

ANSWER MAZE



DILATIONS: CENTER AND SCALE FACTOR

Dilations: Multiply, Never Add

One page · 10–15 minutes · nothing to prepare

FREE

7

A dilation has center O and scale factor $2/5$. P is 15 cm from O . How far from O is its image P' ?

37.5 cm → go to 4

6 cm → go to 2

Is the scale factor more than one or less than one? Then decide if P' is farther from O or closer.

2

A dilation with center O sends S to S' and T to T' . S is 4 cm from O , and S' is 10 cm from O . T is 6 cm from O . How far from O is T' ?

15 cm → go to 5

12 cm → go to 6

Find the scale factor from S and S' first. How many times as far from O is S' ?

5

A dilation with center O sends P to P' . P is 12 cm from O , and P' is 18 cm from O . What is the scale factor?

$2/3$ → go to 4

1.5 → go to 1

Scale factor = image distance $\div$ original distance. Which point is the image?

1

A dilation with center O sends P to P' . P is 5 cm from O , and P' is 15 cm from O . What is the scale factor?

3 → go to 8

10 → go to 6

Compare the two distances from O . How many times as far from O is P' as P ?

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“A dilation multiplies every distance from the center by the scale factor. It never adds. The scale factor is the image distance divided by the original distance.”*
3. **Start at box 7.** Six boxes and you are out. **Students write every box number in the row at the bottom as they go.**

Student sheet	page 3, one per student. Three small pictures on it show the center and the scale factor, a factor more than 1, and a factor less than 1.
Answers	page 4.

The route is 7 → 2 → 5 → 1 → 8 → 3 → out. Boxes 4 and 6 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 4. A student there used the scale factor upside down. They divided by it instead of multiplying, divided the original distance by the image distance, or treated the image as the original point. Three boxes send a wrong answer to box 6. A student there added instead of multiplying. They think “S moved from 4 cm to 10 cm, so every point moves 6 cm.” Or they give the number of centimeters between P and P’ as the scale factor. None of these boxes uses a scale factor of 2, because with 2, adding and multiplying can give the same answer.

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 a 4 or a 6 is the box the student got wrong. A 4 means they turned the factor upside down. A 6 means they added.



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Answer Maze

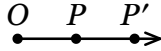
Start at box 7

Name _____

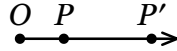
Period _____

Date _____

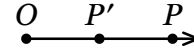
Start at box 7. Answer the question in the box. Choose your answer, and go to the box it names. If you are not sure, read the small line at the bottom of the box.



center O • scale factor k
 $k = \text{image distance} \div \text{original distance}$



k more than 1
 P' is farther from O than P



k less than 1
 P' is closer to O than P

1

A dilation with center O sends P to P'. P is 5 cm from O, and P' is 15 cm from O. What is the scale factor?

3 → go to 8
10 → go to 6

Compare the two distances from O. How many times as far from O is P' as P?

2

A dilation with center O sends S to S' and T to T'. S is 4 cm from O, and S' is 10 cm from O. T is 6 cm from O. How far from O is T'?

15 cm → go to 5
12 cm → go to 6

Find the scale factor from S and S' first. How many times as far from O is S'?

3

A dilation with center O sends S to S' and T to T'. S is 10 cm from O, and S' is 6 cm from O. T is 15 cm from O. How far from O is T'?

9 cm → you are out
11 cm → go to 6

S' is closer to O than S. Does every point move the same number of cm?

4

A dilation has center O and scale factor 0.25. P is 12 cm from O. How far from O is its image P'?

48 cm → go to 7
3 cm → go to 2

Is 0.25 more than one or less than one? Then decide if P' is farther from O than P or closer.

5

A dilation with center O sends P to P'. P is 12 cm from O, and P' is 18 cm from O. What is the scale factor?

2/3 → go to 4
1.5 → go to 1

Scale factor = image distance ÷ original distance. Which point is the image?

6

A dilation with center O sends S to S' and T to T'. S is 3 cm from O, and S' is 12 cm from O. T is 5 cm from O. How far from O is T'?

20 cm → go to 5
14 cm → go to 2

How many times as far from O is S' as S? Use that same number for T.

7

A dilation has center O and scale factor 2/5. P is 15 cm from O. How far from O is its image P'?

37.5 cm → go to 4
6 cm → go to 2

Is the scale factor more than one or less than one? Then decide if P' is farther from O or closer.

8

A dilation has center O and scale factor 4. The image P' is 10 cm from O. How far from O is P?

40 cm → go to 4
2.5 cm → go to 3

Which point is given here, P or its image? Which one is farther from O?

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.

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This is the route, in order. The table follows it. Boxes 4 and 6 are not on the route and come last. A student reaches them only after a wrong answer.

7 → 2 → 5 → 1 → 8 → 3 → out

	Box	Right answer, and why	Wrong answer, and the mistake behind it	Right goes to
1	Box 7	6 cm. P' is $\frac{2}{5}$ times as far from O as P, so $OP' = \frac{2}{5} \times 15 \text{ cm} = 6 \text{ cm}$.	37.5 cm → box 4. It divides 15 cm by $\frac{2}{5}$ instead of multiplying.	box 2
2	Box 2	15 cm. The scale factor is $10 \div 4 = 2.5$, so $OT' = 2.5 \times 6 \text{ cm} = 15 \text{ cm}$.	12 cm → box 6. It adds 6 cm, the same amount S moved, instead of multiplying.	box 5
3	Box 5	1.5. The scale factor is the image distance divided by the original distance: $18 \div 12 = 1.5$.	2/3 → box 4. It is $12 \div 18$, the original distance divided by the image distance.	box 1
4	Box 1	3. The scale factor is the image distance divided by the original distance: $15 \div 5 = 3$.	10 → box 6. It is $15 - 5$, the number of centimeters between P and P' , not a scale factor.	box 8
5	Box 8	2.5 cm. P' is 4 times as far from O as P, so $OP = 10 \text{ cm} \div 4 = 2.5 \text{ cm}$.	40 cm → box 4. It multiplies 10 cm by 4, as if P' were the original point.	box 3
6	Box 3	9 cm. The scale factor is $6 \div 10 = 0.6$, so $OT' = 0.6 \times 15 \text{ cm} = 9 \text{ cm}$.	11 cm → box 6. It takes away 4 cm, the same amount S moved, instead of multiplying.	out
	Box 4	3 cm. P' is 0.25 times as far from O as P, so $OP' = 0.25 \times 12 \text{ cm} = 3 \text{ cm}$.	48 cm → box 7. It divides 12 cm by 0.25 instead of multiplying.	box 2
	Box 6	20 cm. The scale factor is $12 \div 3 = 4$, so $OT' = 4 \times 5 \text{ cm} = 20 \text{ cm}$.	14 cm → box 2. It adds 9 cm, the same amount S moved, instead of multiplying.	box 5

Guessing does not get a student out. Every simple guessing rule, such as always taking the bigger number, 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.