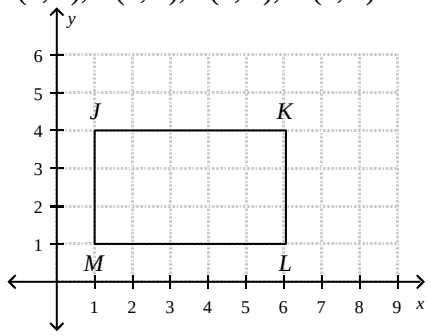
Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. A video game designer is modeling a tower that is 200 ft high and 160 ft wide. She creates a model so that the similarity ratio of the model to the tower is $\frac{1}{500}$. What is the height and the width of the model in inches?

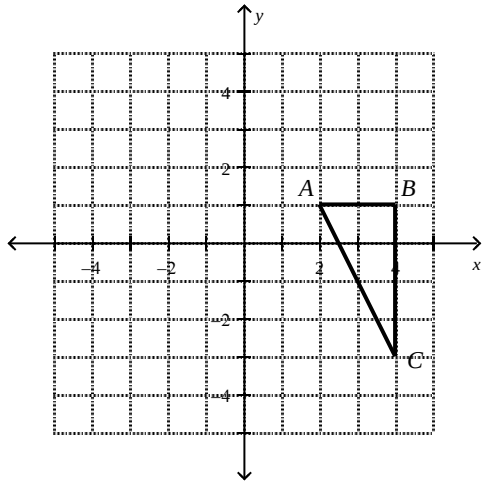
a. height = 4.8 in.; width = 3.84 in.
b. height = 100,000 in.; width = 80,000 in.
c. height = 2400 in.; width = 1920 in.
d. height = 0.4 in.; width = 0.32 in.

____ 2. Apply the dilation *D* to the polygon with the given vertices. Name the coordinates of the image points.
$D\colon (x, y) \rightarrow (2x, 2y)$
J(1, 4), *K*(6, 4), *L*(6, 1), *M*(1, 1)



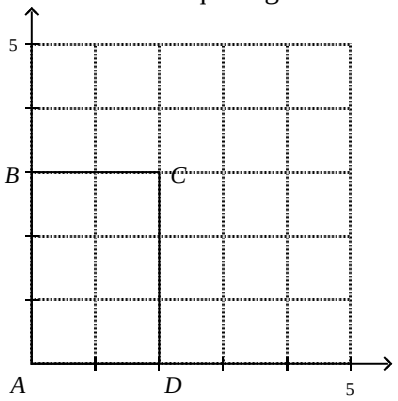
a. *J*′(–2, –8), *K*′(–12, –8), *L*′(–12, –2), *M*′(–2, –2)
b. *J*′(8, 2), *K*′(8, 12), *L*′(2, 12), *M*′(2, 2)
c. *J*′(2, 8), *K*′(12, 8), *L*′(12, 2), *M*′(2, 2)
d. *J*′(2, 8), *K*′(12, 8), *L*′(6, 1), *M*′(1, 1)

____ 3. Apply the dilation *D* to the polygon with the given vertices. Name the coordinates of the image points. Identify and describe the transformation.
$D\colon (x, y) \rightarrow (0.5x, 0.5y)$
A(2, 1), *B*(4, 1), *C*(4, −3)



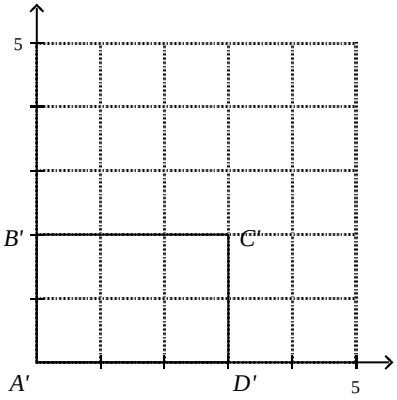
a. This is a dilation about (0, 0) with a scale factor of 2; $A'(4, 2)$, $B'(8, 2)$, $C'(8, -6)$.
b. This is a dilation about (0, 0) with a scale factor of 0.5; $A'(1, 0.5)$, $B'(2, 0.5)$, $C'(2, -1.5)$.
c. This is a dilation about (0, 0) with a scale factor of 2; $A'(1, 0.5)$, $B'(2, 0.5)$, $C'(2, -1.5)$.
d. This is a dilation about (0, 0) with a scale factor of 0.5; $A'(4, 2)$, $B'(8, 2)$, $C'(8, -6)$.

____ 4. Tamika is resizing a photograph with a height of 3 inches and a width of 2 inches.The original photo *ABCD* is shown on a 1-inch square grid.

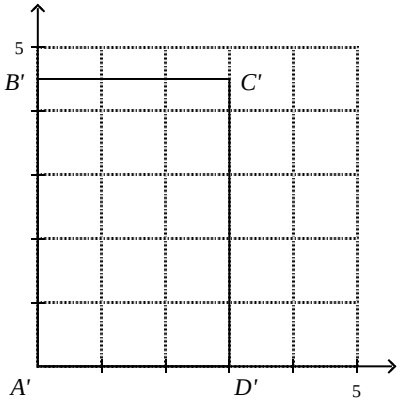


Show the image, $A'B'C'D'$, on the grid after a dilation with scale factor $\frac{2}{3}$.

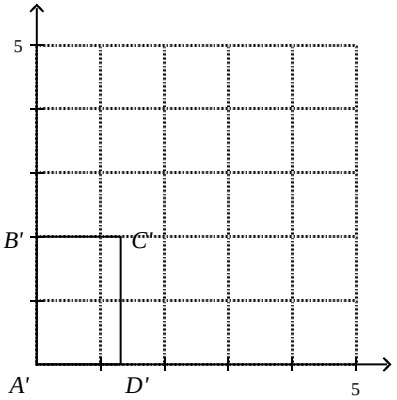
a.



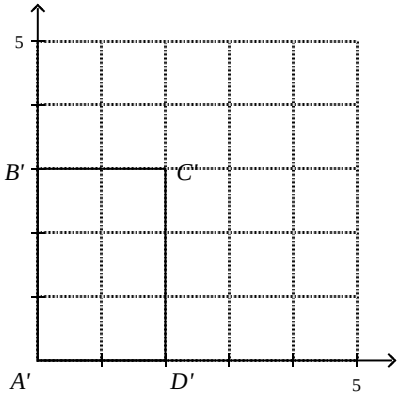
c.



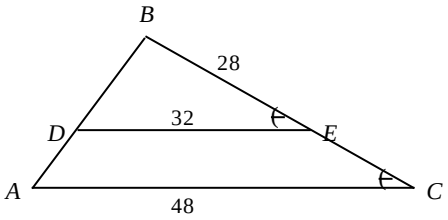
b.



d.



____ 5. Explain why $\Delta ABC \sim \Delta DBE$ and then find *BC*.



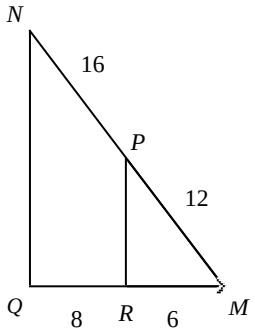
a. $\overline{AC} \parallel \overline{DE}$ by the Converse of the Corresponding Angles Postulate.
$\angle A \cong \angle BDE$ by the Corresponding Angles Postulate.
$\Delta ABC \sim \Delta DBE$ by AA Similarity.
Corresponding sides are proportional, so $BC = 42$.

b. $\overline{AC} \parallel \overline{DE}$ by the Converse of the Alternate Interior Angles Theorem.
$\angle A \cong \angle BDE$ by the Alternate Interior Angles Theorem.
$\Delta ABC \sim \Delta DBE$ by AA Similarity.
Corresponding sides are proportional, so $BC = 14$.

c. $\angle B \cong \angle B$ by the Reflexive Property of Congruence.
$\Delta ABC \sim \Delta DBE$ by AA Similarity.
Corresponding sides are proportional, so $BC = 14$.

d. $\angle A \cong \angle BDE, \angle C \cong \angle BED$ by the Corresponding Angles Postulate.
$\Delta ABC \sim \Delta DBE$ by AA Similarity.
Corresponding sides are proportional, so $BC = 42$.

____ 6. Verify that $\overline{NQ} \parallel \overline{PR}$.



a. $\frac{NP}{PM} = \frac{16}{12} = \frac{4}{3}$ and $\frac{QR}{RM} = \frac{8}{6} = \frac{4}{3}$.
Since $\frac{NP}{PM} = \frac{QR}{RM}$, $\overline{NQ} \parallel \overline{PR}$. by the Converse of the Triangle Proportionality Theorem.

b. $\frac{NP}{QR} = \frac{16}{12} = \frac{4}{3}$ and $\frac{PM}{RM} = \frac{8}{6} = \frac{4}{3}$.

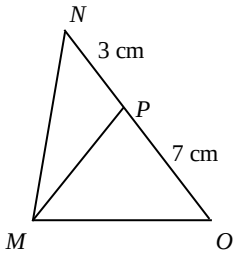
c. $\frac{NP}{RM} = \frac{16}{8} = 2$ and $\frac{PM}{QR} = \frac{12}{6} = 2$.
Since $\frac{NP}{RM} = \frac{PM}{QR}$, $\overline{NQ} \parallel \overline{PR}$. by the Converse of the Triangle Proportionality Theorem.

d. $\frac{NP}{RM} = \frac{16}{6} = \frac{8}{3}$ and $\frac{PM}{QR} = \frac{12}{8} = \frac{4}{3}$.

Since $\frac{NP}{RM} = \frac{PM}{QR}$, $\overline{NQ} \parallel \overline{PR}$. by the Converse of the Triangle Proportionality Theorem.

Since $\frac{NP}{RM} = \frac{PM}{QR}$, $\overline{NQ} \parallel \overline{PR}$. by the Converse of the Triangle Proportionality Theorem.

____ 7. The perimeter of ΔMNO is 30 cm. $\overline{MP}$ bisects $\angle M$. Find *MN* and *MO*.



a. *MN* = 10 cm; *MO* = 10 cm
b. *MN* = 6 cm; *MO* = 14 cm
c. *MN* = 9 cm; *MO* = 21 cm
d. *MN* = 14 cm; *MO* = 6 cm

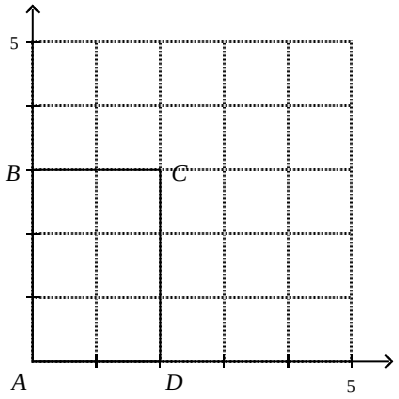
____ 8. A house is 32 feet wide and 60 feet long. If a sketch is made of the house using the scale 1 cm: 4 ft, what are the dimensions of the sketch?

a. 8 ft × 15 ft
b. 8 cm × 15 cm
c. 256 ft × 480 ft
d. 256 cm × 480 cm

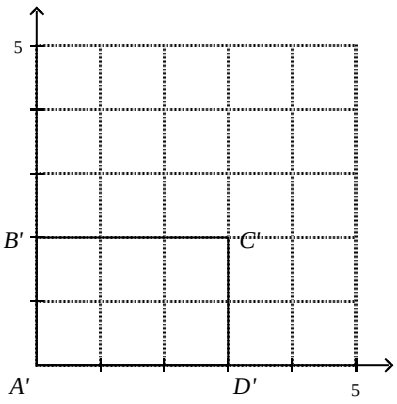
____ 9. The city of Bangor, Maine has a scale model of Paul Bunyan nearly 30 feet tall. The model's scale is 1:5. On the scale model, Paul Bunyan's belt buckle is 12 feet from the ground. In real life, how far from the ground is Paul Bunyan's belt buckle? The diameter of Paul Bunyan's actual head is 9 inches. What is the diameter of the Paul Bunyan's scale model head in feet?

a. 60 feet; 0.15 feet
b. 0.4 feet; 22.5 feet
c. 2 feet; 4.5 feet
d. 2.4 feet; 3.75 feet

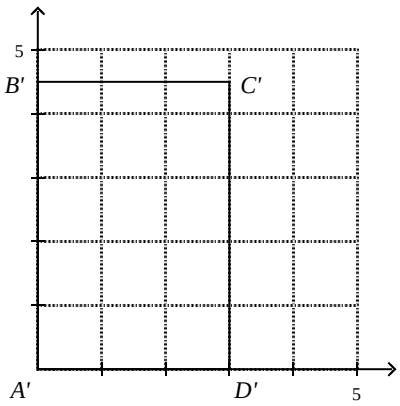
____ 10. The figure shows the position of a photo. Which of the following is the drawing of the photo after a dilation with scale factor $\frac{2}{3}$?



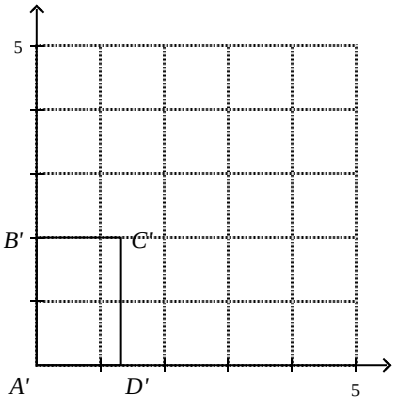
a.



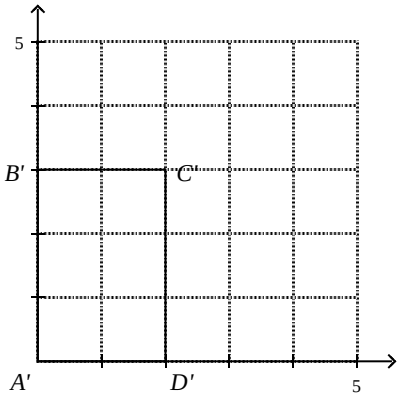
c.



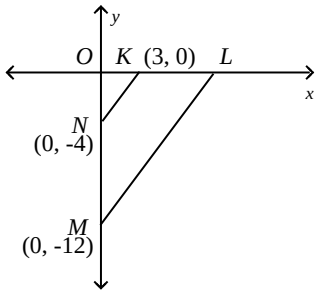
b.



d.



____ 11. Given that $\Delta KON \sim \Delta LOM$, find the coordinates of L and the scale factor.



a. L (6, 0) and scale factor is 2

b. L (9, 0) and scale factor is 3

c. L (9, 0) and scale factor is $\frac{4}{3}$

d. L (6, 0) and scale factor is 3

Numeric Response

1. If 6, 12, and 14 and 21, 42, and x are the lengths of the corresponding sides of two similar triangles, what is the value of x?

2. $\overline{PQ}$ with endpoints $P(2,4)$ and $Q(8,12)$ is dilated by a scale factor of 4. Find the length of $\overline{P'Q'}$.

Matching

Match each vocabulary term with its definition.

a. dilation
b. indirect measurement
c. transformation
d. translation
e. scale factor
f. similarity ratio
g. scale drawing
h. scale

____ 1. the ratio of two corresponding linear measurements in a pair of similar figures

____ 2. a method of measuring an object by using formulas, similar figures, and/or proportions

____ 3. a drawing that uses a scale to represent an object as smaller or larger than the original object

____ 4. the ratio of any length in a drawing to the corresponding actual length

____ 5. a transformation in which the lines connecting every point *P* with its preimage P' all intersect at a point *C*, and $\frac{CP'}{CP}$ is the same for every point *P*, or a transformation that changes the size of a figure but not its shape

____ 6. in a dilation, the ratio of a linear measurement of the image to the corresponding measurement of the preimage

Review
Answer Section

MULTIPLE CHOICE

1. ANS: A
   Step 1 Convert measurements to inches.
   tower's length = 200 ft = 2400 in.
   tower's width = 160 ft = 1920 in.

   Step 2 Apply the scale factor formula.
   new dimension = (scale factor)(original dimension)
   model's length = $\left(\frac{1}{500}\right)(2400 \text{ in.}) = 4.8$ in.
   model's width = $\left(\frac{1}{500}\right)(1920 \text{ in.}) = 3.84$ in.

	Feedback
A	Correct!
B	Multiply the scale factor by each dimension.
C	Multiply the scale factor by each dimension.
D	Convert answers to inches.

   PTS: 1 DIF: Advanced REF: 1b8087c6-4683-11df-9c7d-001185f0d2ea
   TOP: 7-1 Ratios in Similar Polygons KEY: application | similarity ratio | scale model
   DOK: DOK 2
2. ANS: C

	Feedback
A	Check the signs of the *x*- and *y*-coordinates of the image points.
B	Check the *x*- and *y*-coordinates of the image points.
C	Correct!
D	Check the *x*- and *y*-coordinates of points L' and M'.

   PTS: 1 DIF: Average REF: 914db812-6ab2-11e0-9c90-001185f0d2ea
   OBJ: 7-2.1 Drawing and Describing Dilations NAT: NT.CCSS.MTH.10.9-12.G.CO.2
   STA: MACC.912.G-CO.1.2 TOP: 7-2 Similarity and Transformations
   KEY: coordinate plane | dilation DOK: DOK 2
3. ANS: B

	Feedback
A	The transformation rule multiplies the coordinates by 4. Check the scale factor.
B	Correct!
C	Check the scale factor. Is this dilation an enlargement or a reduction?
D	The transformation rule multiplies the coordinates by 4. Check the coordinates of the image points.

   PTS: 1 DIF: Average REF: 914ddf22-6ab2-11e0-9c90-001185f0d2ea

OBJ: 7-2.1 Drawing and Describing Dilations NAT: NT.CCSS.MTH.10.9-12.G.CO.2
STA: MACC.912.G-CO.1.2 TOP: 7-2 Similarity and Transformations
KEY: transformation | coordinate geometry | dilation DOK: DOK 2

4. ANS: B

	Feedback
A	A dilation with this scale factor changes the size of the figure.
B	Correct!
C	A dilation with a scale factor less than 1 is a reduction.
D	A dilation with a scale factor less than 1 is a reduction.

PTS: 1 DIF: Average REF: 9152a3d8-6ab2-11e0-9c90-001185f0d2ea
OBJ: 7-2.4 Application NAT: NT.CCSS.MTH.10.9-12.G.CO.2
STA: MACC.912.G-CO.1.2 TOP: 7-2 Similarity and Transformations
KEY: transformation | coordinate geometry | scale factor DOK: DOK 2

5. ANS: A

Step 1 Prove triangles are similar.

As shown $\angle C \cong \angle BED$, so $\overline{AC} \parallel \overline{DE}$ by the Converse of the Corresponding Angles Postulate.
$\angle A \cong \angle BDE$ by the Corresponding Angles Postulate.
Therefore $\Delta ABC \sim \Delta DBE$ by AA Similarity.

Step 2 Find *BC*.

$\frac{DE}{AC} = \frac{BE}{BC}$ Corresponding sides are proportional.

$\frac{32}{48} = \frac{28}{BC}$ Substitute 32 for *DE*, 48 for *AC*, and 28 for *BE*.

$32(BC) = 28 \cdot 48$ Cross Products Property

$32(BC) = 1344$ Simplify.

$BC = 42$ Divide both sides by 32.

	Feedback
A	Correct!
B	Are angles *C* and *BED* and angles *A* and *BDE* pairs of alternate interior angles? Can *BC* equal 14 if *BE* equals 28?
C	You found the value of *EC*, not *BC*.
D	It is given that angles *C* and *BED* are congruent. You are also missing one step before concluding that angles *A* and *BDE* are congruent.

PTS: 1 DIF: Average REF: 1b85256e-4683-11df-9c7d-001185f0d2ea
OBJ: 7-3.3 Finding Lengths in Similar Triangles NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
STA: MACC.912.G-SRT.2.5 TOP: 7-3 Triangle Similarity: AA, SSS, and SAS
KEY: similar triangles | side length | AA similarity DOK: DOK 2

6. ANS: A

$\frac{NP}{PM} = \frac{16}{12} = \frac{4}{3}$ and $\frac{QR}{RM} = \frac{8}{6} = \frac{4}{3}$

Since $\frac{NP}{PM} = \frac{QR}{RM}$, $\overline{NQ} \parallel \overline{PR}$. by the Converse of the Triangle Proportionality Theorem.

	Feedback
A	Correct!
B	These ratios are not the correct ones to show that the sides are divided proportionally.
C	These ratios are not the correct ones to show that the sides are divided proportionally.
D	These two ratios are not equal.

PTS: 1 DIF: Average REF: 1b8c4c82-4683-11df-9c7d-001185f0d2ea
OBJ: 7-4.2 Verifying Segments are Parallel
TOP: 7-4 Applying Properties of Similar Triangles KEY: similar triangles
DOK: DOK 2

7. ANS: B

$\frac{3}{7} = \frac{MN}{MO}$ Triangle Angle Bisector Theorem

$3(MO) = 7(MN)$ Cross multiply.

$MO = \frac{7}{3}(MN)$ Simplify.

$MN + NO + MO = 30$ Perimeter of ΔMNO

$MN + 10 + \frac{7}{3}MN = 30$ Substitute 10 for *NO* and $\frac{7}{3}MN$ for *MO*.

$MN = 6$ Simplify and solve.

$MO = \frac{7}{3}(MN) = \frac{7}{3}(6) = 14$

$MN = 6$ Substitute 6 for *MN* and simplify.

	Feedback
A	By the Triangle Angle Bisector Theorem, an angle bisector of a triangle divides the opposite side into two segments whose lengths are proportional to the lengths of the other two sides.
B	Correct!
C	Perimeter is the sum of all side lengths.
D	Set up a proportion to solve.

PTS: 1 DIF: Advanced REF: 1b91113a-4683-11df-9c7d-001185f0d2ea
TOP: 7-4 Applying Properties of Similar Triangles KEY: triangle angle bisector theorem
DOK: DOK 2

8. ANS: B

The sketch is of the ratio 1cm: 4ft. Let *x* represent the width of the house. Let *y* represent the length of the house.

$\frac{1\text{ cm}}{4\text{ ft}} = \frac{x\text{ cm}}{32\text{ ft}}$

$32 = 4(x)$ Cross Products Property

$8 = x$ Divide by 4.

$\frac{1\text{ cm}}{4\text{ ft}} = \frac{y\text{ cm}}{60\text{ ft}}$

$60 = 4(y)$ Cross Products Property

$15 = y$ Divide by 4.

The width is 8 cm, and the length is 15 cm.

	Feedback
A	Be sure to convert from feet to cm.
B	Correct!
C	The sketch is smaller than the house, for each 4 feet in the house, the sketch is 1 cm.
D	The sketch is smaller than the house, for each 4 feet in the house, the sketch is 1 cm.

PTS: 1 DIF: Basic REF: 1b95d5f2-4683-11df-9c7d-001185f0d2ea
OBJ: 7-5.3 Making a Scale Drawing TOP: 7-5 Using Proportional Relationships
KEY: scale drawing | proportion | application DOK: DOK 1

9. ANS: D

To find the actual distance, write a proportion comparing the scale model's distance to the actual distance.

$\frac{1}{5} = \frac{x}{12 \text{ feet}}$

$1(12) = 5x$ Cross Products Property
$12 = 5x$ Simplify.
$x = 2.4$ Divide both sides by 5.

To find the scale model diameter, write a proportion comparing the scale model's diameter to the actual diameter.

$\frac{1}{5} = \frac{9 \text{ inches}}{x}$

$1x = 5(9)$ Cross Products Property
$x = 45$ Simplify and solve.
$x = 45$ inches = 3.75 feet Convert to feet.

	Feedback
A	Set up consistent ratios in the proportions.
B	The ratio of actual size to model size is 1:5.
C	Use the scale factor of the model to solve for each value.
D	Correct!

PTS: 1 DIF: Advanced REF: 1b98384e-4683-11df-9c7d-001185f0d2ea
TOP: 7-5 Using Proportional Relationships
KEY: scale model | proportion | application DOK: DOK 2

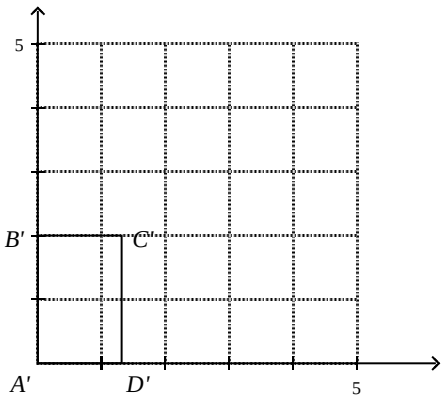
10. ANS: B

Step 1 Multiply the vertices of the rectangle by $\frac{2}{3}$.

$A(0, 0) \rightarrow A'(0\left(\frac{2}{3}\right), 0\left(\frac{2}{3}\right)) \rightarrow A'(0, 0)$ $C(2, 3) \rightarrow C'(2\left(\frac{2}{3}\right), 3\left(\frac{2}{3}\right)) \rightarrow C'(\frac{4}{3}, 2)$

$B(0, 3) \rightarrow B'(0\left(\frac{2}{3}\right), 3\left(\frac{2}{3}\right)) \rightarrow B'(0, 2)$ $D(2, 0) \rightarrow D'(2\left(\frac{2}{3}\right), 0\left(\frac{2}{3}\right)) \rightarrow D'(\frac{4}{3}, 0)$

Step 2 Plot the points and draw the rectangle.



	Feedback
A	This is the rectangle rotated. In the dilated rectangle, each coordinate has been multiplied by 2/3.
B	Correct!
C	This is the rectangle after multiplying by 3/2.
D	This is the original rectangle.

PTS: 1 DIF: Average REF: 1b9a9aaa-4683-11df-9c7d-001185f0d2ea
OBJ: 7-6.1 Application TOP: 7-6 Dilations and Similarity in the Coordinate Plane
KEY: coordinate geometry | dilation | scale factor | similar DOK: DOK 2

11. ANS: B

$\frac{MO}{NO} = \frac{LO}{KO}$ If triangles are similar, sides are in proportion.

$\frac{12}{4} = \frac{LO}{3}$ Substitute 12 for *MO*, 4 for *NO*, and 3 for *KO*.

$4LO = 36$ Cross Products Property

$LO = 9$ Divide both sides by 4.

L lies on the *x*-axis, so the *y*-coordinate is 0. Since $LO = 9$, its *x*-coordinate must be 9. The coordinates of *L* are (9, 0).

$(3, 0) \rightarrow (3 \cdot 3, 0 \cdot 3) \rightarrow (9, 0)$, so the scale factor is 3.

	Feedback
A	Compare whole triangle sides to determine the scale factor.
B	Correct!
C	A scale factor compares corresponding sides of similar triangles.
D	Add together distances from the origin along the *x*-axis to determine the *x*-coordinate.

PTS: 1 DIF: Basic REF: 1b9ac1ba-4683-11df-9c7d-001185f0d2ea
OBJ: 7-6.2 Finding Coordinates of Similar Triangles
TOP: 7-6 Dilations and Similarity in the Coordinate Plane
KEY: coordinate geometry | dilation | scale factor | similar DOK: DOK 2

NUMERIC RESPONSE

1. ANS: 49

PTS: 1 DIF: Average REF: 1b9f5f62-4683-11df-9c7d-001185f0d2ea
TOP: 7-3 Triangle Similarity: AA, SSS, and SAS
KEY: similarity | similar triangles | corresponding sides DOK: DOK 2

2. ANS: 40

PTS: 1 DIF: Advanced REF: 1ba1c1be-4683-11df-9c7d-001185f0d2ea
TOP: 7-6 Dilations and Similarity in the Coordinate Plane KEY: dilation | scale factor
DOK: DOK 3

MATCHING

1. ANS: F PTS: 1 DIF: Basic
REF: 1ba1e8ce-4683-11df-9c7d-001185f0d2ea TOP: 7-1 Ratios in Similar Polygons
DOK: DOK 1
2. ANS: B PTS: 1 DIF: Basic
REF: 1ba4241a-4683-11df-9c7d-001185f0d2ea
TOP: 7-5 Using Proportional Relationships DOK: DOK 1
3. ANS: G PTS: 1 DIF: Basic
REF: 1ba68676-4683-11df-9c7d-001185f0d2ea
TOP: 7-5 Using Proportional Relationships DOK: DOK 1
4. ANS: H PTS: 1 DIF: Basic
REF: 1ba6ad86-4683-11df-9c7d-001185f0d2ea
TOP: 7-5 Using Proportional Relationships DOK: DOK 1
5. ANS: A PTS: 1 DIF: Basic
REF: 1ba8e8d2-4683-11df-9c7d-001185f0d2ea
TOP: 7-6 Dilations and Similarity in the Coordinate Plane DOK: DOK 1
6. ANS: E PTS: 1 DIF: Basic
REF: 1bab4b2e-4683-11df-9c7d-001185f0d2ea
TOP: 7-6 Dilations and Similarity in the Coordinate Plane DOK: DOK 1