On the first week of school, Joel purchases 2 movies and 6 songs from his favorite media website. If he purchases the same number of movies and songs each week, how does the number of songs purchased compare to the number of movies purchased from one week to the next?

**STEP 1** Use the two rules given in the problem to generate the first 4 terms in the sequence for the number of movies and the sequence for number of songs.

- The sequence for the number of movies each week is:
  
  $2, \quad , \quad , \quad , \quad , \quad , \ldots$

- The sequence for the number of songs each week is:
  
  $6, \quad , \quad , \quad , \quad , \quad , \ldots$

**STEP 2** Write number pairs that relate the number of movies to the number of songs.

Week 1: $2, \quad 6$  
Week 2: $\quad$  
Week 3: $\quad$  
Week 4: $\quad$

**STEP 3** For each number pair, compare the number of movies to the number of songs. Write a rule to describe this relationship.

Think: For each related number pair, the second number is ______ times as great as the first number.

Rule: __________________________

So, from one week to the next, the number of songs Joel purchased is ______ times as many as the number of movies purchased.
Example

When Alice completes each level in her favorite video game, she wins 3 extra lives and 6 gold coins. What rule can you write to relate the number of gold coins to the number of extra lives she has won at any level? How many extra lives will Alice have won after she completes 8 levels?

<table>
<thead>
<tr>
<th>Level</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Lives</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Gold Coins</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>...</td>
<td>48</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Add ____.

Multiply by ____ or divide by ____.

STEP 1 To the left of the table, complete the rule for how you could find the number of extra lives won from one level to the next.

\[0, 3, 6, 9, 12\]  \(\text{difference between consecutive terms}\)

From one level to the next, Alice wins ____ more extra lives.

STEP 2 To the left of the table, complete the rule for how you could find the number of gold coins won from one level to the next.

\[0, 6, 12, 18, 24\]  \(\text{difference between consecutive terms}\)

From one level to the next, Alice wins ____ more gold coins.

STEP 3 Write number pairs that relate the number of gold coins to the number of extra lives won at each level.

Level 1: 6, 3  
Level 2: ____

Level 3: ____  
Level 4: ____

STEP 4 Complete the rule to the right of the table that describes how the number pairs are related. Use your rule to find the number of extra lives at level 8.

Think: For each level, the number of extra lives is ____ as great as the number of gold coins.

Rule: __________________________

So, after 8 levels, Alice will have won ____ extra lives.
Share and Show

Use the given rules to complete each sequence. Then, complete the rule that describes how nickels are related to dimes.

1. 

<table>
<thead>
<tr>
<th>Number of coins</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickels (£)</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Dimes (£)</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Add 5. Multiply by _____.

Add 10. Complete the rule that describes how one sequence is related to the other. Use the rule to find the unknown term.

2. Multiply the number of books by _____ to find the amount spent.

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>...</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Num. of Books</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>...</td>
<td>24</td>
</tr>
<tr>
<td>Amount Spent ($)</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

3. Divide the weight of the bag by _____ to find the number of marbles.

<table>
<thead>
<tr>
<th>Bags</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>...</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Num. of Marbles</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Weight of Bag (grams)</td>
<td>30</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>...</td>
<td>360</td>
</tr>
</tbody>
</table>

On Your Own

Complete the rule that describes how one sequence is related to the other. Use the rule to find the unknown term.

4. Multiply the number of eggs by _____ to find the number of muffins.

<table>
<thead>
<tr>
<th>Batches</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>...</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Num. of Eggs</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>...</td>
<td>18</td>
</tr>
<tr>
<td>Muffins</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

5. Divide the number of meters by _____ to find the number of laps.

<table>
<thead>
<tr>
<th>Runners</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Num. of Laps</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Num. of Meters</td>
<td>1,600</td>
<td>3,200</td>
<td>4,800</td>
<td>6,400</td>
</tr>
</tbody>
</table>

6. Make Connections Suppose the number of eggs used in Exercise 4 is changed to 3 eggs for each batch of 12 muffins, and 48 eggs are used. How many batches and how many muffins will be made?
7. **Go Deeper**  
Emily has a road map with a key that shows every inch on the map equals 5 miles of actual distance. She will drive on two roads to get to the beach. One road is 7 inches long on the map. The other road is 5 inches long. What is the actual distance Emily will drive to the beach? Write the rule you used to find the actual distance.

8. **Mathematical Practice**  
Identify Relationships  
To make a shade of lavender paint, Jon mixes 4 ounces of red tint and 28 ounces of blue tint into one gallon of white paint. If 20 gallons of white paint and 80 ounces of red tint are used, how much blue tint should be added? Write a rule that you can use to find the amount of blue tint needed.

9. **Think Smarter**  
In the cafeteria, tables are arranged in groups of 4, with each table seating 8 students. How many students can sit at 10 groups of tables? Write the rule you used to find the number of students.

10. **Think Smarter**  
Jessie made a table to show how many miles the runners ran.

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Runners</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Number of Miles</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>?</td>
</tr>
</tbody>
</table>

For 10a-10b, choose the correct values to describe how one sequence is related to the other.

10a. The unknown number in Day 5 is 54, 56, or 60.

10b. The rule that relates the number of miles to the number of runners is multiply by 3, add 10, or multiply by 5.
**Numerical Patterns**

Complete the rule that describes how one sequence is related to the other. Use the rule to find the unknown term.

1. Multiply the number of laps by ______ to find the number of yards.

   **Think:** The number of yards is 50 times the number of laps.

   - **Swimmers**
     - Number of Laps: 4, 8, 12, 16
     - Number of Yards: 200, 400, 600, 800

2. Multiply the number of pounds by ______ to find total cost.

   - **Boxes**
     - Number of Pounds: 3, 6, 9, 12, 18
     - Total Cost ($): 12, 24, 36, 48

3. Multiply the number of hours by ______ to find the number of miles.

   - **Cars**
     - Number of Hours: 2, 4, 6, 8
     - Number of Miles: 130, 260, 390

4. Multiply the number of hours by ______ to find the amount earned.

   - **Days**
     - Number of Hours: 8, 16, 24, 32, 56
     - Amount Earned ($): 96, 192, 288, 384

5. A map's key shows that every of 5 inches on the map represents 200 miles of actual distance. Suppose the distance between two cities on the map is 7 inches. What is the actual distance between the two cities? Write the rule you used to find the actual distance.

6. To make each costume, Rachel uses 6 yards of material and 3 yards of trim. Suppose she uses a total of 48 yards of material to make several costumes. How many yards of trim does she use? Write the rule you used to find the number of yards of trim.

7. **WRITE** Math Give an example using the subject of time to describe how two number patterns are related.
Lesson Check (5.OA.B.3)

Use the table below to answer questions 1 and 2.

<table>
<thead>
<tr>
<th>Term Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>...</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence 1</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>...</td>
<td>24</td>
</tr>
<tr>
<td>Sequence 2</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>...</td>
<td>?</td>
</tr>
</tbody>
</table>

1. What rule could you write that relates Sequence 2 to Sequence 1?

2. What is the unknown number in Sequence 2?

Spiral Review (5.OA.A.1, 5.NBT.A.1, 5.NFA.A.2, 5.NF.B.3)

3. What is the value of the following expression?

\[ 40 - (3 + 2) \times 6 \]

4. What is the value of the digit 9 in the number 597,184?

5. What is the best estimate for the sum of \( \frac{3}{8} \) and \( \frac{1}{12} \)?

6. Terry uses 3 cups of pumpkin seeds to decorate the tops of 12 loaves of bread. She puts an equal amount of seeds on each loaf. How many cups of pumpkin seeds does she put on each loaf of bread?