7th Grade Unit Test Review - Stretching and Shrinking

Short Answer

1. Are shapes A and B similar? Explain why or why not. Include information about side lengths, angle measures and scale factor.

![Shape A and B diagram]

2. In each figure below, find the missing measurement.

   a. 
   
   ![Diagram a]

   b. 
   
   ![Diagram b]
3. **a.** Identify the three similar parallelograms below.

![Parallelogram Diagram]

**b.** Name all sets of corresponding sides for the similar parallelograms you found.

**c.** Name all sets of corresponding angles for the similar parallelograms you found.

4. The ratio of two adjacent side lengths of a rectangle is \(\frac{2}{3}\). Which of these could be the ratio of two adjacent side lengths of a similar rectangle?

\[
\begin{align*}
\frac{4}{9} & \quad \frac{4}{3} & \quad \frac{2}{6} & \quad \frac{4}{5} & \quad \frac{6}{9}
\end{align*}
\]

5. Which of the following rectangles is similar to a 10 by 15 rectangle?

![Rectangle Diagram]

6. Complete the table below.

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<thead>
<tr>
<th>Rectangle</th>
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<th>Short Side</th>
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7. Gerald wanted to find the height of the flagpole at the entrance to his school. He used a mirror and recorded some measurements on a drawing. What is the height of the flagpole?

![Diagram of a flagpole and a mirror with measurements]

8. Figure $VWXYZ$ is an enlargement of figure $ABCDE$. Name all the pairs of corresponding sides and all the pairs of corresponding angles of the two figures.

![Diagram of two parallelograms $ABCDE$ and $VWXYZ$]

9. On centimeter grid paper, make an isosceles triangle with base and height both equal to 6 centimeters.

   a. Can isosceles triangles with base and height equal to 2 centimeters be put together to exactly match the shape of the original triangle? Is each smaller triangle similar to the original?

   b. Can isosceles triangles with base and height equal to 4 centimeters be put together to exactly match the shape of the original triangle? Is each smaller triangle similar to the original?

   c. Can copies of the triangle below be put together to exactly match the shape of your original isosceles triangle? Is this triangle similar to the original?

![Diagram of a triangle with base and height 6 cm and 3 cm]
10. Find the value of \( x \) in each pair of similar figures below.

a.

\[ \text{3 cm} \quad \text{x} \quad \text{2 cm} \quad \text{8 cm} \]

b.

\[ \text{2 cm} \quad \text{x} \quad \text{2 cm} \quad \text{4 cm} \quad \text{6 cm} \]

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

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1. Tatenda has a chocolate chip cookie recipe that uses 2 cups of sugar for 6 dozen cookies. How much sugar will he need if he only wants to make 36 cookies?

A. 1 cup  
B. 5 cups  
C. 2 cups  
D. 4 cups

---

2. A scale of a map indicates that “1 inch equals 75 miles”. How many miles does 6 inches represent?

A. 81 miles  
B. 375 miles  
C. 450 miles  
D. 525 miles

---

3. Parallelogram \( \text{PARL} \sim \) parallelogram \( \text{WXYZ} \). Find the value of \( c \).

A. 45  
B. 21  
C. 3  
D. 22

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4. A building 50 ft high casts a 75-ft shadow. Sarah casts a 6-ft shadow. The triangle formed by the building and its shadow is similar to the triangle formed by Sarah and her shadow. How tall is Sarah?

A. 4 ft  
B. 5 ft  
C. 3 ft  
D. not here

---

5. The triangles below are similar. Find the value of \( x \).

A. 14  
B. 12.5  
C. 13.5  
D. 12
6. \[ \begin{align*} 
\text{A.} & \quad \frac{91}{3} \\
\text{B.} & \quad 14 \\
\text{C.} & \quad \frac{82}{3} \\
\text{D.} & \quad \frac{102}{3} 
\end{align*} \]

7. A 6-ft adult has a shadow 3.6 ft long. How long is the shadow of a 5-ft child standing next to the adult?

\[ \begin{align*} 
\text{A.} & \quad 3.6 \text{ ft} \\
\text{B.} & \quad 2.6 \text{ ft} \\
\text{C.} & \quad 4 \text{ ft} \\
\text{D.} & \quad 3 \text{ ft} 
\end{align*} \]

8. The ladders shown below are standing against the wall at the same angle. How high up the wall does the longer ladder go? (All measurements are in feet.)

\[ \begin{align*} 
\text{A.} & \quad 26 \text{ ft} \\
\text{B.} & \quad 14 \text{ ft} \\
\text{C.} & \quad 12.5 \text{ ft} \\
\text{D.} & \quad 11.25 \text{ ft} 
\end{align*} \]
9. Refer to the diagram below. Surveyors know that \( \Delta PQR \) and \( \Delta STR \) are similar. What is \( PQ \), the distance across the lake?

![Diagram of two similar triangles](image)

A. 3.65 km  
B. 3.29 km  
C. 2.89 km  
D. 3.15 km

10. A scale model of a car is 8 in. long. The actual car is 12 ft long. What is the scale of the model?

A. 1 in. : 1.5 in.  
B. 1 in. : 18 in.  
C. 1 in. : 18 ft  
D. 1 in. : 24 in.

11. Graph the points \( A(5, -4) \), \( B(1, -2) \), and \( C(3, 3) \) on the same coordinate plane.

A.  
B.  
C.  
D.
12. Graph \( A(-3, 2), B(1, -5)\), and \( C(5, -1)\) on the same coordinate plane.

A. 

B. 

C. 

D. 

13. A dozen apples costs $2.55. At this rate, how much would 8 apples cost?
   A. $20.40  
   B. $3.83  
   C. $0.21  
   D. $1.70

14. A building casts a shadow 100 m long. At the same time, a nearby pole 4 m high casts a shadow 8 m long. What is the height of the building? Round your answer to the nearest tenth, if necessary.
   A. 200 m  
   B. 0.5 m  
   C. 50 m  
   D. 800 m

15. Standing next to each other, a woman who is 70 inches tall and her son cast shadows that are 47 inches and 33 inches, respectively. What is the height of the son, to the nearest inch?
   A. 47 in.  
   B. 33 in.  
   C. 49 in.  
   D. 22 in.
SHORT ANSWER

1. ANS:
Shapes A and B are similar. They have the same basic shape, corresponding angles are equal, and the side lengths of shape A are 3 times the corresponding side lengths of B.
Note: Students may determine this by measuring, tracing, or cutting out the two shapes to compare their angles and sides.

PTS: 1  DIF: L2  REF: Stretching and Shrinking | Partner Quiz
OBJ: Investigation 3: Scaling Perimeter and Area
TOP: Problem 3.1 Rep-Tile Quadrilaterals
KEY: rep-tile | area | perimeter | similar figures | scale factors

2. ANS:
   a. \( x = 4 \text{ cm} \)
   b. \( y = 24 \text{ cm} \)

PTS: 1  DIF: L2  REF: Stretching and Shrinking | Additional Practice Investigation 4
OBJ: Investigation 4: Similarity and Ratios
NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f
TOP: Problem 4.3 Using Similarities to Find Measurements
KEY: ratio | equivalent ratio | similar figures | finding similar measures

3. ANS:
   a. Parallelograms \( AEFG, AHIJ \) and \( ABCD \) are all similar to each other.
   b. and c.

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PTS: 1  DIF: L2  REF: Stretching and Shrinking | Additional Practice Investigation 5
OBJ: Investigation 4: Similarity and Ratios
NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3c
KEY: similar | finding similar measures
4. ANS:
\[
\frac{6}{9}
\]
PTS: 1  DIF: L2  REF: Stretching and Shrinking | Question Bank
OBJ: Investigation 4: Similarity and Ratios
NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f
TOP: Problem 4.2 Ratios Within Similar Triangles
KEY: ratio | equivalent ratio | similar figures

5. ANS:
rectangle A

PTS: 1  DIF: L2  REF: Stretching and Shrinking | Question Bank
OBJ: Investigation 4: Similarity and Ratios
NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f
TOP: Problem 4.2 Ratios Within Similar Triangles
KEY: ratio | equivalent ratio | similar figures

6. ANS:

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PTS: 1  DIF: L2  REF: Stretching and Shrinking | Question Bank
OBJ: Investigation 3: Scaling Perimeter and Area
TOP: Problem 3.3 Scale Factors and Similar Shapes
KEY: scale factors | similar figures | finding similar measures

7. ANS:
The flagpole measures $\frac{600}{100} \times 150 = 900$ cm.

PTS: 1  DIF: L2  REF: Stretching and Shrinking | Question Bank
OBJ: Investigation 4: Similarity and Ratios
NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3c
KEY: mirror | similar | finding similar measures
8. ANS:

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PTS: 1  DIF: L2
REF: Stretching and Shrinking | Additional Practice Investigation 1
OBJ: Investigation 1: Enlarging and Reducing Shapes
NAT: CC 7.G.A.1 | NAEP G2c | NAEP G2e
TOP: Problem 1.3 Corresponding Sides and Angles  KEY: similar figures | scaling

9. ANS:
   a. Yes, 9 of these smaller triangles can be put together to match the shape of the original triangle. Each smaller triangle is similar to the original because of the restriction that the triangles are isosceles, together with the fixed height and base.
   b. No, copies of the smaller triangle cannot be put together to make the original because the scale factor from the smaller to the larger triangle is not a whole number. However, the smaller triangle is similar to the original because the scale factor is 1.5.
   c. No, copies of the triangle cannot be put together to make the original because the triangles are not similar. The ratios of the side lengths are not constant.

PTS: 1  DIF: L2
REF: Stretching and Shrinking | Additional Practice Investigation 3
OBJ: Investigation 3: Scaling Perimeter and Area
KEY: rep-tile | area | perimeter | similar figures | scale factors

10. ANS:
   a. \( x = 12 \) cm
   b. \( x = 3 \) cm

PTS: 1  DIF: L2
REF: Stretching and Shrinking | Additional Practice Investigation 3
OBJ: Investigation 3: Scaling Perimeter and Area
KEY: scale factors | similar figures | finding similar measures
MULTIPLE CHOICE

1. ANS: A  PTS: 1  DIF: L2
   REF: Stretching and Shrinking | Multiple Choice
   OBJ: Investigation 4: Similarity and Ratios
   NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f
   TOP: Problem 4.3 Using Similarities to Find Measurements
   KEY: ratio | equivalent ratio | similar figures | finding similar measures

2. ANS: C  PTS: 1  DIF: L2
   REF: Stretching and Shrinking | Multiple Choice
   OBJ: Investigation 3: Scaling Perimeter and Area
   TOP: Problem 3.3 Scale Factors and Similar Shapes
   KEY: scale factors | similar figures | finding similar measures

3. ANS: B  PTS: 1  DIF: L1  REF: Skills Practice Investigation 4
   OBJ: Investigation 3: Scaling Perimeter and Area
   TOP: Problem 4.4 Ratios with Similar Parallelograms
   KEY: similar figures | corresponding angles | corresponding sides | solving a proportion | proportion

4. ANS: A  PTS: 1  DIF: L1  REF: Skills Practice Investigation 5
   OBJ: Investigation 4: Similarity and Ratios
   NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3e
   KEY: problem solving | proportion | similar figures | solving a proportion | corresponding angles | corresponding sides | indirect measurement | word problem

5. ANS: D  PTS: 1  DIF: L1  REF: Skills Practice Investigation 4
   OBJ: Investigation 3: Scaling Perimeter and Area
   TOP: Problem 4.3 Using Similarities to Find Measurements
   KEY: proportion | similar figures | solving an equation

6. ANS: D  PTS: 1  DIF: L1  REF: Skills Practice Investigation 4
   OBJ: Investigation 3: Scaling Perimeter and Area
   TOP: Problem 4.3 Using Similarities to Find Measurements
   KEY: proportion | similar figures | solving an equation

7. ANS: D  PTS: 1  DIF: L1  REF: Skills Practice Investigation 5
   OBJ: Investigation 4: Similarity and Ratios
   NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3e
   KEY: proportion | similar figures | word problem | problem solving

8. ANS: C  PTS: 1  DIF: L1  REF: Skills Practice Investigation 5
   OBJ: Investigation 4: Similarity and Ratios
   NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3e
   KEY: proportion | similar figures | word problem | decimals | problem solving

9. ANS: D  PTS: 1  DIF: L2  REF: Skills Practice Investigation 5
   OBJ: Investigation 4: Similarity and Ratios
   NAT: CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3e
   KEY: proportion | similar figures | word problem | decimals | problem solving | indirect measurement
10. **ANS:** B  **PTS:** 1  **DIF:** L1  **REF:** Skills Practice Investigation 2  
**OBJ:** Investigation 2: Similar Figures  **NAT:** CC 7.G.A.1 | CC 7.G.B.6 | NAEP G2d | NAEP G2f  
**TOP:** Problem 2.3 Scale Factors  **KEY:** proportion | scale | scale model | word problem

11. **ANS:** C  **PTS:** 1  **DIF:** L1  **REF:** Skills Practice Investigation 2  
**OBJ:** Investigation 2: Similar Figures  **NAT:** CC 7.G.A.1 | CC 7.G.B.6 | NAEP G2d | NAEP G2f  
**TOP:** Problem 2.1 Enlarging a Figure  
**KEY:** quadrants | ordered pair | coordinates | x-axis | x-coordinate | y-axis | y-coordinate | origin | graphing a point

12. **ANS:** A  **PTS:** 1  **DIF:** L1  **REF:** Skills Practice Investigation 2  
**OBJ:** Investigation 2: Similar Figures  **NAT:** CC 7.G.A.1 | CC 7.G.B.6 | NAEP G2d | NAEP G2f  
**TOP:** Problem 2.1 Enlarging a Figure  
**KEY:** coordinate plane | x-axis | y-axis | quadrants | origin | ordered pair | x-coordinate | y-coordinate

13. **ANS:** D  **PTS:** 1  **DIF:** L2  **REF:** Skills Practice Investigation 4  
**OBJ:** Investigation 3: Scaling Perimeter and Area  **NAT:** CC 7.G.A.1 | CC 7.G.B.6 | NAEP G2e | NAEP G2f  
**TOP:** Problem 4.1 Ratios with Similar Parallelograms  
**KEY:** proportion

14. **ANS:** C  **PTS:** 1  **DIF:** L2  **REF:** Skills Practice Investigation 5  
**OBJ:** Investigation 4: Similarity and Ratios  **NAT:** CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3c  
**KEY:** indirect measurement | similar triangles | proportion

15. **ANS:** C  **PTS:** 1  **DIF:** L2  **REF:** Skills Practice Investigation 5  
**OBJ:** Investigation 4: Similarity and Ratios  **NAT:** CC 7.G.A.1 | CC 7.RP.A.2c | CC 7.RP.A.3 | NAEP G2e | NAEP G2f | NAEP G3c  
**KEY:** indirect measurement | proportion | word problem | similar triangles