Investigation 3: Scaling Perimeter and Area and Investigation 4: Similarity and Ratios

Standards:
- 7.RP.A: Recognize and represent proportional relationships between quantities.
  - Proportional relationships have a scale factor.
- 7.G.A.1: Solve problems involving scale drawings of geometric figures.

<table>
<thead>
<tr>
<th>Date</th>
<th>Learning Target/s</th>
<th>Classwork (Check Off Completed/Corrected Items)</th>
<th>Homework (Check Off Completed/Corrected Items)</th>
<th>Self-Assess Your Understanding of the Learning Target/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday, Nov. 12</td>
<td>I can use rep-tiles to see the effect of scale factor on side lengths, angles, perimeter, and area.</td>
<td>☐ Pg. 2-3 – SS 3.1/3.2: Rep-Tile Quadrilaterals and Triangles</td>
<td>☐ Pg. 4 – Similar Rectangles</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Friday, Nov. 13</td>
<td>I can use scale factors to make scale drawings.</td>
<td>☐ Pg. 5-6 – SS 3.3: Scale Factors and Similar Shapes ☐ Exit Ticket</td>
<td>☐ Pg. 7 – SS 3.4 Zaption</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Monday, Nov. 16</td>
<td>I can use scale factors to find missing values in similar figures.</td>
<td>☐ Pg. 8-9 – SS 3.4 – Additional Practice with Similar Figures</td>
<td>☐ MathXL</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Tuesday, Nov. 17</td>
<td>I can use scale factors to find missing values in similar figures.</td>
<td>☐ Check Up</td>
<td>☐ Pg. 10 – SS 4.1 Zaption</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Wednesday, Nov. 18</td>
<td>I can use equivalent ratios to compare corresponding sides of similar rectangles.</td>
<td>☐ Pg. 11 – Ratios in Similar Rectangles</td>
<td>☐ Pg. 12 – SS 4.2 Zaption</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Thursday, Nov. 19</td>
<td>I can use equivalent ratios to compare corresponding sides of similar triangles.</td>
<td>☐ Pg. 13 – Ratios in Similar Triangles</td>
<td>☐ Pg. 14 – Termite Puzzle</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Friday, Nov. 20</td>
<td>I can use proportions to find missing values in similar figures.</td>
<td>☐ Pg. 15-16 – Finding Missing Parts</td>
<td>☐ Pg. 17 – Tuesday Puzzle</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>Monday, Nov. 23</td>
<td>I can use scale factors and ratios to find missing values in similar figures.</td>
<td>☐ Partner Quiz</td>
<td>☐ Pg. 18 – Cryptic Quiz Puzzle</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>MathXL</td>
<td>☐ I completed 30 minutes of MathXL between Thursday, Nov. 12 and Monday, Nov. 23.</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
</tr>
<tr>
<td>Exit Ticket</td>
<td>I can find the scale factor between similar figures.</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
</tr>
<tr>
<td>Exit Ticket Check Up</td>
<td>I can find the effect of scale factor on side lengths, perimeter and area.</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
</tr>
<tr>
<td>Partner Quiz</td>
<td>I can find missing values in similar figures using scale factors.</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
</tr>
<tr>
<td></td>
<td>I can set up and solve proportions for missing values in similar figures.</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
<td>☐ Exit Ticket</td>
</tr>
</tbody>
</table>

Parent/Guardian Signature: __________________________________________ Due: __________________________________
SS 3.1/3.2: Rep-Tile Quadrilaterals and Triangles

1. Look for rep-tile patterns in the design below. For each design,
   - Decide whether the small quadrilaterals within each figure are similar to the large quadrilateral that makes up the whole figure. Explain.
   - If the quadrilaterals are similar, give the scale factor from each small quadrilateral to the large quadrilateral.

![Quad1](image1.png)  ![Quad2](image2.png)

2. Suppose you put together nine copies of a rectangle to make a larger, similar rectangle.
   a. Make a sketch of the large rectangle with the smaller rectangles inside:

   ![RectangleSketch](image3.png)

   b. How is the area of the larger rectangle related to the area of the smaller rectangle?

   c. What is the scale factor from the smaller rectangle to the larger rectangle?

   d. Challenge: If the area of the large rectangle is 81 in², what is the area of one of the small rectangles?

   e. Challenge: If the area of one of the small rectangles is 15 in², what is the area of the large rectangle?
3. Suppose you divide a rectangle into 25 smaller rectangles such that each rectangle is similar to the original rectangle.
   a. Make a sketch of the large rectangle with the smaller rectangles inside:

b. How is the area of each of the smaller rectangles related to the area of the original rectangle?

c. What is the scale factor from the original rectangle to each of the smaller rectangles?

d. Challenge: If the area of one of the small rectangles is 4 \( \text{cm}^2 \), what is the area of the large rectangle?

e. Challenge: If the area of the large rectangle is 225 \( \text{cm}^2 \), what is the area of one of the small rectangles?

4. Look for rep-tile patterns in the figures below.
   a. Tell whether the small triangles are similar to the large triangles. Explain.
   b. If the triangles are similar, give the scale factor from each small triangle to the large triangle.
Homework: Similar Rectangles (Bring to Class Completed)

1. Look at the diagram of Rectangles F and G.
   
a. Identify the length, width, perimeter, and area of Rectangle F:
      
      Length: ______  Width: ______
      
      Perimeter: ______  Area: ______
      
      i. Give the length and width of a different, similar rectangle H (you get to make it up, but rectangle H must be similar to rectangle F):
         
         Length: ______  Width: ______
         
      ii. How do you know rectangle H is similar to Rectangle F?
         
      iii. What is the scale factor from Rectangle F to rectangle H?
         
      iv. What is the perimeter of rectangle H?
         
      v. What is the area of rectangle H?
   
b. Identify the length, width, perimeter, and area of Rectangle G:
      
      Length: ______  Width: ______  Perimeter: ______  Area: ______
      
      i. Give the length and width of a different, similar rectangle J (you get to make it up, but rectangle J must be similar to rectangle G):
         
         Length: ______  Width: ______
         
      ii. How do you know that your new rectangle J is similar to Rectangle G?
         
      iii. What is the scale factor from Rectangle G to rectangle J?
         
      iv. What is the perimeter of rectangle J?
         
      v. What is the area of rectangle J?
SS 3.3: Designing Under Constraints – Scale Factors and Similar Shapes

Use the lab sheet to see Rectangle A and Triangle B and to draw and label the additional similar figures.

A. For each part, find a rectangle similar to Rectangle A that fits the given description.

1. The scale factor from Rectangle A to Rectangle C is 2.5.
   a. What are the side lengths of Rectangle A?
   b. What is the scale factor from Rectangle A to Rectangle C?
      i. (Circle one): The rectangle is getting bigger / smaller.
   c. What are the side lengths of the Rectangle C? Show how you use the scale factor.
      Length of Rectangle C = ______________________  Width of Rectangle C = ____________________
   d. Draw and label Rectangle C on the grid.

2. The area of Rectangle D is ¼ the area of Rectangle A.
   a. What is the area of Rectangle A?
   b. What is the scale factor from Rectangle A to Rectangle D?
      i. (Circle one): The rectangle is getting bigger / smaller.
   c. What is the area of Rectangle D? Show how you use the scale factor.
      Area of Rectangle D = _________________________________
   d. Draw and label Rectangle D on the grid.
   e. Challenge: How many copies (rep-tiles) of Rectangle D fit inside Rectangle A?

3. The perimeter of Rectangle E is 3 times the perimeter of Rectangle A.
   a. What is the perimeter of Rectangle A?
   b. What is the scale factor from Rectangle A to Rectangle E?
      i. (Circle one): The rectangle is getting bigger / smaller.
   c. What is the perimeter of Rectangle E? Show how you use the scale factor.
      Perimeter of Rectangle E = _________________________________
   d. Draw and label Rectangle E on the grid.

Continue to next page....
B. For each part, find a triangle similar to Triangle B that fits the given description.

1. The area of Triangle F is 16 times the area of Triangle B.
   a. What is the area of Triangle B?
   b. What is the area of Triangle F?
      
      Area of Triangle F = ________________________________
   c. How many copies (rep-tiles) of Triangle B fit inside Triangle F?
   d. Think about the relationship between rep-tiles and area, as well as the relationship between scale factor and area. What is the scale factor from Triangle B to Triangle F?
   e. Draw and label Triangle F on the grid.

2. The scale factor from Triangle B to Triangle G is ½.
   a. What are the side lengths of Triangle B?
   b. What is the scale factor from Triangle B to Triangle G?
      i. (Circle one): The triangle is getting bigger / smaller.
   e. What are the side lengths of the Triangle G? Show how you use the scale factor.
      
      Side 1 = _________________  Side 2 = ________________  Side 3 = ________________
   c. Draw and label Triangle G on the grid.

C. Rectangles ABCD and EFGH are similar. Find the length of side AD. Explain how you found the length.
Homework - Complete the notes from the Zaption tour for SS 3.4:

1. Triangles ABC and DEF are similar. Find the missing side lengths and angle measures. Explain how you found the missing measures.

   Angle B:

   Angle E:

   Angle F:

   Side DF:

   Side FE:

2. What is the relationship between scale factor and corresponding angles?

3. What is the relationship between scale factor and corresponding sides?

4. What is the relationship between scale factor and perimeter?

5. What is the relationship between scale factor and area?

6. What are nested triangles?

   Match up corresponding ________ and _________.

   Look for a _____________ ____________.
SS 3.4 – Additional Practice with Similar Figures

A. Triangle ABC is similar to triangle PQR.
   1. What is the scale factor from triangle ABC to triangle PQR?
   2. What is the scale factor from triangle PQR to triangle ABC?
   3. What is the measure of angle A?
   4. What is the measure of angle Q?
   5. What is the measure of angle P?
   6. What is the length of side AB?
   7. What is the length of side AC?

B. Parallelograms ABCD and RSPQ are similar.
   1. What is the scale factor from parallelogram ABCD to parallelogram RSPQ?
   2. What is the scale factor from parallelogram RSPQ to parallelogram ABCD?
   3. What is the measure of angle D?
   4. What is the measure of angle R?
   5. What is the measure of side AD?

C. Judy lies on the ground 45 feet from her tent. Both the top of the tent and the top of a tall cliff are in her line of sight. Her tent is 10 feet tall. About how high is the cliff? Assume the two triangles are similar. (If you need help, look at your homework notes on nested triangles).
D. Find each missing side length in the nested triangles.

E. The right triangles are similar.

1. Find the length of side RS.

2. Find the length of side RQ.

3. The measure of angle x is 40 degrees.

4. What is the angle relationship between angle x and angle y?

5. What is the measure of angle y?

6. What do the angles in a triangle add up to?

7. What is the measure of angle R?

8. What is the angle relationship between angle z and the 80 degree angle?

9. What is the measure of angle z?

10. What is the measure of angle Q?
Homework - Complete the notes from the Zaption tour for SS 4.1:

You can use _______________ to describe and compare shapes. A ratio is a _______________ of two quantities, such as two lengths.

The rectangle around the original figure is about 10 centimeters tall and 8 centimeters wide. You can say, “The ratio of height to width is 10 to 8.” You can also write a ratio as a _______________.

You can enlarge or reduce the size of the original and produce these images. The table gives the ratios of height to width for the images:

<table>
<thead>
<tr>
<th>Figure</th>
<th>Height (cm)</th>
<th>Width (cm)</th>
<th>Height-to-Width Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>10</td>
<td>8</td>
<td>10 to 8</td>
</tr>
<tr>
<td>Left</td>
<td>8</td>
<td>3</td>
<td>8 to 3</td>
</tr>
<tr>
<td>Middle</td>
<td>3</td>
<td>6</td>
<td>3 to 6</td>
</tr>
<tr>
<td>Right</td>
<td>5</td>
<td>4</td>
<td>5 to 4</td>
</tr>
</tbody>
</table>

The comparisons “10 to 8” and “5 to 4” are _______________ ratios. Equivalent ratios are like equivalent _______________.

When you create equivalent ratios (or equivalent fractions), you multiply the numerator (top number) and denominator (bottom number) by the same number. You can think of this as a _______________.

\[
\frac{10}{8} = \frac{5}{4} \quad \text{and} \quad \frac{8}{10} = \frac{4}{5}
\]

You can express equivalent ratios with equations (be sure to match up corresponding sides). A _______________ is an equation stating that two ratios are _______________.

What if you want to draw a new figure that is similar to the original (10 cm high by 8 cm wide), though you want the image to be 15 centimeters high. How wide should the image be?

1. Set up a proportion (two ratios) comparing corresponding sides and label the unknown value (x)

\[
\frac{10}{8} = \frac{x}{15}
\]

2. Find the scale factor to create equivalent ratios

3. Find the unknown value
SS 4.1 – Ratios within Similar Rectangles

A. Which rectangles are similar? Explain your reasoning.

1. For each rectangle, find the **ratio** of the length of a short side to the length of a long side.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Ratio of Length of Short Side to Length of Long Side</th>
<th>Fraction (Simplify, if possible)</th>
<th>This rectangle is similar to…</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. What do you notice about the ratios for similar rectangles?

3. What do you notice about the ratios for non-similar rectangles?

4. Choose two similar rectangles. Find the scale factor from the smaller to the larger rectangle. What does the scale factor tell you?

5. Compare the information given by the scale factor to the information given by the ratios of side lengths.
Homework - Correct your work with Zaption tour for SS 4.2:

A. The rectangles at right are similar.
   1. What is the scale factor from Rectangle A to Rectangle B?

   2. Complete the following sentence in two different ways.
      Use the side lengths of Rectangles A and B.

      The ratio of _____ to _____ is equivalent to the ratio of _____ to _____.

      The ratio of _____ to _____ is equivalent to the ratio of _____ to _____.

   3. What is the value of x? Explain your reasoning.

   4. What is the ratio of the area of Rectangle A to the area of Rectangle B?

B. Which pairs of rectangles are similar?

   1. For each pair of similar rectangles, find
      the scale factor from the larger rectangle
      to the smaller rectangle.

   2. For each pair of similar rectangles, find
      the scale factor from the smaller rectangle to the larger rectangle.

   3. For each similar pair of rectangles, find the ratio of the area of the larger rectangle to the area of the smaller rectangle.
SS 4.2: Ratios within Similar Triangles

A. Look at triangles A-D below. Which triangles are similar? Explain your reasoning.

1. For each triangle, find the ratio of shortest side to longest side, and the ratio of shortest side to middle side.

<table>
<thead>
<tr>
<th>Triangle</th>
<th>Ratio (Short: Long)</th>
<th>Ratio (Short: Middle)</th>
<th>This triangle is similar to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. What do you notice about the ratios for similar triangles?

3. What do you notice about the ratios for non-similar triangles?

4. Choose two similar triangles. Find the scale factor from the smaller to the larger triangle. What does the scale factor give?

5. Compare the information given by the ratios of the side lengths and the information given by the scale factor.
Homework:

Use scale factors and/or proportions to find the missing value in each pair of similar figures.

What Is a Termite’s Favorite Breakfast?

For each pair of similar figures, find the length $x$. Cross out the letter next to your answer. When you finish, the answer to the title question will remain.

1. $9$ cm
   - $9$ m
   - $6$ m
   - $12$ m
   - $x$

2. $15$ cm
   - $12$ cm
   - $20$ cm
   - $x$

3. $18$ cm
   - $30$ cm
   - $24$ cm
   - $x$

4. $10$ in.
   - $35$ in.
   - $6$ in.
   - $x$

5. $72$ in.
   - $36$ in.
   - $25$ in.
   - $x$

6. $30$ m
   - $25$ m
   - $15$ m
   - $x$

7. $21$ cm
   - $20$ cm
   - $35$ cm
   - $x$

8. $14$ m
   - $20$ m
   - $60$ m
   - $x$

9. A flagpole casts a shadow $10$ ft long. If a man $6$ ft tall casts a shadow $4$ ft long at the same time of day, how tall is the flagpole?

10. A photograph is $25$ cm wide and $20$ cm high. It must be reduced to fit a space that is $8$ cm high. Find the width of the reduced photograph.
SS 4.3: Finding Missing Parts – Using Similarity to Find Measurements

When two figures are similar, you can find missing lengths in two ways:

1. Use the scale factor from one figure to the other.
2. Use the ratios of the side lengths within each figure to make a proportion.

A. Find the missing side lengths in the similar figures. Explain how you know your answer is correct.

Similar Triangles:

B. The figures at right are similar.
1. Find the value of $x$. Explain how you found it.

2. Find the value of $y$. Explain how you found it.

3. Find the area and perimeter of the smaller figure.

4. Use the area and perimeter of the smaller figure and the scale factor to find the area and perimeter of the larger figure.
C. Find the missing values in the similar figures:

The Washington Monument is the tallest structure in Washington, DC. At a certain time, the monument casts a shadow that is about 500 feet long. At the same time, a 40-foot flagpole nearby casts a shadow that is about 36 feet long. About how tall is the monument? **Sketch a diagram** and then find the missing value.

Deacon uses the shadow method to estimate the height of a flagpole. He finds that a 5-foot stick casts a 4-foot shadow. What is the height of the flagpole? **Sketch a diagram** and then find the missing value.
# Why Is Tuesday the Favorite Day of Math Teachers?

For each exercise, write the missing number. Find your answer in the set of boxes under the exercise. Write the letter of the exercise in the box containing the answer.

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Equivalent Fraction</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>$\frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$</td>
<td>15</td>
</tr>
<tr>
<td>T</td>
<td>$\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$</td>
<td>3</td>
</tr>
<tr>
<td>H</td>
<td>$\frac{3}{7} = \frac{3 \times 8}{7 \times 8} = \frac{24}{56}$</td>
<td>56</td>
</tr>
<tr>
<td>Y</td>
<td>$\frac{5}{8} = \frac{5 \times 4}{8 \times 4} = \frac{20}{32}$</td>
<td>32</td>
</tr>
<tr>
<td>A</td>
<td>$\frac{1}{2} = \frac{1 \times 15}{2 \times 15} = \frac{15}{30}$</td>
<td>30</td>
</tr>
<tr>
<td>S</td>
<td>$\frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$</td>
<td>18</td>
</tr>
<tr>
<td>T</td>
<td>$\frac{7}{12} = \frac{7 \times 2}{12 \times 2} = \frac{14}{24}$</td>
<td>24</td>
</tr>
<tr>
<td>O</td>
<td>$\frac{4}{9} = \frac{4 \times 9}{9 \times 9} = \frac{36}{81}$</td>
<td>81</td>
</tr>
<tr>
<td>H</td>
<td>$\frac{2}{5} = \frac{2 \times 20}{5 \times 20} = \frac{40}{100}$</td>
<td>100</td>
</tr>
<tr>
<td>I</td>
<td>$\frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$</td>
<td>60</td>
</tr>
<tr>
<td>A</td>
<td>$\frac{1}{6} = \frac{1 \times 6}{6 \times 6} = \frac{6}{36}$</td>
<td>36</td>
</tr>
<tr>
<td>T</td>
<td>$\frac{7}{10} = \frac{7 \times 6}{10 \times 6} = \frac{42}{60}$</td>
<td>60</td>
</tr>
<tr>
<td>L</td>
<td>$\frac{5}{12} = \frac{5 \times 5}{12 \times 5} = \frac{25}{60}$</td>
<td>60</td>
</tr>
<tr>
<td>Y</td>
<td>$\frac{6}{7} = \frac{6 \times 36}{7 \times 36} = \frac{216}{252}$</td>
<td>252</td>
</tr>
<tr>
<td>I</td>
<td>$\frac{4}{15} = \frac{4 \times 20}{15 \times 20} = \frac{80}{300}$</td>
<td>300</td>
</tr>
<tr>
<td>T</td>
<td>$\frac{3}{8} = \frac{3 \times 36}{8 \times 36} = \frac{108}{288}$</td>
<td>288</td>
</tr>
<tr>
<td>N</td>
<td>$\frac{1}{3} = \frac{1 \times 10}{3 \times 10} = \frac{10}{30}$</td>
<td>30</td>
</tr>
<tr>
<td>D</td>
<td>$\frac{3}{20} = \frac{3 \times 15}{20 \times 15} = \frac{45}{300}$</td>
<td>300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Equivalent Fraction</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$\frac{5}{7} = \frac{5 \times 3}{7 \times 3} = \frac{15}{21}$</td>
<td>15</td>
</tr>
<tr>
<td>U</td>
<td>$\frac{1}{9} = \frac{1 \times 7}{9 \times 7} = \frac{7}{63}$</td>
<td>63</td>
</tr>
<tr>
<td>E</td>
<td>$\frac{5}{6} = \frac{5 \times 5}{6 \times 5} = \frac{25}{30}$</td>
<td>30</td>
</tr>
<tr>
<td>A</td>
<td>$\frac{2}{11} = \frac{2 \times 3}{11 \times 3} = \frac{6}{33}$</td>
<td>33</td>
</tr>
<tr>
<td>S</td>
<td>$\frac{9}{25} = \frac{9 \times 4}{25 \times 4} = \frac{36}{100}$</td>
<td>100</td>
</tr>
<tr>
<td>E</td>
<td>$\frac{3}{10} = \frac{3 \times 7}{10 \times 7} = \frac{21}{70}$</td>
<td>70</td>
</tr>
<tr>
<td>R</td>
<td>$\frac{7}{16} = \frac{7 \times 5}{16 \times 5} = \frac{35}{80}$</td>
<td>80</td>
</tr>
<tr>
<td>A</td>
<td>$\frac{4}{5} = \frac{4 \times 10}{5 \times 10} = \frac{40}{50}$</td>
<td>50</td>
</tr>
<tr>
<td>W</td>
<td>$\frac{1}{18} = \frac{1 \times 10}{18 \times 10} = \frac{10}{180}$</td>
<td>180</td>
</tr>
<tr>
<td>D</td>
<td>$\frac{7}{20} = \frac{7 \times 5}{20 \times 5} = \frac{35}{100}$</td>
<td>100</td>
</tr>
<tr>
<td>A</td>
<td>$\frac{7}{8} = \frac{7 \times 4}{8 \times 4} = \frac{28}{32}$</td>
<td>32</td>
</tr>
<tr>
<td>E</td>
<td>$\frac{1}{5} = \frac{1 \times 55}{5 \times 55} = \frac{55}{275}$</td>
<td>275</td>
</tr>
<tr>
<td>R</td>
<td>$\frac{8}{9} = \frac{8 \times 10}{9 \times 10} = \frac{80}{90}$</td>
<td>90</td>
</tr>
<tr>
<td>N</td>
<td>$\frac{2}{15} = \frac{2 \times 4}{15 \times 4} = \frac{8}{60}$</td>
<td>60</td>
</tr>
<tr>
<td>T</td>
<td>$\frac{9}{10} = \frac{9 \times 4}{10 \times 4} = \frac{36}{40}$</td>
<td>40</td>
</tr>
<tr>
<td>B</td>
<td>$\frac{4}{7} = \frac{4 \times 10}{7 \times 10} = \frac{40}{70}$</td>
<td>70</td>
</tr>
<tr>
<td>M</td>
<td>$\frac{3}{4} = \frac{3 \times 25}{4 \times 25} = \frac{75}{100}$</td>
<td>100</td>
</tr>
<tr>
<td>N</td>
<td>$\frac{3}{16} = \frac{3 \times 5}{16 \times 5} = \frac{15}{80}$</td>
<td>80</td>
</tr>
<tr>
<td>F</td>
<td>$\frac{7}{12} = \frac{7 \times 8}{12 \times 8} = \frac{56}{96}$</td>
<td>96</td>
</tr>
<tr>
<td>M</td>
<td>$\frac{19}{20} = \frac{19 \times 5}{20 \times 5} = \frac{95}{100}$</td>
<td>100</td>
</tr>
</tbody>
</table>
Homework: Solve each proportion (equivalent ratios). You may find it helps to simplify ratios, if possible, before finding a scale factor (see example).

**CRYPTIC QUIZ**

1. What should the JOLLY GREEN GIANT receive?

2. Why did it take the GOAT more than 3 hours to finish a 20-page book?

Solve each proportion and find your answer in the code. Each time the answer appears, write the letter of the exercise above it.

I $\frac{2}{5} = \frac{12}{n}$

S $\frac{3}{4} = \frac{9}{n}$

G $\frac{6}{2} = \frac{21}{n}$

O $\frac{10}{4} = \frac{n}{6}$

Y $\frac{5}{15} = \frac{n}{9}$

T $\frac{12}{8} = \frac{n}{4}$

U $\frac{2}{n} = \frac{5}{25}$

A $\frac{33}{n} = \frac{11}{3}$

L $\frac{49}{n} = \frac{7}{10}$

V $\frac{n}{6} = \frac{6}{9}$

Z $\frac{n}{4} = \frac{18}{72}$

H $\frac{n}{2} = \frac{50}{20}$

W $\frac{14}{n} = \frac{7}{4}$

E $\frac{8}{12} = \frac{12}{n}$

B $\frac{n}{13} = \frac{4}{1}$

R $\frac{24}{6} = \frac{n}{5}$

N $\frac{n}{10} = \frac{40}{25}$

P $\frac{24}{n} = \frac{30}{100}$