date _____

Start at box 4. Read what the box asks: the area or the perimeter. Find it, pick one answer, and go to the box it names. Write each box number in the row at the bottom as you go.



Perimeter is the length all the way around, in units. Add every side. Leave it exact, in simplest radical form ($\sqrt{20} = \sqrt{4 \times 5} = 2\sqrt{5}$), like $12 + 2\sqrt{13}$. Do not use a decimal.

Area is the space inside, in square units. Rectangle: $\text{base} \times \text{height}$. Triangle: $\frac{1}{2} \times \text{base} \times \text{height}$. The height goes straight up, down or across from the base line to the opposite corner. A slant side is never the height. An area never needs a square root here.

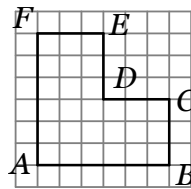


1

Quadrilateral ABCD has corners $A(3, 6)$, $B(10, 6)$, $C(10, 3)$ and $D(6, 3)$. **Find its perimeter, in units.**

Perimeter = $14 + 3\sqrt{2}$ → go to box 2
Perimeter = $10 + 3\sqrt{2}$ → go to box 7

Hint: Write every side with its length, all the way around, before adding.

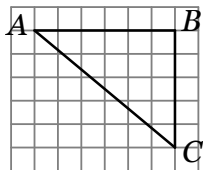


2

Hexagon ABCDEF has corners $A(2, 2)$, $B(8, 2)$, $C(8, 5)$, $D(5, 5)$, $E(5, 8)$ and $F(2, 8)$. **Find its area, in square units.**

Area = 24 → go to box 6
Area = 27 → go to box 5

Hint: Area counts the squares the figure covers. Cut along a grid line into rectangles.

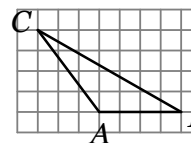


3

Triangle ABC has corners $A(-9, -3)$, $B(-3, -3)$ and $C(-3, -8)$. **Find its perimeter, in units.**

Perimeter = $6 + \sqrt{61}$ → go to box 1
Perimeter = $11 + \sqrt{61}$ → you are out

Hint: Go all the way around the figure, one side at a time.

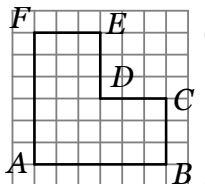


4

Triangle ABC has corners $A(6, 3)$, $B(10, 3)$ and $C(3, 7)$. **Find its area, in square units.**

Area = 10 → go to box 6
Area = 8 → go to box 7

Hint: Find the side along a grid line. Count straight up from that line to the top corner.

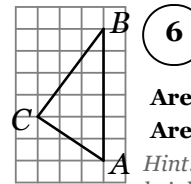


5

Hexagon ABCDEF has corners $A(2, 2)$, $B(8, 2)$, $C(8, 5)$, $D(5, 5)$, $E(5, 8)$ and $F(2, 8)$. **Find its perimeter, in units.**

Perimeter = 24 → go to box 8
Perimeter = 21 → go to box 1

Hint: Count the sides of the figure. Each side goes into the sum.

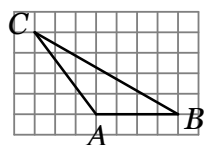


6

Triangle ABC has corners $A(-3, 2)$, $B(-3, 8)$ and $C(-6, 4)$. **Find its area, in square units.**

Area = 14 → go to box 4
Area = 9 → go to box 7

Hint: Count the spaces between grid lines. The height runs straight across from the upright base.

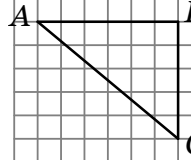


7

Triangle ABC has corners $A(6, 3)$, $B(10, 3)$ and $C(3, 7)$. **Find its perimeter, in units.**

Perimeter = $9 + \sqrt{65}$ → go to box 2
Perimeter = $10 + \sqrt{65}$ → go to box 1

Hint: Find each slant side with the distance formula, from its across and its up.



8

Triangle ABC has corners $A(-9, -3)$, $B(-3, -3)$ and $C(-3, -8)$. **Find its area, in square units.**

Area = 15 → go to box 3
Area = 30 → go to box 6

Hint: A triangle covers half of the rectangle drawn on its base and its height.

Write every box number here, in order.

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The route, in order. Boxes 6 and 1 are not on it. A student reaches them only by a wrong answer. They are the last two rows of the table.

4 → 7 → 2 → 5 → 8 → 3 → out

	The box's question	Right answer, and why	Wrong answer, and why a student picks it
1	Box 4 Triangle ABC: A(6, 3), B(10, 3), C(3, 7). Find its area.	8 square units. Base AB is along a grid line, 4 long. The height goes straight up from the base line to C: 4. The corner is past the end of the base, and the height is still measured from the base line. Area = $\frac{1}{2} \times 4 \times 4 = 8$ square units.	"10 square units" goes to box 6. The slant side CA = 5 is used as the height: $\frac{1}{2} \times 4 \times 5 = 10$. No square root shows, because this slant side is a whole number long. The height is 4.
2	Box 7 Triangle ABC: A(6, 3), B(10, 3), C(3, 7). Find its perimeter.	9 + $\sqrt{65}$ units. AB = 4, BC = $\sqrt{7^2 + 4^2} = \sqrt{65}$, CA = $\sqrt{3^2 + 4^2} = 5$. Perimeter = $9 + \sqrt{65}$ units.	"10 + $\sqrt{65}$ units" goes to box 1. Side CA is counted by the squares it passes through, 6. Its length is $\sqrt{3^2 + 4^2} = 5$.
3	Box 2 Hexagon ABCDEF: A(2, 2), B(8, 2), C(8, 5), D(5, 5), E(5, 8), F(2, 8). Find its area.	27 square units. Cut along a grid line into rectangles: $6 \times 3 = 18$ and $3 \times 3 = 9$. Area = 27 square units. Cut the other way, it is $18 + 9 = 27$ again.	"24 square units" goes to box 6. 24 is the perimeter, the length around the figure. The question asks for the area, the space it covers.
4	Box 5 Hexagon ABCDEF: A(2, 2), B(8, 2), C(8, 5), D(5, 5), E(5, 8), F(2, 8). Find its perimeter.	24 units. AB = 6, BC = 3, CD = 3, DE = 3, EF = 3, FA = 6. Perimeter = 24 units.	"21 units" goes to box 1. Side DE = 3 is left out. A perimeter adds every side.
5	Box 8 Triangle ABC: A(-9, -3), B(-3, -3), C(-3, -8). Find its area.	15 square units. Base AB is along a grid line, 6 long. The height goes straight down from the base line to C: 5. Area = $\frac{1}{2} \times 6 \times 5 = 15$ square units.	"30 square units" goes to box 6. The $\frac{1}{2}$ is left out: $6 \times 5 = 30$ is the rectangle around the triangle. The triangle is half of it.
6	Box 3 Triangle ABC: A(-9, -3), B(-3, -3), C(-3, -8). Find its perimeter.	11 + $\sqrt{61}$ units. AB = 6, BC = 5, CA = $\sqrt{6^2 + 5^2} = \sqrt{61}$. Perimeter = $11 + \sqrt{61}$ units.	"6 + $\sqrt{61}$ units" goes to box 1. Side BC = 5 is left out. A perimeter adds every side.
	Box 6 Triangle ABC: A(-3, 2), B(-3, 8), C(-6, 4). Find its area.	9 square units. Base AB is along a grid line, 6 long. The height goes straight across from the base line to C: 3. Area = $\frac{1}{2} \times 6 \times 3 = 9$ square units.	"14 square units" goes to box 4. The grid lines are counted, not the spaces between them, so the base is read as 7 and the height as 4: $\frac{1}{2} \times 7 \times 4 = 14$.
	Box 1 Quadrilateral ABCD: A(3, 6), B(10, 6), C(10, 3), D(6, 3). Find its perimeter.	14 + $3\sqrt{2}$ units. AB = 7, BC = 3, CD = 4, DA = $\sqrt{3^2 + 3^2} = 3\sqrt{2}$. Perimeter = $14 + 3\sqrt{2}$ units.	"10 + $3\sqrt{2}$ units" goes to box 7. Side CD = 4 is left out. A perimeter adds every side.

How to check any box. An area here never has a square root, because its base and height run along grid lines. A perimeter has one length for every side, so count the sides first.

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.