LESSON MAKER PRO

Circle Match Moves

Use translations and dilations to match any two circles.

HIGH SCHOOL · MA.912.GR.6.5

MA.912.GR.6.5 "Apply transformations to prove that all circles are similar."

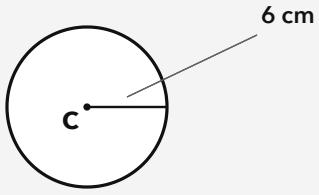
NAME _____ DATE _____

MATCH CENTERS, THEN SCALE

A translation moves a circle without changing its radius. After the centers match, dilate by target radius/source radius. Since any two positive radii have a positive ratio, every circle can be mapped onto any other circle.

WORKED EXAMPLE

The shown circle is mapped to a circle with radius 15 cm. Find the dilation factor after the centers are aligned.



1. Source radius = 6 cm.
2. Target radius = 15 cm.
3. k = 15/6 = 5/2.

Answer: k = 5/2

PRACTICE 4 problems

1 A circle with radius 3 cm is mapped to a circle with radius 12 cm. Find the dilation factor.

ANSWER _____

2 A circle with radius 14 cm is mapped to a circle with radius 7 cm. Find the dilation factor.

ANSWER _____

3 Circle A has radius 5 cm. Circle B has radius 15 cm and a different center. Name a transformation sequence that maps A onto B.

ANSWER _____

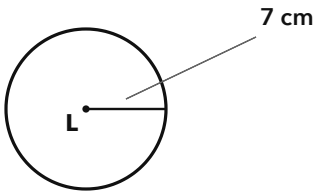
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4 A circle has radius 18 cm. A dilation with k = 2/3 maps it to a new circle. Find the new radius.

ANSWER _____

APPLY IT Show your work

1 A student uses the shown circular logo on a banner. The banner logo has radius 28 cm. What dilation factor maps the shown logo to the banner logo? State the needed transformation sequence.



ANSWER _____

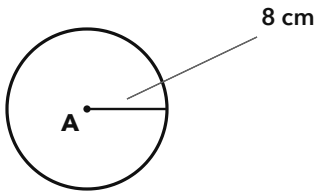
2 A game club changes a circular avatar from radius 16 mm to radius 10 mm. Explain why the two avatar circles are similar.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The shown circle has center A. Circle B has radius 18 cm, and its center is 11 cm right and 4 cm up from A. Describe transformations that map the shown circle onto circle B. Explain why the final image is circle B.



WORK SPACE AND ANSWER

ANSWER KEY # Circle Match Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A circle with radius 3 cm is mapped to a circle with radius 12 cm. Find the dilation factor.	**k = 4**
2	A circle with radius 14 cm is mapped to a circle with radius 7 cm. Find the dilation factor.	**k = 1/2**
3	Circle A has radius 5 cm. Circle B has radius 15 cm and a different center. Name a transformation sequence that maps A onto B.	**Translate circle A so its center matches circle B's center, then dilate centered at that point with k = 3.**
4	A circle has radius 18 cm. A dilation with k = 2/3 maps it to a new circle. Find the new radius.	**12 cm**

PART 2 · APPLY IT

1. **k = 4; translate the centers to match, then dilate centered at the matched center with k = 4.** Use 28/7 = 4. A translation aligns the centers, and the dilation scales the radius to 28 cm.
2. **Translate one center onto the other, then dilate with k = 5/8. The dilation changes radius 16 mm to 10 mm, so the circles are similar.** Compute 10/16 = 5/8. Translation preserves radius, and dilation maps one circle exactly onto the other.

CHALLENGE

Translate the circle 11 cm right and 4 cm up. Then dilate centered at B with k = 18/8 = 9/4. The translation puts the center at B, and the dilation gives radius 18 cm, so the image has the same center and radius as circle B. Alternatively, first dilate about A with factor 9/4, then translate 11 cm right and 4 cm up; the same target center and radius result.

Accept equivalent dilation factors, such as 2.5 for 5/2. Accept any correctly specified sequence that maps the source center to the target center and the source radius to the target radius. Translation first followed by dilation about the aligned target center is one valid sequence. Dilation about the source center first, followed by translation of that center to the target center, is also valid. Require the dilation center and translation to be clear; when dilation is about the target center after translation, the centers must already be aligned.