PRACTICE & PROBLEM SOLVING

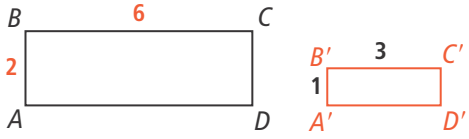
Scan for Multimedia

Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

10. Error Analysis Kendall was asked to find the scale factor for the dilation. What is Kendall's error?



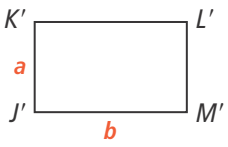
$\frac{6}{2} = 3$

The scale factor is 3.

11. Higher Order Thinking Points $M(a, b)$ and $N(c, d)$ are dilated by scale factor k, with the origin as the center of dilation. Show algebraically that $\overleftrightarrow{MN} \parallel \overleftrightarrow{M'N'}$.

12. Communicate Precisely Suppose you want to dilate a figure on the coordinate plane with a center of dilation at point (a, b) that is not the origin and with a scale factor k. Describe how you can use a composition of translations and a dilation centered at the origin to dilate the figure. Then write the transformation rule.

13. Reason Rectangle $J'K'L'M'$ is a dilation of $JKLM$ with scale factor k. What are the perimeter and area of $JKLM$?

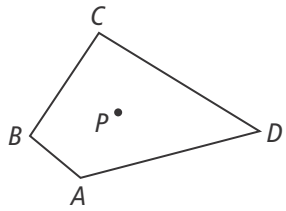


14. Mathematical Connections Carolina says that when a figure is dilated using a scale factor of 2, the angle measures in the image are twice the angle measures in the preimage. How could you use the Triangle Angle Sum Theorem to explain why this cannot be true?

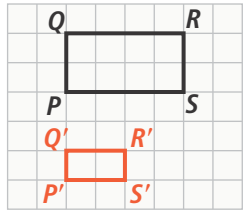
15. Generalize Is it always true that $(D_m \circ D_n)(X) = D_{mn}(X)$? Explain.

PRACTICE

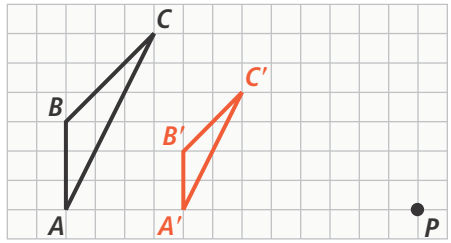
16. Trace $ABCD$ and point P. Draw the dilation of $ABCD$ using P as the center of dilation and sides that are two times as long. SEE EXAMPLE 1



17. How are the side lengths of the preimage and dilated image related? SEE EXAMPLE 2



18. What is the scale factor of the dilation shown? SEE EXAMPLE 3

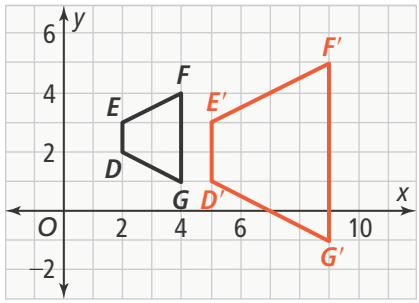


19. What are the coordinates of $D_{1.5}(ABCD)$ for $A(2, 0)$, $B(8, -4)$, $C(4, -6)$, and $D(-5, -10)$? SEE EXAMPLE 4

20. What are the coordinates of $D_{(2, X)}(\triangle XYZ)$ for $X(1, 1)$, $Y(2, 2)$, and $Z(3, 0)$? SEE EXAMPLE 5

21. The population density of the city of Wellington is 12,000 people per square mile. The neighboring city Morrison is a dilation of Wellington with scale factor 1.2. If Morrison has $\frac{3}{4}$ of the population of Wellington, what is the population density of Morrison? SEE EXAMPLE 6

22. What are the coordinates of the center of dilation for the dilation shown?



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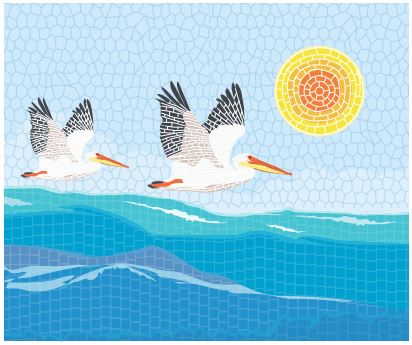
APPLY

23. Reason The images on Henry's digital camera have a width-to-length ratio of 2 : 3. He wants to make an 8 in.-by-10 in. print of one of his photographs.

a. Is this possible? Explain.

b. How can Henry crop an image so that an 8 in.-by-10 in. print can be made?

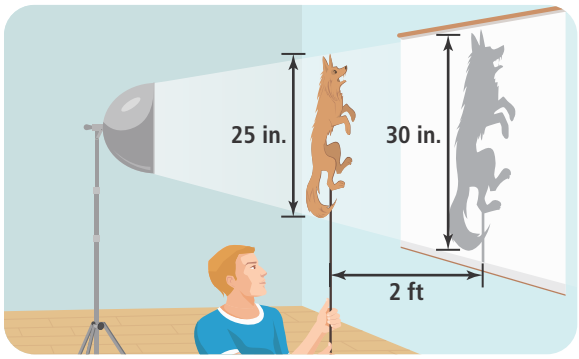
24. Model With Mathematics Alex draws the scale model shown as a plan for a large wall mosaic.



a. The wall is 10 m wide and 7 m high. What are the dimensions of the largest mosaic he can make on that wall? Explain.

b. He will use 2-cm square tiles to make his mosaic. How many tiles will he need? Explain how you found your answer.

25. Look for Relationships How far from the screen should the light be placed in order for the shadow of the puppet to be 30 in. tall? Explain how you found your answer.



ASSESSMENT PRACTICE

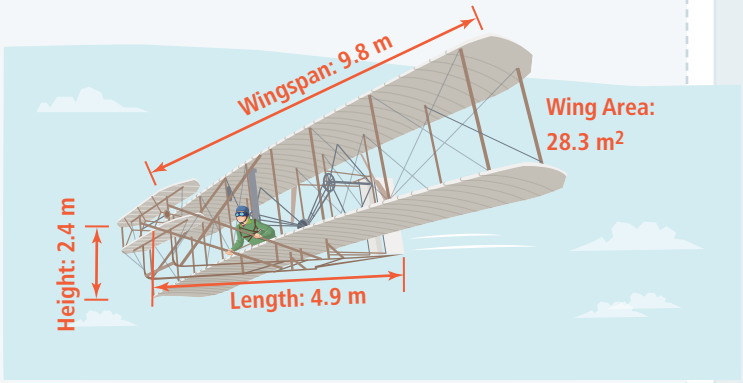
26. Copy and complete the table to show information about dilations centered at the origin.

Preimage Coordinates	Scale Factor	Image Coordinates
(5, –2)	4	■
(9, 3)	■	(3, 1)
■	1.5	(–6, 0)
(–1, 2)	■	(–5, 10)

27. SAT/ACT A dilation maps $\triangle ABC$ to $\triangle A'B'C'$. The area of $\triangle ABC$ is 13 square units, and the area of $\triangle A'B'C'$ is 52 square units. What is the scale factor?

Ⓐ 2 Ⓒ 4
Ⓑ 13 Ⓓ 26

28. Performance Task Alberto wants to make a scale model of the Wright brothers' glider.



Part A The wingspan of the scale model must be between 15 cm and 18 cm. What scale factor should he use? Explain.

Part B Use your scale factor from Part A. What will be the length, wingspan, and height of the model glider?

Part C What will be the wing area of the model glider? If both wing sections are the same size, what will be the dimensions of each wing section?