

ANSWER MAZE



DILATING LINES, SEGMENTS AND ANGLES

Dilations: Lengths Grow, Angles Stay

One page · 10–15 minutes · nothing to prepare

FREE

3

A dilation has scale factor 3. Angle PQR measures 35° . What does its image, angle $P'Q'R'$, measure?

$105^\circ \rightarrow$ go to 8

$35^\circ \rightarrow$ go to 5

The arms of the angle get longer. Does the opening between the arms change?

5

Line m passes through the center O . A dilation with center O and scale factor 2 acts on line m . What is the image of line m ?

a different line, parallel to $m \rightarrow$ go to 1

line m itself $\rightarrow$ go to 2

Look at where the center O is. Is O on line m ?

2

A dilation has scale factor 4. Segment AB is 3.5 cm long. It does not lie on a line through the center. How long is its image $A'B'$?

14 cm $\rightarrow$ go to 7

3.5 cm $\rightarrow$ go to 8

Compare $A'B'$ with AB . How many times as long must $A'B'$ be?

7

The center O is inside triangle ABC , but not on line AB . A dilation with center O and scale factor 3 acts on line AB . What is the image of line AB ?

a different line, parallel to $AB \rightarrow$ go to 4

line AB itself $\rightarrow$ go to 1

Inside the triangle is not the same as on the line. Is O on line AB ?

Answer Maze — how to run it

10–15 minutes

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“A dilation multiplies every length by the scale factor. It does not change any angle. A line through the center goes to itself.”*
3. **Start at box 3.** Six right answers take a student out. **Students write every box number in the row at the bottom as they go.**

Student sheet	page 3, one per student. Five small pictures on it show what a dilation is and the four results of this lesson.
Answers	page 4.

The route is 3 → 5 → 2 → 7 → 4 → 6 → out. Boxes 8 and 1 are not on it. **They look like every other box:** a question, two answers, two box numbers and a hint. Both of their answers lead back onto the route.

Every wrong answer comes from one of two common mistakes. Three boxes send a wrong answer to box 8. A student there used the scale factor on the wrong thing. They multiplied an angle by the factor because its arms grew, or they gave the image segment the same length as the original. Three boxes send a wrong answer to box 1. A student there mixed up “the same line” and “a parallel line”. They called the image of a line through the center parallel to it, or they thought a center inside a triangle is on one of its lines. In this lesson, a line is not parallel to itself.

The row at the bottom shows you where a student went wrong. A clean run is **six numbers**. In a longer row, the number just before box 8 or box 1 is the box the student got wrong. Box 8 means they used the factor on the wrong thing. Box 1 means they mixed up the same line and a parallel line.



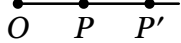
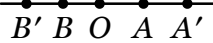
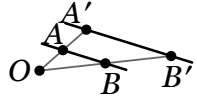
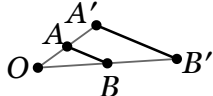
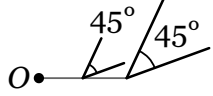
This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.
chooseyourlesson.com — 135 free geometry lessons.

Name _____

Period _____

Date _____

Start at box 3. Answer the question and go to the box your answer names. If you are not sure, read the small line at the bottom of the box. In this course, a line is not parallel to itself.

 center O • scale factor k P' is on ray OP, k times as far from O	 a line through O its image is the same line	 a line not through O its image is a new line, parallel to it	 a segment AB A'B' is k times as long as AB	 an angle its image has the same measure
--	---	--	---	---

1 Line n is 1 cm away from the center O. A dilation with center O and scale factor 0.5 acts on line n. What is the image of line n? line n itself → go to 5 a different line, parallel to n → go to 2 <i>The box gives the distance from O to line n. Is that distance O?</i>	2 A dilation has scale factor 4. Segment AB is 3.5 cm long. It does not lie on a line through the center. How long is its image A'B'? 14 cm → go to 7 3.5 cm → go to 8 <i>Compare A'B' with AB. How many times as long must A'B' be?</i>
3 A dilation has scale factor 3. Angle PQR measures 35°. What does its image, angle P'Q'R', measure? 105° → go to 8 35° → go to 5 <i>The arms of the angle get longer. Does the opening between the arms change?</i>	4 A dilation has scale factor 1/2. Angle DEF measures 120°. Its arms are 6 cm and 10 cm long. What does its image, angle D'E'F', measure? 60° → go to 8 120° → go to 6 <i>The arms get shorter. Is the measure of an angle about its arms or about its opening?</i>
5 Line m passes through the center O. A dilation with center O and scale factor 2 acts on line m. What is the image of line m? a different line, parallel to m → go to 1 line m itself → go to 2 <i>Look at where the center O is. Is O on line m?</i>	6 Points A and B lie on one ray from the center O. A dilation with center O and scale factor 3 acts on line AB. What is the image of line AB? line AB itself → you are out a different line, parallel to AB → go to 1 <i>A ray from O starts at O. Does line AB pass through O?</i>
7 The center O is inside triangle ABC, but not on line AB. A dilation with center O and scale factor 3 acts on line AB. What is the image of line AB? a different line, parallel to AB → go to 4 line AB itself → go to 1 <i>Inside the triangle is not the same as on the line. Is O on line AB?</i>	8 A dilation has scale factor 2.5. Segment GH is 6 cm long. It does not lie on a line through the center. How long is its image G'H'? 15 cm → go to 5 6 cm → go to 3 <i>Parallel does not mean the same length. How many times as long is G'H' as GH?</i>

Write every box number here as you go. It shows you the way back if you lose your place. **A clean run is six numbers.**

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



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

Answer Maze — answers

For the teacher

This is the route, in order. The table follows it. Boxes 8 and 1 are not on the route and come last. A student reaches them only after a wrong answer.

3 → 5 → 2 → 7 → 4 → 6 → out

	Box	Right answer, and why	Wrong answer, and the mistake behind it	Right goes to
1	Box 3	35°. A dilation never changes an angle measure, so the image still measures 35°.	105° → box 8. It multiplies 35° by 3, as if the angle changed size with its arms.	box 5
2	Box 5	line m itself. O is on line m, and a line through the center goes to itself.	a different line, parallel to m → box 1. It calls the image parallel, but O is on the line. A line is not parallel to itself.	box 2
3	Box 2	14 cm. The image is 4 times as long: $4 \times 3.5 \text{ cm} = 14 \text{ cm}$.	3.5 cm → box 8. It gives the image the same length as AB. Parallel does not mean the same length.	box 7
4	Box 7	a different line, parallel to AB. O is inside the triangle but not on line AB. A line that misses the center goes to a different, parallel line.	line AB itself → box 1. It calls the image the same line, but O is not on the line.	box 4
5	Box 4	120°. A dilation never changes an angle measure, so the image still measures 120°.	60° → box 8. It multiplies 120° by $1/2$, as if the angle changed size with its arms.	box 6
6	Box 6	line AB itself. A ray from O starts at O, so line AB passes through O and goes to itself.	a different line, parallel to AB → box 1. It calls the image parallel, but O is on the line. A line is not parallel to itself.	out
	Box 8	15 cm. The image is 2.5 times as long: $2.5 \times 6 \text{ cm} = 15 \text{ cm}$.	6 cm → box 3. It gives the image the same length as GH. Parallel does not mean the same length.	box 5
	Box 1	a different line, parallel to n. Line n does not pass through O, so it goes to a different, parallel line.	line n itself → box 5. It calls the image the same line, but O is not on the line.	box 2

Guessing does not get a student out. Every simple guessing rule, such as always taking the shorter answer, goes wrong within the first four boxes. One shortcut does work: a student can find the route by following the arrows backward from “you are out.” So ask a student with a clean row to explain one box.