1. Determine the perimeter and area of rectangles A and B.

**Rectangle A**
- Perimeter: $P = 2(16 + w)$
- $P = 32$
- Area: $A = 1 \times w$
- $A = 63$ square units

**Rectangle B**
- Perimeter: $P = 2(15 + w)$
- $P = 30$
- Area: $A = 9 \times 6$
- $A = 54$ square units

2. Determine the perimeter and area of each rectangle.

   **Rectangle a.**
   - Perimeter: $P = 2(5 + 6)$
   - $P = 22$
   - Area: $A = 6 \times 5$
   - $A = 30$ square units

   **Rectangle b.**
   - Perimeter: $P = 2(11 + 3)$
   - $P = 22$
   - Area: $A = 8 \times 3$
   - $A = 24$ square units

3. Determine the perimeter of each rectangle.

   **Rectangle a.**
   - Perimeter: $P = 2(16 + w)$
   - $P = 2 \times 265$
   - $P = 530$ m

   **Rectangle b.**
   - Perimeter: $P = 2(100 + 75)$
   - $P = 2 \times 175$
   - $P = 350$ cm

---

**Notes:**
- The area calculation for the rectangle is done with repeated addition.
- The perimeter calculations use the formula $P = 2l + 2w$ for a rectangle, where $l$ is the length and $w$ is the width.

---

**References:**
- Common Core Standards: 3.A.11
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4. Given the rectangle’s area, find the unknown side length.

a. \[ A = l \times w \]
\[ 80 = 8 \times x \]
\[ x = 10 \]

b. \[ A = l \times w \]
\[ 49 = 7 \times x \]
\[ x = 7 \]

5. Given the rectangle’s perimeter, find the unknown side length. *Note the division involved in this problem.

a. \[ P = 120 \text{ cm} \]
\[ 2L + 2w = 120 \]
\[ 20 + 2(80) = 120 \]
\[ 160 + 2w = 120 \]
\[ 2w = 120 - 160 \]
\[ w = 40 \]
\[ x = 40 \text{ cm} \]

b. \[ P = 1,000 \text{ m} \]
\[ 2L + 2w = 1,000 \]
\[ 250 + 2(500) = 1,000 \]
\[ 500 + 2w = 1,000 \]
\[ 2w = 1,000 - 500 \]
\[ w = 250 \]
\[ x = 250 \text{ m} \]

6. Each of the following rectangles has whole number side lengths. Given the area and perimeter, find the length and width.

a. \[ P = 20 \text{ cm} \]
\[ L = 10 \]
\[ W = 1 + w \]
\[ 20 = 2(1+w) \]
\[ 10 = 1+w \]
\[ 10 = 6 + 4 \]

b. \[ P = 28 \text{ m} \]
\[ 14 = 1+w \]
\[ 14 = 2+12 \]
1. A rectangular porch is 4 feet wide. It is 3 times as long as it is wide.
   
   a. Label the diagram with the dimensions of the porch.
   
   $\begin{array}{c}
   \text{2 ft} \\
   \text{4 ft} \\
   \text{4 ft} \\
   \end{array}$

   b. Find the perimeter of the porch.
   
   $P = 2 \times (1 + w)$
   
   $P = 2 \times (4 + 12)$
   
   $P = 2 \times 16$
   
   $P = 32$ feet

2. A narrow rectangular banner is 5 inches wide. It is 6 times as long as it is wide.

   a. Draw a diagram of the banner and label its dimensions.

   $\begin{array}{c}
   \text{5 in} \\
   \text{30 in} \\
   \end{array}$

   b. Find the perimeter and area of the banner.

   $P = 2 \times (1 + w)$
   
   $P = 70$ in

   $A = lw$
   
   $A = 30 \times 5$
   
   $A = 150$ square inches

(Note the multiplication)
3. The area of a rectangle is 42 square centimeters. Its length is 7 centimeters.
   a. What is the width of the rectangle?

   ![Rectangle with dimensions](image)

   \[ A = l \times w \]
   \[ 42 = 7 \times w \]
   \[ w = \frac{42}{7} = 6 \text{ cm} \]

   b. Charlie wants to draw a second rectangle that is the same length but is 3 times as wide. Draw and label Charlie’s second rectangle.

   ![Updated Rectangle](image)

   c. What is the perimeter of Charlie’s second rectangle?

   \[ P = 2(l + w) \]
   \[ P = 2(7 + 18) \]
   \[ P = 2(25) = 50 \text{ cm} \]

4. The area of Betsy’s rectangular sandbox is 20 square feet. The longer side measures 5 feet. The sandbox at the park is twice as long and twice as wide as Betsy’s.

   a. Draw and label a diagram of Betsy’s sandbox. What is its perimeter?

   ![Diagram](image)

   \[ A = 1 \times w \]
   \[ 20 = 5 \times w \]
   \[ w = 4 \text{ ft} \]

   \[ A = 4 \times 10 = 40 \text{ sq ft} \]

   \[ P = 2(l + w) \]
   \[ P = 2(10 + 4) \]
   \[ P = 2 \times 14 = 28 \text{ ft} \]

   b. Draw and label a diagram of the sandbox at the park. What is its perimeter?

   ![Updated Diagram](image)

   \[ A = 2 \times (l \times w) \]
   \[ A = 2 \times (10 \times 8) \]
   \[ A = 2 \times 80 = 160 \text{ sq ft} \]

   \[ P = 2(l + w) \]
   \[ P = 2(10 + 8) \]
   \[ P = 2 \times 18 = 36 \text{ ft} \]
c. What is the relationship between the two perimeters?

The park's sandbox has a perimeter that is 2 times as large as Betsy's sandbox.

d. Find the area of the park's sandbox using the formula \( A = l \times w \).

\[
\begin{align*}
A &= l \times w \\
A &= 8 \times 10 \\
A &= 80 \text{ sq ft}
\end{align*}
\]

e. The sandbox at the park has an area that is how many times that of Betsy's sandbox?

It has 4 times the area of Betsy's sandbox.

\[
20 \times 4 = 80
\]

f. Compare the way the perimeter changed with the way the area changed between the two sandboxes. Explain what you notice using words, pictures, or numbers.
Solve the following problems. Use pictures, words, or diagrams to help you solve.

1. The projection screen in the school auditorium is 5 times as long and 5 times as wide as the screen in the library. The screen in the library is 4 feet long with a perimeter of 14 feet. What is the perimeter of the screen in the auditorium?

   \[
   P = 2(x + w) \\
   = 2(10 + 5) \\
   = 2 \times 15 \\
   = 30 \text{ ft}
   \]

   The perimeter of the screen in the auditorium is 30 ft.

2. The width of David's tent is 5 feet. The length is twice the width. David's rectangular air mattress measures 3 feet by 6 feet. If David puts the air mattress in the tent, how many square feet of floor space will be available for the rest of his things?

   \[
   \text{Tent:} \\
   A = l \times w \\
   = 10 \times 5 \\
   = 50 \text{ sq ft}
   \]

   \[
   \text{Air mattress:} \\
   A = l \times w \\
   = 6 \times 3 \\
   = 18 \text{ sq ft}
   \]

   \[
   50 - 18 = 32 \text{ sq ft}
   \]

32 square feet of floor space will be available.
3. Jackson’s bedroom has an area of 90 square feet. The area of his bedroom is 9 times that of his closet. If the closet is 2 feet wide, what is its length?

\[
\begin{align*}
\text{Area of closet} \times 9 &= \text{Area of bedroom} \\
\text{Area of closet} \times 9 &= 90 \\
90 \div 9 &= 10 \\
\text{Area of closet} &= 10 \text{ square ft}
\end{align*}
\]

2 ft

\[
\begin{align*}
A &= l \times w \\
10 &= 1 \times 2 \\
l &= 5
\end{align*}
\]

The length of the closet is 5 feet.

4. The length of a rectangular deck is 4 times its width. If the deck’s perimeter is 30 feet, what is the deck’s area?

\[
P = 2 \times (l + w)
\]

\[
\begin{align*}
P &= 2 \times (1 + w) \\
&= 2 \times (4 + 1) \\
&= 2 \times 5 \\
&= 10 \text{ units}
\end{align*}
\]

The deck’s area is 36 square feet.

\[
\begin{align*}
l &= 3 \text{ ft} \\
w &= 12 \text{ ft} \\
A &= l \times w \\
&= 36 \text{ square ft}
\end{align*}
\]

The deck’s area is 36 square feet.

10 units = 30 ft

1 unit = 3 ft
Example:

\[ 5 \times 10 = 50 \]
\[ 5 \text{ ones} \times 10 = 5 \text{ tens} \]

Directions: Draw number disks and arrows as shown to represent each product.

1. \[ 5 \times 100 = 500 \]
   \[ 5 \times 10 \times 10 = 500 \]
   \[ 5 \text{ ones} \times 100 = 5 \text{ hundreds} \]

2. \[ 5 \times 1,000 = 5,000 \]
   \[ 5 \times 10 \times 10 \times 10 = 5,000 \]
   \[ 5 \text{ ones} \times 1,000 = 5 \text{ thousands} \]

3. Complete the following equations.
   a. \[ 6 \times 10 = 60 \]
   b. \[ 100 \times 6 = 600 \]
   c. \[ 6,000 = 6 \times 1,000 \]
   d. \[ 10 \times 4 = 40 \]
   e. \[ 4 \times 100 = 400 \]
   f. \[ 1,000 \times 4 = 4,000 \]
   g. \[ 1,000 \times 9 = 9,000 \]
   h. \[ 90 = 10 \times 9 \]
   i. \[ 900 = 9 \times 100 \]
Directions: Draw number disks and arrows as shown to represent each product.

4. \[ 12 \times 10 = 120 \]
   \[ (1 \text{ ten 2 ones}) \times 10 = 12 \text{ tens} \]

5. \[ 18 \times 100 = 1800 \]
   \[ 18 \times 10 \times 10 = 1800 \]
   \[ (1 \text{ ten 8 ones}) \times 100 = 18 \text{ hundreds} \]

6. \[ 25 \times 1000 = 25000 \]
   \[ 25 \times 10 \times 10 \times 10 = 25000 \]
   \[ (2 \text{ tens 5 ones}) \times 1000 = 25 \text{ thousands} \]

Decompose each multiple of 10, 100, or 1000 before multiplying.

7. \[ 3 \times 40 = 3 \times 4 \times 10 \]
   \[ = 12 \times 10 \]
   \[ = 120 \]

8. \[ 3 \times 200 = 3 \times 2 \times 100 \]
   \[ = 6 \times 100 \]
   \[ = 600 \]

9. \[ 4 \times 4000 = 4 \times 4 \times 1000 \]
   \[ = 16 \times 1000 \]
   \[ = 16000 \]

10. \[ 5 \times 4000 = 5 \times 4 \times 1000 \]
    \[ = 20 \times 1000 \]
    \[ = 20000 \]
Example:

\[
5 \times 10 = \frac{\cancel{50}}{\cancel{5} \times \cancel{10}} = \frac{\cancel{5} \times \cancel{10}}{\cancel{5} \times \cancel{10}} = 5 \text{ tens}
\]

Draw number disks and arrows as shown to represent each product.

1. \(5 \times 100 = \frac{\cancel{500}}{\cancel{5} \times \cancel{100}} = \frac{\cancel{5} \times \cancel{100}}{\cancel{5} \times \cancel{100}} = 5 \text{ hundreds}
\]

2. \(5 \times 1,000 = \frac{\cancel{5,000}}{\cancel{5} \times \cancel{1,000}} = \frac{\cancel{5} \times \cancel{1,000}}{\cancel{5} \times \cancel{1,000}} = 5 \text{ thousands}
\]

3. Complete the following equations.

a. \(6 \times 10 = \frac{\cancel{60}}{\cancel{6} \times \cancel{10}} = \frac{\cancel{6} \times \cancel{10}}{\cancel{6} \times \cancel{10}} = 60\)

b. \(100 \times 6 = 600\)

c. \(6,000 = \frac{\cancel{6,000}}{\cancel{6} \times \cancel{1,000}} = \frac{\cancel{6} \times \cancel{1,000}}{\cancel{6} \times \cancel{1,000}} = 6 \times 1,000\)

d. \(10 \times 4 = \frac{\cancel{40}}{\cancel{4} \times \cancel{10}} = \frac{\cancel{4} \times \cancel{10}}{\cancel{4} \times \cancel{10}} = 40\)

e. \(4 \times \frac{\cancel{100}}{\cancel{10} \times \cancel{10}} = \frac{\cancel{4} \times \cancel{100}}{\cancel{4} \times \cancel{100}} = 400\)

f. \(1,000 \times 4 = 4,000\)

g. \(1,000 \times 9 = \frac{\cancel{9,000}}{\cancel{9} \times \cancel{1,000}} = \frac{\cancel{9} \times \cancel{1,000}}{\cancel{9} \times \cancel{1,000}} = 9,000\)

h. \(90 = \frac{\cancel{90}}{\cancel{9} \times \cancel{10}} = \frac{\cancel{9} \times \cancel{10}}{\cancel{9} \times \cancel{10}} = 10 \times 9\)

i. \(900 = \frac{\cancel{900}}{\cancel{9} \times \cancel{100}} = \frac{\cancel{9} \times \cancel{100}}{\cancel{9} \times \cancel{100}} = 9 \times 100\)
I did my work on the chart first, wrote down what I ended up with and then filled in the equations thinking about how they connected to the chart.

Draw number disks and arrows as shown to represent each product.

4. \(12 \times 10 = 120\)

\[(1 \text{ ten } 2 \text{ ones}) \times 10 = 12 \text{ tens}\]

5. \(18 \times 100 = 1800\)

\[18 \times 10 \times 10 = 1800\]

\[(1 \text{ ten } 8 \text{ ones}) \times 100 = 18 \text{ hundreds}\]

6. \(25 \times 1000 = 25000\)

\[25 \times 10 \times 10 \times 10 = 25000\]

\[(2 \text{ tens } 5 \text{ ones}) \times 1000 = 25 \text{ thousands}\]

Decompose each multiple of 10, 100, or 1,000 before multiplying.

7. \(3 \times 40 = 3 \times 4 \times 10\)

\[= 12 \times 10\]

\[= 120\]

8. \(3 \times 200 = 3 \times 2 \times 100\)

\[= 6 \times 100\]

\[= 600\]

9. \(4 \times 4000 = 4 \times 4 \times 1000\)

\[= 16 \times 1000\]

\[= 16000\]

10. \(5 \times 4000 = 5 \times 4 \times 1000\)

\[= 20 \times 1000\]

\[= 20000\]
Draw number disks to represent the value of the following expressions.

1. \(2 \times 3 = 6\)
   
   2 times \(3\) ones is \(6\) ones.

   \[
   \begin{array}{c|c|c}
   \text{ones} & \text{tens} & \text{hundreds} \\
   \hline
   \text{2} & \text{3} & \text{0} \\
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{2} \\
   \text{3} \\
   \text{ones} = \text{6 ones}
   \end{array}
   \]

2. \(2 \times 30 = 60\)

   2 times \(3\) tens is \(6\) tens.

   \[
   \begin{array}{c|c|c}
   \text{ones} & \text{tens} & \text{hundreds} \\
   \hline
   \text{0} & \text{3} & \text{0} \\
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{2} \\
   \text{3} \\
   \text{tens} = \text{6 tens}
   \end{array}
   \]

3. \(2 \times 300 = \text{600}\)

   2 times \(3\) hundreds is \(6\) hundreds.

   \[
   \begin{array}{c|c|c}
   \text{ones} & \text{tens} & \text{hundreds} \\
   \hline
   \text{0} & \text{0} & \text{3} \\
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{2} \\
   \text{3} \\
   \text{hundreds} = \text{6 hundreds}
   \end{array}
   \]

4. \(2 \times 3,000 = 6,000\)

   2 times \(3\) thousands is \(6\) thousands.

   \[
   \begin{array}{c|c|c}
   \text{ones} & \text{tens} & \text{hundreds} \\
   \hline
   \text{0} & \text{0} & \text{0} \\
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{2} \\
   \text{3} \\
   \text{thousands} = \text{6 thousands}
   \end{array}
   \]
5. Find the product.

<table>
<thead>
<tr>
<th></th>
<th>a. $20 \times 7 = 140$</th>
<th>b. $3 \times 60 = 180$</th>
<th>c. $3 \times 400 = 1200$</th>
<th>d. $2 \times 800 = 1600$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$2 \text{tens} \times 7 = 14 \text{tens}$</td>
<td>$3 \times 6 \text{tens} = 18 \text{tens}$</td>
<td>$3 \times 4 \text{hundreds} = 12 \text{hundreds}$</td>
<td>$2 \times 8 \text{hundreds} = 16 \text{hundreds}$</td>
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<td>$= 1200$</td>
<td>$= 1600$</td>
</tr>
<tr>
<td>e.</td>
<td>$7 \times 30 = 210$</td>
<td>f. $60 \times 6 = 360$</td>
<td>g. $400 \times 4 = 1600$</td>
<td>h. $4 \times 8,000 = 32,000$</td>
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<td></td>
<td>$7 \times 3 \text{tens} = 21 \text{tens}$</td>
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<td>$= 1600$</td>
<td>$= 32,000$</td>
</tr>
<tr>
<td>i.</td>
<td>$5 \times 30 = 150$</td>
<td>j. $5 \times 60 = 300$</td>
<td>k. $5 \times 400 = 2000$</td>
<td>l. $8,000 \times 5 = 40,000$</td>
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<td>$= 150$</td>
<td>$= 300$</td>
<td>$= 2000$</td>
<td>$= 40,000$</td>
</tr>
</tbody>
</table>

6. Brianna bought 3 packs of balloons for a party. Each pack had 60 balloons. How many balloons does Brianna have?

\[ B = 3 \times 60 = 3 \times 6 \times 10 = 18 \times 10 = 180 \]

Brianna has 180 balloons.

7. Jordan has twenty times as many baseball cards as his brother. His brother has 9 cards. How many cards does Jordan have?

\[ J = 20 \times 9 = 2 \times 9 \times 10 = 18 \times 10 = 180 \]

Jordan has 180 cards.

8. The aquarium has 30 times as many fish in one tank as Jacob has. The aquarium has 90 fish. How many fish does Jacob have?

\[ \text{Jacob} \times 30 = \text{Aquarium} \]

\[ \text{Jacob} \times 30 = 90 \]

\[ \text{Jacob} \times 3 \text{tens} = 9 \text{tens} \]

\[ \text{Jacob} = 3 \text{ fish} \]

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Draw number disks to represent the value of the following expressions.

1. \(2 \times 3 = \_6\)

2 times \(3\) ones is \(6\) ones.

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\text{2} & \times 3 & \text{6} \\
\end{array}
\]

2. \(2 \times 30 = \_60\)

2 times \(3\) tens is \(6\) tens.

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\text{} & \text{30} & \text{} \\
\hline
\text{2} & \times 2 & \text{60} \\
\end{array}
\]

3. \(2 \times 300 = \_600\)

2 times \(3\) hundreds is \(6\) hundreds.

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\text{} & \text{} & \text{} \\
\hline
\text{300} & \times 2 & \text{600} \\
\end{array}
\]

4. \(2 \times 3,000 = \_6,000\)

2 times \(3\) thousands is \(6\) thousands.

\[
\begin{array}{c|c|c|c}
\text{thousands} & \text{hundreds} & \text{tens} & \text{ones} \\
\hline
\text{} & \text{} & \text{} & \text{} \\
\hline
\text{3,000} & \times 2 & \text{6,000} \\
\end{array}
\]
5. Find the product.

<p>| | | | |</p>
<table>
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<tr>
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<tr>
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<td>20 \times 7 =</td>
<td>b.</td>
<td>3 \times 60 =</td>
</tr>
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<td>\begin{align*} 2 \text{ tens} \times 7 &amp;= 14 \text{ tens} \ &amp;= 140 \end{align*}</td>
<td></td>
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</tr>
<tr>
<td>l.</td>
<td>8,000 \times 5 =</td>
<td>m.</td>
<td>5 \times 400 =</td>
</tr>
<tr>
<td></td>
<td>\begin{align*} 8 \times 8 \text{ thousands} &amp;= 64 \text{ thousands} \ &amp;= 64,000 \end{align*}</td>
<td></td>
<td>\begin{align*} 5 \times 4 \text{ hundreds} &amp;= 20 \text{ hundreds} \ &amp;= 2,000 \end{align*}</td>
</tr>
</tbody>
</table>

6. Brianna buys 3 packs of balloons for a party. Each pack has 60 balloons. How many balloons does Brianna have?

\[
\begin{align*}
60 & \quad 60 \quad 60 \\
\text{3 \times 6 tens} & = 18 \text{ tens} \\
\text{= 180} & \\
\text{She has 180 balloons} & \\
\end{align*}
\]

7. Jordan has twenty times as many baseball cards as his brother. His brother has 9 cards. How many cards does Jordan have?

\[
\begin{align*}
\text{J} & \text{B} \\
\text{9} & \text{2 \times tens} \\
\text{= 18 \text{ tens}} & \\
\text{= 180} & \\
\text{Jordan has 180 cards} & \\
\end{align*}
\]

8. The aquarium has 30 times as many fish in one tank as Jacob has. The aquarium has 90 fish. How many fish does Jacob have?

\[
\begin{align*}
\text{A} & \text{J} \\
\text{90} & \text{3 \times 30} \\
\text{\text{\text{9 tens}} = 90} & \\
\text{Jacob has 3 fish} & \\
\end{align*}
\]
Directions: Represent the following problem by drawing disks in the place value chart.

1. To solve $20 \times 40$, think:

   $$(2 \text{ tens} \times 4) \times 10 = 800$$
   
   $$20 \times (4 \times 10) = 800$$
   
   $$20 \times 40 = 800$$

2. Draw an area model to represent $20 \times 40$.

   $20 \times 40$
   
   2 tens $\times$ 4 tens
   8 hundreds

   2 tens $\times$ 4 tens = 8 hundreds

3. Draw an area model to represent $30 \times 40$.

   $30 \times 40$
   
   3 tens $\times$ 4 tens
   12 hundreds

   3 tens $\times$ 4 tens = 12 hundreds
   
   $30 \times 40 = 1200$
4. Draw an area model to represent $20 \times 50$.

\[
\begin{array}{c}
20 \\
\hline
20 \times 50 \\
2 \text{ tens} \times 5 \text{ tens} \\
10 \text{ hundreds}
\end{array}
\]

\[2 \text{ tens} \times 5 \text{ tens} = \underline{10} \text{ hundreds}\]

\[20 \times 50 = \underline{1000}\]

Directions: Rewrite each equation in unit form and solve.

5. \[20 \times 20 = \underline{400}\]

\[2 \text{ tens} \times 2 \text{ tens} = \underline{4} \text{ hundreds}\]

6. \[60 \times 20 = \underline{1200}\]

\[6 \text{ tens} \times 2 \text{ tens} = \underline{12} \text{ hundreds}\]

7. \[70 \times 20 = \underline{1400}\]

\[7 \text{ tens} \times 2 \text{ tens} = \underline{14} \text{ hundreds}\]

8. \[70 \times 30 = \underline{2100}\]

\[7 \text{ tens} \times 3 \text{ tens} = \underline{21} \text{ hundreds}\]

9. If there are 40 seats per row, how many seats are in 90 rows?

\[9 \text{ tens} \times 4 \text{ tens} = 36 \text{ hundreds} = \underline{3600}\]

There are 3,600 seats in 90 rows.

10. One ticket to the symphony costs $50. How much money is collected if 80 tickets are sold?

\[80 \times 50 = \underline{4000}\]

$4,000 is collected if 80 tickets are sold.
Represent the following problem by drawing disks in the place value chart.

1. To solve $20 \times 40$, think:

   $$(2 \text{ tens} \times 4) \times 10 = 800$$
   $$20 \times (4 \times 10) = 800$$
   $$20 \times 40 = 800$$

   $\text{ten} \times 10 = \text{hundred}$

2. Draw an area model to represent $20 \times 40$.

   $20 \times 40$
   $2 \text{ tens} \times 4 \text{ tens}$
   $8 \text{ hundreds}$

3. Draw an area model to represent $30 \times 40$.

   $30 \times 40$
   $3 \text{ tens} \times 4 \text{ tens}$
   $12 \text{ hundreds}$

   $3 \text{ tens} \times 4 \text{ tens} = 12 \text{ hundreds}$
   $$30 \times 40 = 1200$$
4. Draw an area model to represent $20 \times 50$.

\[ \begin{array}{c}
\text{20} \\
\text{50} \\
\hline
\text{20} \\
\text{50} \\
\hline
\text{20 tens x 5 tens} \\
\text{10 hundreds} \\
\end{array} \]

2 tens x 5 tens = \boxed{10 \text{ hundreds}}

$20 \times 50 = \boxed{1000}$

Rewrite each equation in unit form and solve.

5. $20 \times 20 = \boxed{400}$ & put into standard form second.

\[ \begin{array}{c}
\text{2 tens x 2 tens = 4} \\
\text{hundreds} \\
\end{array} \]

6. $60 \times 20 = \boxed{1200}$

\[ \begin{array}{c}
6 \text{ tens x 2 tens = 12} \\
\text{hundreds} \\
\end{array} \]

7. $70 \times 20 = \boxed{1400}$

\[ \begin{array}{c}
7 \text{ tens x 2 tens = 14} \\
\text{hundreds} \\
\end{array} \]

8. $70 \times 30 = \boxed{2100}$

\[ \begin{array}{c}
7 \text{ tens x 3 tens = 21} \\
\text{hundreds} \\
\end{array} \]

9. If there are 40 seats per row, how many seats are in 90 rows?

\[ \begin{array}{c}
40 \times 90 = \boxed{3600} \\
4 \text{ tens x 9 tens =} \\
36 \text{ hundreds} \\
\end{array} \]

3600 seats in 90 rows

10. One ticket to the symphony costs $50. How much money is collected if 80 tickets are sold?

\[ \begin{array}{c}
50 \times 80 = \boxed{4000} \\
5 \text{ tens x 8 tens =} \\
40 \text{ hundreds} \\
= 4000 \\
\end{array} \]

80 tickets cost $4,000.
1. Represent the following expressions with disks, regrouping as necessary, writing a matching expression, and recording the partial products vertically as shown below.

a. \( 1 \times 43 \)

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
\bullet \bullet \bullet \bullet & \bullet \bullet \\
\end{array}
\]

\[
\begin{array}{c}
4 \times 3 \\
\times 1 \\
\hline
3 \\
\hline
43
\end{array}
\rightarrow 1 \times 3 \text{ ones}
\]

\[
\begin{array}{c}
+ 40 \\
\hline
43
\end{array}
\rightarrow 1 \times 4 \text{ tens}
\]

\[
1 \times 4 \text{ tens} + 1 \times 3 \text{ ones}
\]

b. \( 2 \times 43 \)

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
\bullet \bullet \bullet \bullet \\
\bullet \bullet \bullet \\
\end{array}
\]

\[
\begin{array}{c}
43 \\
\times 2 \\
\hline
6 \rightarrow 2 \times 3 \text{ ones}
\end{array}
\]

\[
\begin{array}{c}
+ 80 \rightarrow 2 \times 4 \text{ tens}
\hline
86
\end{array}
\]

\[
2 \times 4 \text{ tens} + 2 \times 3 \text{ ones}
\]

\[
8 \text{ tens} + 6 \text{ ones} = 86
\]

c. \( 3 \times 43 \)

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\bullet & \bullet \bullet \bullet \bullet \\
\bullet \bullet \bullet & \bullet \bullet \\
\end{array}
\]

\[
\begin{array}{c}
43 \\
\times 3 \\
\hline
9 \rightarrow 3 \times 3 \text{ ones}
\end{array}
\]

\[
\begin{array}{c}
+ 120 \rightarrow 3 \times 4 \text{ tens}
\hline
129
\end{array}
\]

\[
3 \times 4 \text{ tens} + 3 \times 3 \text{ ones}
\]

\[
1 \text{ hundred} + 2 \text{ tens} + 9 \text{ ones} = 129
\]
d. $4 \times 43$

\[ \begin{array}{|c|c|c|}
\hline
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
\text{4} & \text{4} & \text{3} \\
\hline
\end{array} \]

$4 \times 4 = 16$

$4 \times 4 = 16$

$4 \times 3 = 12$

$160 + 120 + 12 = 312$

$4 \times 4 = 16$

$4 \times 3 = 12$

$160 + 120 + 12 = 322$

$12 + 3 = 15$

$160 + 120 + 12 = 336$

$12 + 160 + 320 = 502$

$320 + 30 = 350$

$320 + 30 = 350$

$320 + 30 = 350$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

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$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$

$3 \times 6 = 18$
1. Represent the following expressions with disks, regrouping as necessary, writing a matching expression, and recording the partial products vertically as shown below.

a. \(1 \times 43\)

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
6 & 4 \\
\end{array}
\]

\(1 \times 4 \text{ tens} + 1 \times 3 \text{ ones}\)

\(4 \text{ tens} + 3 \text{ ones}\)

\(43\)

b. \(2 \times 43\)

\[
\begin{array}{c|c}
\text{tens} & \text{ones} \\
\hline
6 & 4 \\
\end{array}
\]

\(2 \times 4 \text{ tens} + 2 \times 3 \text{ ones}\)

\(8 \text{ tens} + 6 \text{ ones}\)

\(86\)

c. \(3 \times 43\)

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
0 & 9 & 0 \\
\end{array}
\]

\(3 \times 4 \text{ tens} + 3 \times 8 \text{ ones}\)

\(1 \text{ hundred} + 2 \text{ tens} + 9 \text{ ones}\)

\(129\)
2. Represent the following expressions with disks, regrouping as necessary. To the right, record the partial products vertically.

**a.** $2 \times 36$

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
2 & 3 & 6 \\
\hline
\end{array}
\]

$2 \times 3 \text{ tens} + 2 \times 6 \text{ ones}$

$2 \times 3 \text{ tens} + 2 \times 6 \text{ ones} = 72$

**b.** $3 \times 61$

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
3 & 6 & 1 \\
\hline
\end{array}
\]

$3 \times 6 \text{ tens} + 3 \times 1 \text{ ones}$

$1 \text{ hundred } + 8 \text{ tens } + 3 \text{ ones}$

$= 183$

**c.** $4 \times 84$

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\hline
4 & 8 & 4 \\
\hline
\end{array}
\]

$4 \times 8 \text{ tens} + 4 \times 4 \text{ ones}$

$3 \text{ hundreds } + 3 \text{ tens } + 6 \text{ ones } = 336$
1. Represent the following expressions with disks, regrouping as necessary, writing a matching expression, and recording the partial products vertically as shown below.

a. \(1 \times 213\)

\[
\begin{array}{ccc}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\cdot & \cdot & \cdot \\
\end{array}
\]

\[
\begin{array}{ccc}
2 & 1 & 3 \\
\times & 1 & \\
\hline
3 & \rightarrow 1 \times 3 \text{ ones} \\
10 & \rightarrow 1 \times 1 \text{ ten} \\
+200 & \rightarrow 1 \times 2 \text{ hundreds} \\
\hline
213
\end{array}
\]

\(1 \times 2 \text{ hundreds} + 1 \times 1 \text{ ten} + 1 \times 3 \text{ ones} = 213\)

b. \(2 \times 213\)

\[
\begin{array}{ccc}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\cdot & \cdot & \cdot \\
\end{array}
\]

\[
\begin{array}{ccc}
2 & 1 & 3 \\
\times & 2 & \\
\hline
6 & \rightarrow 2 \times 3 \text{ ones} \\
20 & \rightarrow 2 \times 1 \text{ ten} \\
+400 & \rightarrow 2 \times 2 \text{ hundreds} \\
\hline
426
\end{array}
\]

\(2 \times 2 \text{ hundreds} + 2 \times 1 \text{ ten} + 2 \times 3 \text{ ones} = 426\)

c. \(3 \times 214\)

\[
\begin{array}{ccc}
\text{hundreds} & \text{tens} & \text{ones} \\
\hline
\cdot & \cdot & \cdot \\
\end{array}
\]

\[
\begin{array}{ccc}
2 & 1 & 4 \\
\times & 3 & \\
\hline
6 & \rightarrow 3 \times 4 \text{ ones} \\
30 & \rightarrow 3 \times 1 \text{ ten} \\
+600 & \rightarrow 3 \times 2 \text{ hundreds} \\
\hline
642
\end{array}
\]

\(3 \times 2 \text{ hundreds} + 3 \times 1 \text{ ten} + 3 \times 4 \text{ ones} = 642\)
2. Represent the following expressions with disks, using either method shown during the class, renaming as necessary. To the right, record the partial products vertically.

a. \(3 \times 212\)

b. \(2 \times 4,036\)

c. \(3 \times 2,546\)

d. \(3 \times 1,407\)

3. Every day at the bagel factory, Cyndi makes 5 different kinds of bagels. If she makes 144 of each kind, what is the total number of bagels that she makes?

\[\frac{144}{5} \times 200 = 2880\]  

She makes 720 bagels.
1. Solve using each method.

<table>
<thead>
<tr>
<th>Partial Products</th>
<th>Standard Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) 34 × 4</td>
</tr>
<tr>
<td></td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Partial Products</th>
<th>Standard Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b) 224 × 3</td>
</tr>
<tr>
<td></td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>600</td>
</tr>
</tbody>
</table>

2. Solve. Use the standard algorithm.

<table>
<thead>
<tr>
<th></th>
<th>a) 251 × 3</th>
<th>b) 135 × 6</th>
<th>c) 304 × 9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>753</td>
<td>810</td>
<td>2736</td>
</tr>
<tr>
<td></td>
<td>153</td>
<td>810</td>
<td>2736</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>d) 405 × 4</th>
<th>e) 316 × 5</th>
<th>f) 392 × 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1620</td>
<td>1580</td>
<td>2352</td>
</tr>
</tbody>
</table>
3. The product of 7 and 86 is **602**.

\[
\begin{array}{c}
86 \\
\times 7 \\
\hline \\
602
\end{array}
\]

4. 9 times as many as 457 is **4,113**.

\[
\begin{array}{c}
457 \\
\times 9 \\
\hline \\
4,113
\end{array}
\]

5. Jashawn wants to make 5 airplane propellers. He needs 18 cm of wood for each propeller. How many centimeters of wood will he use?

\[
\begin{array}{c}
18 \\
\times 5 \\
\hline \\
90
\end{array}
\]

Jashawn will use **90 cm of wood**.

6. One game system costs $238. How much will 4 game systems cost?

\[
\begin{array}{c}
238 \\
\times 4 \\
\hline \\
952
\end{array}
\]

Four game systems cost **$952**.

7. A small bag of chips weighs 48 g. A large bag of chips weighs three times as much as the small bag. How much will 7 large bags of chips weigh?

\[
\begin{array}{c}
48 \\
\times 3 \\
\hline \\
144
\end{array}
\]

\[
\begin{array}{c}
144 \\
\times 7 \\
\hline \\
1008
\end{array}
\]

7 bags will weigh **1,008 grams**.
1. Solve using the standard algorithm.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>$3 \times 42$</td>
<td>$\frac{42}{3}$</td>
<td>$\frac{126}{1}$</td>
</tr>
<tr>
<td>b.</td>
<td>$6 \times 42$</td>
<td>$\frac{42}{6}$</td>
<td>$\frac{252}{2}$</td>
</tr>
<tr>
<td>c.</td>
<td>$6 \times 431$</td>
<td>$\frac{431}{6}$</td>
<td>$\frac{2586}{2}$</td>
</tr>
<tr>
<td>d.</td>
<td>$3 \times 431$</td>
<td>$\frac{431}{3}$</td>
<td>$\frac{1293}{1}$</td>
</tr>
<tr>
<td>e.</td>
<td>$3 \times 6,212$</td>
<td>$\frac{6212}{3}$</td>
<td>$\frac{18636}{1}$</td>
</tr>
<tr>
<td>f.</td>
<td>$3 \times 3,106$</td>
<td>$\frac{3106}{3}$</td>
<td>$\frac{9318}{3}$</td>
</tr>
<tr>
<td>g.</td>
<td>$4 \times 4,309$</td>
<td>$\frac{4309}{4}$</td>
<td>$\frac{17236}{4}$</td>
</tr>
<tr>
<td>h.</td>
<td>$4 \times 8,618$</td>
<td>$\frac{8618}{4}$</td>
<td>$\frac{34472}{4}$</td>
</tr>
</tbody>
</table>
2. There are 365 days in a common year. How many days are in 3 common years?

\[
\begin{array}{c}
365 \\
\times \quad 3 \\
\hline
1095
\end{array}
\]

There are 1,095 days in 3 common years.

3. The length of one side of a square city block is 462 meters. What is the perimeter of the block?

\[
\begin{array}{c}
462 \\
\times \quad 4 \\
\hline
1848
\end{array}
\]

The perimeter is 1,848 meters.

4. Jake ran 2 miles. Jesse ran 4 times as far. There are 5,280 feet in a mile. How many feet did Jesse run?

\[
\begin{array}{c}
2 \\
\times \quad 8 \\
\hline
16
\end{array}
\]

Jesse runs 42,240 feet.
1. Solve the following expressions using the standard algorithm, the partial products method, and the area model.

a. $425 \times 4$

\[
\begin{array}{c}
425 \\
\times 4 \\
\hline
1600 \\
+ 80 \\
\hline
1700 \\
\end{array}
\]

$4(400 + 20 + 5)$

$4 \times 400 + 4 \times 20 + 4 \times 5$

b. $534 \times 7$

\[
\begin{array}{c}
534 \\
\times 7 \\
\hline
3738 \\
+ 28 \\
\hline
3500 \\
\end{array}
\]

$7(500 + 30 + 4)$

$7 \times 500 + 7 \times 30 + 7 \times 4$

c. $209 \times 8$

\[
\begin{array}{c}
209 \\
\times 8 \\
\hline
1672 \\
+ 72 \\
\hline
1600 \\
\end{array}
\]

$8(200 + 9)$

$8 \times 200 + 8 \times 9$
2. Solve using the partial products method.

Cayla's school has 258 students. Janet's school has 3 times as many students as Cayla's. How many students are in Janet's school?

\[
\begin{array}{c}
C \\
J
\end{array}
\begin{array}{c}
258 \\
\times 3
\end{array}
\begin{array}{c}
774
\end{array}
\]

There are 774 students in Janet's school.

3. Model with a tape diagram and solve.

4 times as much as 467.

\[
\begin{array}{c}
467
\end{array}
\begin{array}{c}
\times 4
\end{array}
\begin{array}{c}
1868
\end{array}
\]

Solve using the standard algorithm, the area model, the distributive property, or the partial products method.

4. \[5,131 \times 7\]

\[
\begin{array}{c}
5131 \\
\times 7
\end{array}
\begin{array}{c}
35917
\end{array}
\]

5. 3 times as many as 2,805.

\[
\begin{array}{c}
2805 \\
\times 3
\end{array}
\begin{array}{c}
8415
\end{array}
\]

6. A restaurant sells 1,725 pounds of spaghetti and 925 pounds of linguini every month. After 9 months, how many pounds of pasta does the restaurant sell? Write your answer as a statement.

\[
\begin{array}{c}
1725 \\
+ 925
\end{array}
\begin{array}{c}
2650
\end{array}
\]

\[
\begin{array}{c|c|c|c}
| & 18000 & 5400 & 450 \\
\hline
9 \times 200 & + (9 \times 600) + (9 \times 50) & \\
\hline
18000 + 5400 + 450 & = 23850
\end{array}
\]

The restaurant sells 23,850 pounds of pasta in 9 months.
Use the RDW process to solve the following problems.

1. The table shows the cost of party favors. Each party guest receives a bag with 1 balloon, 1 lollipop, and 1 bracelet. What is the total cost for 9 guests?

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 balloon</td>
<td>26¢</td>
</tr>
<tr>
<td>1 lollipop</td>
<td>14¢</td>
</tr>
<tr>
<td>1 bracelet</td>
<td>33¢</td>
</tr>
</tbody>
</table>

\[
73 \times 9 = 657 \\
\frac{657}{9} = 73 \\
\text{It would be fine to leave the answer in cents. Decimal fractions are introduced in 6.R.1.M.6.}
\]

2. The Turner family uses 548 liters of water per day. The Hill family uses 3 times as much water per day. How much water does the Hill family use per week?

\[
T \quad 548 \\
H \quad 548 \times 3 = 1644 \\
1644 \times 7 = 11,508 \\
The Hill family uses 1,644 L per day. They use 11,508 L per week.
\]

3. Jayden has 347 marbles. Elvis has 4 times as many as Jayden. Presley has 799 fewer than Elvis. How many marbles does Presley have?

\[
J \quad 347 \\
E \quad 347 \times 4 = 1,388 \\
1,388 - 799 = 589 \\
Presley has 589 marbles.
\]
4.

a. Write an equation that would allow someone to find the value of R.

\[(3 \times 1167) - 239 = R \quad \text{or} \quad R + 239 = 3 \times 1167\]

b. Write your own word problem to correspond to this tape diagram, then solve.

If Marcus had 239 more stamps his collection would be 3 times as large as his brother's collection. If his brother has 1,167 stamps how many stamps does Marcus have?
Name: Jack

Directions: Use the RDW process to solve the following problems.

1. The table shows the cost of party favors. Each party guest receives a bag with 1 balloon, 1 lollipop, and 1 bracelet. What is the total cost for 9 guests?

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 balloon</td>
<td>26¢</td>
</tr>
<tr>
<td>1 lollipop</td>
<td>14¢</td>
</tr>
<tr>
<td>1 bracelet</td>
<td>33¢</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c}
26 \\
14 \\
33 \\
\hline
73 \\
\end{array}
\quad \begin{array}{c}
264 \\
144 \\
334 \\
\hline
734 \\
\end{array}
\times \frac{9}{9} = \frac{6574}{6574}

The total cost for 9 guests is $6.57.

2. The Turner family uses 548 liters of water per day. The Hill family uses 3 times as much water per day. How much water does the Hill family use per week?

\[
\begin{array}{c}
548 \\
\times \frac{3}{1} \\
\hline
1644 \\
\end{array}
\quad \begin{array}{c}
548 \\
\times \frac{7}{1} \\
\hline
3836 \\
\end{array}
\]

1,644 L per day

11,508 L

The Hill family uses 11,508 liters of water per week.

3. Jayden has 347 marbles. Elvis has 4 times as many as Jayden. Presley has 799 fewer than Elvis. How many marbles does Presley have?

\[
\begin{array}{c}
347 \\
\times \frac{4}{1} \\
\hline
1388 \\
\end{array}
\quad \begin{array}{c}
347 \\
\times \frac{9}{1} \\
\hline
3123 \\
\end{array}
\]

1,388

1,888

589 marbles.
4.

a. Write an equation that would allow someone to find the value of R.

\[
R + 239 = 3 \times 1,167 \\
R = 3 \times 1,167 - 239
\]

b. Write your own word problem to correspond to this tape diagram, then solve.

Patti’s sandals weigh 1,167 grams. She bought 3 pairs, all different colors. All 3 pairs of sandals weigh 239 grams more than her winter boots. What is the weight of Patti’s winter boots?

\[
\begin{array}{c}
\text{1,167g} \\
\text{1,167g} \\
\text{1,167g}
\end{array}
\]

\[
\begin{array}{c}
3,501g \\
1,167 \\
\times 3 \\
-239
\end{array}
\]

\[
\begin{array}{c}
3,501 \\
3,262
\end{array}
\]

Patti’s winter boots weigh 3,262 grams.
Solve using the RDW process.

1. Over the summer, Kate earns $180 each week for 7 weeks. Of that money, she spends $375 on a new computer and $137 on new clothes. How much money does she have left?

\[
\begin{array}{c}
\text{?} \\
\text{\textdollar}375 \times \frac{7}{5} \\
\text{\textdollar}137 \\
\hline
\text{\textdollar}1,260 \quad \text{\textdollar}512 \\
\text{\textdollar}748
\end{array}
\]

Kate had \textdollar748 left.

2. Sylvia weighed 8 pounds when she was born. By her first birthday, her weight had tripled. By her second birthday, she had gained 12 more pounds. At that time, Sylvia's father weighed 5 times as much as her. What is Sylvia and her dad's combined weight?

\[
\begin{array}{c}
\text{36} \\
\text{8} \quad \text{8} \quad \text{8} \quad \text{12} \\
\hline
\text{36} \times \frac{6}{3} \\
\text{216}
\end{array}
\]

Sylvia and her dad weigh 216 pounds combined.
3. Three boxes weighing 128 pounds each and one box weighing 254 pounds were loaded onto the back of an empty truck. A crate of apples was then loaded onto the same truck. If the total weight loaded onto the truck was 2,000 pounds, how much did the crate of apples weigh?

\[
\begin{align*}
\text{Total Weight} &= \frac{128 \times 3}{384} + \frac{254}{638} \\
&= 1,362 \\
\end{align*}
\]

The crate of apples weighed 1,362 pounds.

4. In one month, Charlie read 814 pages. In the same month, his mom read 4 times as many pages as Charlie, and that was 143 pages more than Charlie’s dad read. What was the total number of pages read by Charlie and his parents?

\[
\begin{align*}
\text{Charlie} &= 814 \\
\text{Mom} &= 3,256 \\
\text{Dad} &= 3,113 \\
\text{Total} &= 814 + 3,256 + 3,113 \\
&= 7,183
\end{align*}
\]

Charlie and his parents read 7,183 pages.
Solve using the RDW process.

1. Over the summer, Kate earned $180 each week for 7 weeks. Of that money, she spent $375 on a new computer and $137 on new clothes. How much money did she have left?

   \[
   \begin{array}{c}
   7 \times 180 \\
   \hline
   \frac{180}{7} \\
   \frac{375}{137} \\
   \frac{4760}{512} \\
   \frac{512}{748}
   \end{array}
   \]

   Kate had $748 left.

2. Sylvia weighed 8 pounds when she was born. By her first birthday, her weight had tripled. By her second birthday, she had gained 12 more pounds. At that time, Sylvia’s father weighed 5 times as much as she did. What was Sylvia and her dad’s combined weight?

   - Born: 8
   - 1st: 24
   - 2nd: 36
   - Father: 36

   \[
   \begin{array}{c}
   8 \\
   \times 3 \\
   \frac{240}{36}
   \end{array}
   \]

   \[
   \begin{array}{c}
   180 \\
   + 36 \\
   \frac{216}{216}
   \end{array}
   \]

   Their combined weight was 216 pounds.
3. Three boxes weighing 128 pounds each and one box weighing 254 pounds were loaded onto the back of an empty truck. A crate of apples was then loaded onto the same truck. If the total weight loaded onto the truck was 2,000 pounds, how much did the crate of apples weigh?

4. In one month, Charlie read 814 pages. In the same month, his mom read 4 times as many pages as Charlie, and that was 143 pages more than Charlie's dad read. What was the total number of pages read by Charlie and his parents?
Solve the following problems. Use the RDW process.

1. There are 19 identical socks. How many pairs of socks are there? Will there be any socks without a match? If so, how many?

   ![Sock Illustration]

   9 pairs with 1 sock left without a match.

   The quotient is 9 and the remainder is 1.

2. If it takes 8 inches of ribbon to make a bow, how many bows can be made from 3 feet of ribbon (1 foot = 12 inches)? Will any ribbon be left over? If so, how much?

   ![Ribbon Illustration]

   4 bows can be made with 4 inches left over.

   The quotient is 4 and the remainder is 4.

3. The library has 27 chairs and 5 tables. If the same number of chairs is placed at each table, how many chairs can be placed at each table? Will there be any extra chairs? If so, how many?

   ![Chair Illustration]

   5 chairs can be placed at every table. Two chairs are extra.

   The quotient is 5 and the remainder is 2.
4. The baker has 42 kilograms of flour. She uses 8 kilograms each day. After how many days will she need to buy more flour?

\[ 42 \div 8 \]

remainder of 2

\[ 8, 16, 24, 32, 40, 48 \]

The quotient is 5 and the remainder is 2.
She will need to buy flour after 5 days.

5. Caleb has 76 apples. He wants to bake as many pies as he can. If it takes 8 apples to make each pie, how many apples will he use? How many apples will not be used?

\[ 76 \div 8 \]

Remainder 4

The quotient is 9 and the remainder is 4.

Caleb will use 72 apples. 4 apples will not be used.

*Note that this problem asks students for the apples used, not the number of pies made.*

6. Forty-five people are going to the beach. Seven people can ride in each van. How many vans will be required to get everyone to the beach?

\[ 45 \div 7 \]

Remainder of 3

The quotient is 6 and the remainder is 3.

7 vans will be needed to get everyone to the beach.

*Note this asks them to interpret the remainder.*
Solve the following problems. Use the RDW process.

1. There are 19 identical socks. How many pairs of socks are there? Will there be any socks without a match? If so, how many?

\[ \text{9 pairs with 1 sock left without a match.} \]

The quotient is 9 and the remainder is 1.

2. If it takes 8 inches of ribbon to make a bow, how many bows can be made from 3 feet of ribbon (1 foot = 12 inches)? Will any ribbon be left over? If so, how much?

\[ 3 \text{ feet} = 36 \text{ inches} \]

4 bows can be made with 4 inches left over.

The quotient is 4 and the remainder is 4.

3. The library has 27 chairs and 5 tables. If the same number of chairs is placed at each table, how many chairs can be placed at each table? Will there be any extra chairs? If so, how many?

5 chairs can be placed at every table. Two chairs are extra.

The quotient is 5 and the remainder is 2.
4. The baker has 42 kilograms of flour. She uses 8 kilograms each day. After how many days will she need to buy more flour?

\[ 42 \div 8 \]

Remainder of 2

The quotient is 5 and the remainder is 7.
She will need to buy flour after 5 days.

5. Caleb has 76 apples. He wants to bake as many pies as he can. If it takes 8 apples to make each pie, how many apples will he use? How many apples will not be used?

\[ 76 \div 8 \]

Remainder of 4

The quotient is 9 and the remainder is 4.

*Note that this problem asks students for the apples used, not the # of pies made.*

6. Forty-five people are going to the beach. Seven people can ride in each van. How many vans will be required to get everyone to the beach?

\[ 45 \div 7 \]

Remainder of 3

The quotient is 6 and the remainder is 3.

*Note this asks them to interpret the remainder.*
Name: Tommy Timberlake

1. $18 \div 6$

- Array:
  - Quotient = 3
  - Remainder = 0

- Area Model:
  - Can you show $18 \div 6$ with one rectangle? Yes

2. $19 \div 6$

- Array:
  - Quotient = 3
  - Remainder = 1

- Area Model:
  - Can you show $19 \div 6$ with one rectangle? No
  - Explain how you showed the remainder:
Solve using an array and an area model. The first one is done for you.

Example: \(25 \div 2\)

a. \[
\begin{array}{ccccccc}
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\end{array}
\]
Quotient = 12 Remainder = 1

b. 2

3. \(29 \div 3\)

a. \[
\begin{array}{ccccccc}
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\end{array}
\]
Quotient = 9 Remainder = 2

b. 3

4. \(22 \div 5\)

a. \[
\begin{array}{ccccccc}
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\end{array}
\]
Quotient = 4 Remainder = 2

b. 4

5. \(43 \div 4\)

a. \[
\begin{array}{ccccccc}
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\end{array}
\]
Quotient = 10 Remainder = 2

b. 4

6. \(59 \div 7\)

a. \[
\begin{array}{ccccccc}
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\end{array}
\]
Quotient = 8 Remainder = 3

b. 7
Show the division using disks. Relate your work on the place value chart to long division. Check your quotient and remainder by using multiplication and addition.

1. \(7 \div 2\)

<table>
<thead>
<tr>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (\overline{\cdot\cdot\cdot})</td>
</tr>
<tr>
<td>0 (\overline{\cdot\cdot\cdot})</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
\hline
2 & 7 \\
\hline
- 6 & -6 \\
\hline
1 & \\
\end{array}
\]

quotient = \(3\)  
remainder = \(1\)

Check Your Work

\[
\begin{aligned}
3 \\
\times 2 \\
\hline
6 \\
\hline
6 + 1 = 7
\end{aligned}
\]

2. \(27 \div 2\)

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (\overline{\cdot\cdot\cdot})</td>
<td></td>
</tr>
<tr>
<td>0 (\overline{\cdot\cdot\cdot})</td>
<td></td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
\hline
2 & 27 \\
\hline
- 2 & -2 \\
\hline
0 & 0 \(\overline{\cdot\cdot\cdot}\) \\
0 & 0 \(\overline{\cdot\cdot\cdot}\) \\
\end{array}
\]

quotient = \(13\)  
remainder = \(1\)

Check Your Work

\[
\begin{aligned}
13 \\
\times 2 \\
\hline
26 \\
\hline
26 + 1 = 27
\end{aligned}
\]

3. \(8 \div 3\)

<table>
<thead>
<tr>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (\overline{\cdot\cdot\cdot})</td>
</tr>
<tr>
<td>0 (\overline{\cdot\cdot\cdot})</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
\hline
3 & 8 \\
\hline
- 6 & -6 \\
\hline
2 & \\
\end{array}
\]

quotient = \(2\)  
remainder = \(2\)

Check Your Work

\[
\begin{aligned}
2 \\
\times 3 \\
\hline
6 \\
\hline
6 + 2 = 8
\end{aligned}
\]
4. \(38 \div 3\)

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄️นำมาเทน</td>
<td>🔄️นำมาเทน</td>
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<tr>
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<tr>
<td>🔄️นำมาเทน</td>
<td>🔄️นำมาเทน</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
3 & 12 \\
\hline
3 & 3 \\
\hline
0 & 8 \\
\hline
0 & 2 \\
\end{array}
\]

quotient = \(12\)

remainder = \(2\)

Check Your Work

\[
\frac{12}{3} + 2 = \frac{36}{38} \checkmark
\]

5. \(6 \div 4\)

<table>
<thead>
<tr>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄️นำมาเทน</td>
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<tr>
<td>🔄️นำมาเทน</td>
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<tr>
<td>🔄️นำมาเทน</td>
</tr>
<tr>
<td>🔄️นำมาเทน</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
4 & 6 \\
\hline
4 & 2 \\
\end{array}
\]

quotient = \(1\)

remainder = \(2\)

Check Your Work

\[
\frac{1}{4} \times 2 = \frac{6}{6} \checkmark
\]

6. \(86 \div 4\)

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄️นำมาเทน</td>
<td>🔄️นำมาเทน</td>
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</tr>
<tr>
<td>🔄️带来更多</td>
<td>🔄️带来更多</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
4 & 86 \\
\hline
4 & 8 \\
\hline
0 & 6 \\
\hline
0 & 2 \\
\hline
0 & 0 \\
\end{array}
\]

quotient = \(21\)

remainder = \(2\)

Check Your Work

\[
\frac{21}{4} + 2 = \frac{86}{86} \checkmark
\]
Show the division using disks. Relate your model to long division. Check your quotient and remainder by using multiplication and addition.

1. \( 5 \div 2 \)

<table>
<thead>
<tr>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢🟢🟢</td>
</tr>
<tr>
<td>○○</td>
</tr>
<tr>
<td>○○</td>
</tr>
</tbody>
</table>

   \[
   \begin{array}{c|c}
   \text{Tens} & \text{Ones} \\
   \hline
   2 & 5 \\
   \hline
   -4 & 1 \\
   \hline
   \end{array}
   \]

   \[
   \text{quotient} = \frac{2}{2}
   \]

   \[
   \text{remainder} = 1
   \]

   \[
   2 \times 2 = 5 \\
   4 + 1 = 5
   \]

2. \( 50 \div 2 \)

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢🟢🟢🟢🟢</td>
<td></td>
</tr>
<tr>
<td>○○</td>
<td></td>
</tr>
<tr>
<td>○○</td>
<td></td>
</tr>
<tr>
<td>○○</td>
<td></td>
</tr>
</tbody>
</table>

   \[
   \begin{array}{c|c}
   \text{Tens} & \text{Ones} \\
   \hline
   2 & 50 \\
   \hline
   -4 & 10 \\
   \hline
   \end{array}
   \]

   \[
   \text{quotient} = \frac{25}{2}
   \]

   \[
   \text{remainder} = 0
   \]

   \[
   25 \times 2 = 50
   \]

3. \( 7 \div 3 \)

<table>
<thead>
<tr>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢🟢🟢</td>
</tr>
<tr>
<td>○○</td>
</tr>
<tr>
<td>○○</td>
</tr>
<tr>
<td>○○</td>
</tr>
</tbody>
</table>

   \[
   \begin{array}{c|c}
   \text{Ones} \\
   \hline
   3 & 7 \\
   \hline
   -6 & 1 \\
   \hline
   \end{array}
   \]

   \[
   \text{quotient} = \frac{2}{3}
   \]

   \[
   \text{remainder} = 1
   \]

   \[
   2 \times 3 = 6 \\
   6 + 1 = 7
   \]
4. \[ 75 + 3 \]

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>5</td>
</tr>
</tbody>
</table>

Quotient: \[ \frac{25}{1} \]
Remainder: 0

Check Your Work

\[ \frac{25}{3} \]

5. \[ 9 \div 4 \]

<table>
<thead>
<tr>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
</tr>
</tbody>
</table>

Quotient: 2
Remainder: 1

Check Your Work

\[ \frac{8}{9} \]

6. \[ 92 \div 4 \]

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>92</td>
<td>2</td>
</tr>
</tbody>
</table>

Quotient: \[ \frac{23}{4} \]
Remainder: 0

Check Your Work

\[ \frac{23}{4} \]
Directions: Solve using the standard algorithm. Check your quotient and remainder by using multiplication and addition.

1. \[ 46 \div 2 \]
   \[
   \begin{array}{c}
   23.
   \hline
   2 \mid 46
   \\
   -4
   \hline
   6
   \\
   -6
   \hline
   0
   \end{array}
   \]
   Quotient = 23
   Remainder = 0

2. \[ 96 \div 3 \]
   \[
   \begin{array}{c}
   32.
   \hline
   3 \mid 96
   \\
   -9
   \hline
   0
   \\
   -0
   \hline
   0
   \end{array}
   \]
   Quotient = 32
   Remainder = 0

3. \[ 85 \div 5 \]
   \[
   \begin{array}{c}
   17.
   \hline
   5 \mid 85
   \\
   -5
   \hline
   35
   \\
   -35
   \hline
   0
   \end{array}
   \]
   Quotient = 17
   Remainder = 0

4. \[ 52 \div 4 \]
   \[
   \begin{array}{c}
   13.
   \hline
   4 \mid 52
   \\
   -4
   \hline
   12
   \\
   -12
   \hline
   0
   \end{array}
   \]
   Quotient = 13
   Remainder = 0

5. \[ 53 \div 3 \]
   \[
   \begin{array}{c}
   17 R 2
   \hline
   3 \mid 53
   \\
   -3
   \hline
   23
   \\
   -21
   \hline
   2
   \end{array}
   \]
   Quotient = 17
   Remainder = 2

6. \[ 95 \div 4 \]
   \[
   \begin{array}{c}
   23 R 3
   \hline
   4 \mid 95
   \\
   -8
   \hline
   15
   \\
   -12
   \hline
   3
   \end{array}
   \]
   Quotient = 23
   Remainder = 3
7. \(89 \div 6\)
   \[
   \begin{array}{c|c}
   \hline
   89 & 14 \text{ R} 5 \\
   -6 & -6 \\
   \hline
   29 & 5 \\
   -24 & \\
   \hline
   5 & \text{Quotient = 14} \\
   \text{Remainder = 5} \\
   \end{array}
   \]

8. \(96 \div 6\)
   \[
   \begin{array}{c|c}
   \hline
   96 & 16 \\
   -6 & -6 \\
   \hline
   30 & -30 \\
   -36 & 0 \\
   \hline
   0 & \text{Quotient = 16} \\
   \text{Remainder = 0} \\
   \end{array}
   \]

9. \(60 \div 3\)
   \[
   \begin{array}{c|c}
   \hline
   60 & 20 \\
   -6 & -6 \\
   \hline
   0 & 0 \\
   \hline
   0 & \text{Quotient = 20} \\
   \text{Remainder = 0} \\
   \end{array}
   \]

10. \(60 \div 4\)
    \[
    \begin{array}{c|c}
    \hline
    60 & 15 \\
    -4 & -4 \\
    \hline
    20 & 20 \\
    -20 & 0 \\
    \hline
    0 & \text{Quotient = 15} \\
    \text{Remainder = 0} \\
    \end{array}
    \]

11. \(95 \div 8\)
    \[
    \begin{array}{c|c}
    \hline
    95 & 11 \text{ R} 7 \\
    -8 & -8 \\
    \hline
    18 & -8 \\
    -8 & 1 \\
    \hline
    1 & \text{Quotient = 11} \\
    \text{Remainder = 7} \\
    \end{array}
    \]

12. \(95 \div 7\)
    \[
    \begin{array}{c|c}
    \hline
    95 & 13 \text{ R} 4 \\
    -7 & -7 \\
    \hline
    25 & -21 \\
    -21 & 4 \\
    \hline
    1 & \text{Quotient = 13} \\
    \text{Remainder = 4} \\
    \end{array}
    \]
1. When you divide 94 by 3 there is a remainder of 1. Model this problem with number disks. In the number disk model, how did you show the remainder?

![Number disk model](image)

I showed my remainder by circling the remaining one in the ones column.

2. Cayman says that $94 \div 3$ is 30 with a remainder of 4. He reasons it is correct because $(3 \times 30) + 4 = 94$. What mistake has Cayman made? Explain how he can correct his work.

Cayman's mistake is that his remainder is greater than his divisor. That means he can divide even more. Instead of 30, he can make 31 groups.

$94 \div 3 = 31$ with a remainder of 1. $(3 \times 31) + 1 = 94$.

3. The number disk model is showing $72 \div 3$.

Complete the model. Explain what happens to the 1 ten that is remaining in the tens column.

The 1 ten remaining gets decomposed into 10 ones in the ones column.
4. Two friends share 56 dollars.
   a. They have 5 ten dollar bills and 6 dollar bills.
      Draw a picture to show how the bills will be shared. Will they have to make change at any stage?
      
      ![Picture of bills]

      yes, they needed to make change for 1 ten dollar bill. In order to share it, I needed to decompose the $10 dollar bill into 10 $1 dollar bills.

      
      2 tens & ones = 28

   b. Explain how they share the money evenly.
      
      Each friend gets two $10 dollar bills and eight $1 dollar bills.

5. Imagine you are filming a video explaining the problem 45 ÷ 3 to new fourth graders. Create a script to explain how you can keep dividing after getting a remainder of 1 ten in the first step.

   "Watch as I divide 45 ÷ 3 using a place value chart."

   First I divide my tens.
   Each of the 3 groups can equally have 1 ten. There is 1 ten remaining.
   We can continue dividing by decomposing the 1 ten into 10 ones. Watch as I show this on my chart. Now I have 15 ones that can be equally distributed into our 3 groups. Each group will get 5 ones. Now we can see that 45 ÷ 3 is 1 ten 5 ones or 15."

   ![
   
   Tens | Ones
   --- | ----
   1 |          
   5 ones = 15
   
   ](image)
1. Alfonso solved a division problem by drawing an area model.
   a. Look at the area model. What division problem did Alfonso solve?
      \[
      \begin{array}{c|c|c|c|c|c|c}
      & & & & & & \\
      & & & & & 10 & 8 \\
      4 & 40 & 32 & & & &
      \end{array}
      \]
      \[\text{72} \div 4 = 18\]
   b. Show a number bond to represent Alfonso's area model. Start with the total and then show how the total is split into two parts. Below the two parts, represent the total length using the distributive property and then solve.
      \[
      \begin{array}{c}
      72 \\
      \downarrow \\
      40 \\
      \downarrow \\
      32 \\
      \downarrow \\
      \end{array}
      \]
      \[
      (40 \div 4) + (32 \div 4) = 10 + 8 = 18
      \]

2. Solve 45 ÷ 3 using an area model. Draw a number bond and use the distributive property to solve for the unknown length.
   \[
   \begin{array}{c|c|c|c|c|c|c|c}
   & & & & & & \\
   & & & & & 10 & 5 \\
   3 & 30 & 15 & & & &
   \end{array}
   \]
   \[
   \begin{array}{c}
   45 \\
   \downarrow \\
   30 \\
   \downarrow \\
   15 \\
   \downarrow \\
   \end{array}
   \]
   \[
   (30 \div 3) + (15 \div 3) = 10 + 5 = 15
   \]
3. Solve $64 \div 4$ using an area model. Draw a number bond to show how you partitioned the area, and represent the division with a written method.

\[
\begin{array}{c|c|c}
4 & 40 & 24 \\
\hline
10 & 6 \\
\end{array}
\]

\[
64 = 60 + 4 = 10 + 6 = 16
\]

4. Solve $92 \div 4$ using an area model. Explain, using words, pictures, or numbers, the connection of the distributive property to the area model.

\[
\begin{array}{c|c|c}
4 & 80 & 12 \\
\hline
20 & 3 \\
\end{array}
\]

We use the area model to show how we can break apart a whole into pieces that make it easier to divide. The distributive property shows how the whole is broken apart.

\[
(80 \div 4) + (12 \div 4) = 20 + 3 = 23
\]

5. Solve $72 \div 6$ using an area model and the standard algorithm.

\[
\begin{array}{c|c|c}
6 & 60 & 12 \\
\hline
10 & 2 \\
\end{array}
\]

\[
6 \overline{)72} \\
-6 \quad \underline{6} \\
12 \quad \underline{-12} \\
0
\]
1. Solve $37 \div 2$ using an area model. Use long division and the distributive property to record your work.

\[
\begin{array}{c|c}
1 \text{ ten} & 8 \text{ ones} \\
\hline
20 \text{ square units} & 16 \text{ square units} \\
\hline
\text{1 square unit remaining} & \\
\end{array}
\]

\[
(20 \div 2) + (16 \div 2) = 10 + 8 = 18
\]

\[
(18 \times 2) + 1 = 37
\]

2. Solve $76 \div 3$ using an area model. Use long division and the distributive property to record your work.

\[
\begin{array}{c|c}
2 \text{ tens} & 5 \text{ ones} \\
\hline
60 \text{ square units} & 15 \text{ square units} \\
\hline
\text{1 square unit remaining} & \\
\end{array}
\]

\[
(60 \div 3) + (15 \div 3) = 20 + 5 = 25
\]

\[
(25 \times 3) + 1 = 76
\]

3. Carolina solved the following division problem by drawing an area model.

\[
\begin{array}{c|c|c}
1 \text{ ten} & 3 \text{ ones} \\
\hline
\text{4 \text{ units}} & \text{1 \text{ unit}} \\
\end{array}
\]

a. What division problem did she solve? $53 \div 4$

b. Show how Carolina’s model can be represented using the distributive property.

\[
(40 \div 4) + (12 \div 4) = 10 + 3 = 13
\]

\[
(13 \times 4) + 1 = 53
\]
Solve the following problems using the area model. Support the area model with long division or the distributive property.

4. \[48 \div 3 = 16\] 
\[
\begin{array}{c|c}
3 & 16 \\
\hline
30 & -3 \\
18 & -18 \\
\hline
0 & \\
\end{array}
\]

(30 \div 3) + (18 \div 3) = 10 + 6 = 16

5. \[49 \div 3 = 16 \text{ R} 1\] 
\[
\begin{array}{c|c}
3 & 16 \\
\hline
30 & -3 \\
18 & -18 \\
\hline
9 & \\
\end{array}
\]

(30 \div 3) + (18 \div 3) = 10 + 6 = 16

\[(16 \times 3) + 1 = 49\]

6. \[56 \div 4 = 14\] 
\[
\begin{array}{c|c}
4 & 14 \\
\hline
40 & -4 \\
16 & -16 \\
\hline
0 & \\
\end{array}
\]

(40 \div 4) + (16 \div 4) = 10 + 4 = 14

7. \[58 \div 4 = 14 \text{ R} 2\] 
\[
\begin{array}{c|c}
4 & 14 \\
\hline
40 & -4 \\
18 & -18 \\
\hline
2 & \\
\end{array}
\]

(40 \div 4) + (16 \div 4) = 10 + 4 = 14

\[(14 \times 4) + 2 = 58\]

8. \[66 \div 5 = 13 \text{ R} 1\] 
\[
\begin{array}{c|c}
5 & 13 \\
\hline
60 & -5 \\
16 & -15 \\
\hline
1 & \\
\end{array}
\]

(50 \div 5) + (15 \div 5) = 10 + 3 = 13

\[(13 \times 5) + 1 = 66\]

9. \[79 \div 3 = 26 \text{ R} 1\] 
\[
\begin{array}{c|c}
3 & 26 \\
\hline
60 & -6 \\
26 & -18 \\
\hline
1 & \\
\end{array}
\]

(60 \div 3) + (18 \div 3) = 20 + 6 = 26

\[(26 \times 3) + 1 = 79\]

10. Seventy-three students are divided into groups of 6 students each. How many groups of 6 students are there? How many students will not be in a group of 6?

\[
\begin{array}{c|c}
6 & 12 \\
\hline
60 & -6 \\
12 & -12 \\
\hline
0 & \\
\end{array}
\]

There are 12 groups of 6 students.

1 student will not be in a group of 6.
1. Record the factors of the given numbers as multiplication sentences and as a list in order from least to greatest. Classify each as prime (P) or composite (C). The first problem is done for you.

<table>
<thead>
<tr>
<th>Multiplication Sentences</th>
<th>Factors</th>
<th>P or C</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 4</td>
<td>The factors of 4 are: 1, 2, and 4</td>
<td>C</td>
</tr>
<tr>
<td>1 × 4 = 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 2 = 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. 6</td>
<td>The factors of 6 are: 1, 2, 3, 6</td>
<td>C</td>
</tr>
<tr>
<td>1 × 6 = 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 3 = 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. 7</td>
<td>The factors of 7 are: 1, 7</td>
<td>P</td>
</tr>
<tr>
<td>1 × 7 = 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. 9</td>
<td>The factors of 9 are: 1, 3, 9</td>
<td>C</td>
</tr>
<tr>
<td>1 × 9 = 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 × 3 = 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. 12</td>
<td>The factors of 12 are: 1, 2, 3, 4, 6, 12</td>
<td>C</td>
</tr>
<tr>
<td>1 × 12 = 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 6 = 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 × 4 = 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. 13</td>
<td>The factors of 13 are: 1, 13</td>
<td>P</td>
</tr>
<tr>
<td>1 × 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. 15</td>
<td>The factors of 15 are: 1, 3, 5, 15</td>
<td>C</td>
</tr>
<tr>
<td>1 × 15 = 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 × 5 = 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. 16</td>
<td>The factors of 16 are: 1, 2, 4, 8, 16</td>
<td>C</td>
</tr>
<tr>
<td>1 × 16 = 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 8 = 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 8 = 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 × 4 = 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. 18</td>
<td>The factors of 18 are: 1, 2, 3, 6, 9, 18</td>
<td>C</td>
</tr>
<tr>
<td>1 × 18 = 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 9 = 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 × 6 = 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. 19</td>
<td>The factors of 19 are: 1, 19</td>
<td>P</td>
</tr>
<tr>
<td>1 × 19 = 19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k. 21</td>
<td>The factors of 21 are: 1, 3, 7, 21</td>
<td>C</td>
</tr>
<tr>
<td>1 × 21 = 21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 × 7 = 21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l. 24</td>
<td>The factors of 24 are: 1, 2, 3, 4, 6, 8, 12, 24</td>
<td>C</td>
</tr>
<tr>
<td>1 × 24 = 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 × 12 = 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 × 8 = 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 × 6 = 24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Find all factors for the following numbers and classify as prime or composite. Explain your classification of each as prime or composite.

<table>
<thead>
<tr>
<th>Factor Pairs for 25</th>
<th>Factor Pairs for 28</th>
<th>Factor Pairs for 29</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 25</td>
<td>1 28</td>
<td>1 29</td>
</tr>
<tr>
<td>5 5</td>
<td>2 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 7</td>
<td></td>
</tr>
</tbody>
</table>

Composite because it has more than two factors.
Composite because it has more than two factors.
Prime because it only has two factors.

3. Bryan says all prime numbers are odd numbers.
   a. List all of the prime numbers less than 20 in numerical order.

   2, 3, 5, 7, 11, 13, 17, 19

   b. Use your list to show that Bryan's claim is false.

   Bryan's claim is false because 2 is a prime number but it is an even number.

4. Sheila has 28 stickers to divide evenly among 3 friends. She thinks there will be no leftovers. Use what you know about factor pairs to explain if Sheila is correct.

   Sheila is incorrect because 3 is not a factor of 28. She would be able to give 9 stickers to each friend but there would be one sticker leftover.
1. Explain your thinking or use division to answer the following.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a.</strong> Is 2 a factor of 84?</td>
<td><strong>b.</strong> Is 2 a factor of 83?</td>
</tr>
<tr>
<td>Yes because 84 is an even number. 2 is a factor of every even number.</td>
<td>No because 83 is an odd number. 2 is not a factor of odd numbers.</td>
</tr>
<tr>
<td><img src="image1" alt="Division Example" /></td>
<td><img src="image2" alt="Division Example" /></td>
</tr>
</tbody>
</table>

| **c.** Is 3 a factor of 84? | **d.** Is 2 a factor of 92? |
| Yes | Yes because 92 is an even number. 2 is a factor of every even number. |
| ![Division Example](image3) | ![Division Example](image4) |

| **e.** Is 6 a factor of 84? | **f.** Is 4 a factor of 92? |
| Yes | Yes |
| ![Division Example](image5) | ![Division Example](image6) |

| **g.** Is 5 a factor of 84? | **h.** Is 8 a factor of 92? |
| No because 84 does not have a 5 or 0 in the ones place. All numbers that have 5 as a factor have a 5 or 0 in the ones place. | No |
| ![Division Example](image7) | ![Division Example](image8) |
2. Use the associative property to find more factors of 24 and 36.
   a. \[ 24 = 12 \times 2 \]
   \[ = (4 \times 3) \times 2 \]
   \[ = 4 \times (3 \times 2) \]
   \[ = 4 \times 6 \]
   \[ = 24 \]
   b. \[ 36 = 9 \times 4 \]
   \[ = (3 \times 3) \times 4 \]
   \[ = 3 \times (3 \times 4) \]
   \[ = 3 \times 12 \]
   \[ = 36 \]

3. In class, we used the associative property to show that when 6 is a factor, then 2 and 3 are factors, because \( 6 = 2 \times 3 \). Use the fact that \( 8 = 4 \times 2 \) to show that 2 and 4 are factors of 56, 72, and 80.
   
   \[ 56 = 8 \times 7 \]
   \[ = (4 \times 2) \times 7 \]
   \[ = 4 \times (2 \times 7) \]
   \[ = 4 \times 14 \]
   \[ = 56 \]

   \[ 72 = 8 \times 9 \]
   \[ = (4 \times 2) \times 9 \]
   \[ = 4 \times (2 \times 9) \]
   \[ = 4 \times 18 \]
   \[ = 72 \]

   \[ 80 = 8 \times 10 \]
   \[ = (4 \times 2) \times 10 \]
   \[ = 4 \times (2 \times 10) \]
   \[ = 4 \times 20 \]
   \[ = 80 \]

4. The first statement is false. The second statement is true. Explain why using words, pictures, or numbers.

   If a number has 2 and 4 as factors, then it has 8 as a factor.
   If a number has 8 as a factor, then both 2 and 4 are factors.

   Any number that can be divided exactly by 8 can also be divided by 2 and 4. Since \( 8 = 2 \times 4 \).

   Example
   \[ 8 \times 5 = 40 \]
   \[ (4 \times 2) \times 5 = 40 \]

   28 has 2 and 4 as factors but not 8.
1. For each of the following, time yourself for 1 minute. See how many multiples you can write.

   a. Write the multiples of 5 starting from 100.
      100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175
      180, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240

   b. Write the multiples of 4 starting from 20.
      20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80,
      84, 88, 92, 96, 100, 104, 108, 112, 116, 120, 124, 128, 132,
      136, 140, 144, 148, 152, 156, 160, 164, 168, 172, 176, 180, 184

   c. Write the multiples of 6 starting from 36.
      36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114, 120,
      126, 132, 138, 144, 150, 156, 162, 168, 174, 180, 186, 192, 198,
      204, 210, 216, 222, 228, 234, 240, 246, 252, 258

2. List the numbers that have 24 as a multiple.
   1, 2, 3, 4, 6, 8, 12, 24

3. Use mental math, division, or the associate property to solve. (Use scratch paper if you like.)

   a. Is 12 a multiple of 4? Yes Is 4 a factor of 12? Yes
   b. Is 42 a multiple of 8? No Is 8 a factor of 42? No
   c. Is 84 a multiple of 6? Yes Is 6 a factor of 84? Yes

4. Can a prime number be a multiple of any other number except itself? Explain your reasons why.
   Yes, a prime number is also a multiple of 1.
   A prime number has two factors: itself and 1.
5. Follow the directions below.

<table>
<thead>
<tr>
<th></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>
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<th>10</th>
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<tbody>
<tr>
<td>11</td>
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<td>97</td>
<td>98</td>
<td>99</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

a. Circle in red the multiples of 2. When a number is a multiple of 2, what are the possible values for the ones digit?

\[ 2, 4, 6, 8, 0 \]

b. Shade in green the multiples of 3. Choose one. What do you notice about the sum of the digits? Choose another. What do you notice about the sum of the digits?

The sum of the digits is also a multiple of 3.

c. Circle in blue the multiples of 5. When a number is a multiple of 5, what are the possible values for the ones digit?

5 and 0

d. Draw an X over the multiples of 10. What digit do all multiples of 10 have in common? What is the digit?

They all have a zero in the ones place.
1. Follow the directions.

Shade the number 1 red.

a. Circle the first un-marked number.
b. Cross off every multiple of that number except the one you circled. If it's already crossed off, skip it.
c. Repeat Steps (a) and (b) until every number is either circled or crossed off.
d. Shade every crossed out number in orange.
2. List the circled numbers.

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59,
61, 67, 71, 73, 79, 83, 89, 97

a. Why weren't the circled numbers crossed off along the way?

The circled numbers are not a multiple of any prior number on the hundreds chart.

b. Except for the number 1, what is similar about all of the numbers that were crossed off?

All of the crossed off numbers except 1 are composite numbers meaning those numbers have more than two factors.

c. What is similar about all of the numbers that were circled?

All of the circled numbers are prime, meaning they only have two factors 1 and themselves.
1. Draw number disks to represent the following problems. Rewrite each in unit form and solve.
   
   a. \(6 \div 2 = \underline{3}\)  
      \(6\) ones \(\div 2 = \underline{3}\) ones

   b. \(60 \div 2 = \underline{30}\)  
      \(6\) tens \(\div 2 = \underline{3}\) tens

   c. \(600 \div 2 = \underline{300}\)  
      \(6\) hundreds \(\div 2 = \underline{3}\) hundreds

   d. \(6,000 \div 2 = \underline{3,000}\)  
      \(6\) thousands \(\div 2 = \underline{3}\) thousands

2. Draw number disks to represent each problem. Rewrite each in unit form and solve.
   
   a. \(12 \div 3 = \underline{4}\)  
      \(12\) ones \(\div 3 = \underline{4}\) ones

   b. \(120 \div 3 = \underline{40}\)  
      \(12\) tens \(\div 3 = \underline{4}\) tens

   c. \(1,200 \div 3 = \underline{400}\)  
      \(12\) hundreds \(\div 3 = \underline{4}\) hundreds
3. Rewrite each in unit form. Solve for the quotient.

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a. $800 \div 2 = 400$</td>
<td>b. $600 \div 2 = \frac{6 \text{hundreds}}{2} = 3 \text{ hundreds}$</td>
<td>c. $800 \div 4 = \frac{8 \text{hundreds}}{4} = 2 \text{ hundreds}$</td>
<td>d. $900 \div 3 = \frac{9 \text{hundreds}}{3} = 3 \text{ hundreds}$</td>
<td></td>
</tr>
<tr>
<td>$8 \text{ hundreds} + 2 = 4 \text{ hundreds}$</td>
<td>$24 \text{ tens} \div 4 = 6 \text{ tens}$</td>
<td>$45 \text{ tens} \div 5 = 9 \text{ tens}$</td>
<td>$20 \text{ tens} \div 5 = 4 \text{ tens}$</td>
<td></td>
</tr>
</tbody>
</table>
| e. $300 \div 6$ | f. $240 \div 4$ | g. $450 \div 5$ | h. $200 \div 5$
| $30 \text{ tens} + 6 = \frac{5 \text{ tens}}{}$ | $24 \text{ hundreds} \div 4 = 6 \text{ hundreds}$ | $45 \text{ tens} \div 5 = 9 \text{ tens}$ | $20 \text{ tens} \div 5 = 4 \text{ tens}$ |
| i. $3,600 \div 4$ | j. $2,400 \div 4$ | k. $2,400 \div 3$ | l. $4,000 \div 5$
| $36 \text{ hundreds} + 4 = \frac{9 \text{ hundreds}}{}$ | $24 \text{ hundreds} \div 4 = 6 \text{ hundreds}$ | $24 \text{ hundreds} \div 3 = \frac{8 \text{ hundreds}}{}$ | $40 \text{ hundreds} \div 5 = \frac{8 \text{ hundreds}}{}$

4. Some sand weighs 2,800 kilograms. It is divided equally between 4 trucks. How many kilograms of sand are in each truck?

- $28 \text{ hundreds} \div 4 = 7 \text{ hundreds}$
- There are 700 kilograms of sand in each truck.

5. Ivy has 5 times as many stickers as Adrian has. Ivy has 350 stickers. How many stickers does Adrian have?

- $35 \text{ tens} \div 5 = 7 \text{ tens}$
- Adrian has 70 stickers.

6. An ice cream stand sold $1,600 worth of ice cream on Saturday, which was 4 times the amount sold on Friday. How much money did the ice cream stand collect on Friday?

- $16 \text{ hundreds} \div 4 = 4 \text{ hundreds}$
- The ice cream stand collected $400 on Friday.
1. Draw number disks to represent the following problems. Rewrite each in unit form and solve.

a. \(6 \div 2 = \frac{3}{\phantom{000}}\)  
   \(6 \text{ ones} \div 2 = \frac{3}{\phantom{000}} \text{ ones}\)

b. \(60 \div 2 = \frac{30}{\phantom{000}}\)  
   \(6 \text{ tens} \div 2 = \frac{3}{\phantom{000}} \text{ tens}\)

c. \(600 \div 2 = \frac{300}{\phantom{000}}\)  
   \(6 \text{ hundreds} \div 2 = \frac{3}{\phantom{000}} \text{ hundreds}\)

d. \(6,000 \div 2 = \frac{3,000}{\phantom{000}}\)  
   \(6 \text{ thousands} \div 2 = \frac{3}{\phantom{000}} \text{ thousands}\)

2. Draw number disks to represent each problem. Rewrite each in unit form and solve.

a. \(12 \div 3 = \frac{4}{\phantom{000}}\)  
   \(12 \text{ ones} \div 3 = \frac{4}{\phantom{000}} \text{ ones}\)

b. \(120 \div 3 = \frac{40}{\phantom{000}}\)  
   \(12 \text{ tens} \div 3 = \frac{4}{\phantom{000}} \text{ tens}\)

c. \(1,200 \div 3 = \frac{400}{\phantom{000}}\)  
   \(12 \text{ hundreds} \div 3 = \frac{4}{\phantom{000}} \text{ hundreds}\)
3. Rewrite each in unit form. Solve for the quotient.

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>a. $800 \div 2 = 400$</td>
<td>b. $600 \div 2 = 300$</td>
<td>c. $800 \div 4 = 200$</td>
<td>d. $900 \div 3 = 300$</td>
</tr>
<tr>
<td>$8$ hundreds $\div 2 = \underline{4}$ hundreds</td>
<td>$6$ hundreds $\div 2 = \underline{3}$ hundreds</td>
<td>$8$ hundreds $\div 4 = \underline{2}$ hundreds</td>
<td>$9$ hundreds $\div 3 = \underline{3}$ hundreds</td>
</tr>
<tr>
<td>e. $300 \div 6 = \underline{50}$</td>
<td>f. $240 \div 4 = \underline{60}$</td>
<td>g. $450 \div 5 = \underline{90}$</td>
<td>h. $200 \div 5 = \underline{40}$</td>
</tr>
<tr>
<td>$30$ tens $\div 6 = \underline{5}$ tens</td>
<td>$24$ tens $\div 4 = \underline{6}$ tens</td>
<td>$46$ tens $\div 5 = \underline{9}$ tens</td>
<td>$20$ tens $\div 5 = \underline{4}$ tens</td>
</tr>
<tr>
<td>i. $3,600 \div 4 = \underline{900}$</td>
<td>j. $2,400 \div 4 = \underline{600}$</td>
<td>k. $2,400 \div 3 = \underline{800}$</td>
<td>l. $4,000 \div 5 = \underline{800}$</td>
</tr>
<tr>
<td>$36$ hundreds $\div 4 = \underline{9}$ hundreds</td>
<td>$24$ hundreds $\div 4 = \underline{6}$ hundreds</td>
<td>$24$ hundreds $\div 3 = \underline{8}$ hundreds</td>
<td>$40$ hundreds $\div 5 = \underline{8}$ hundreds</td>
</tr>
</tbody>
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4. Some sand weighs 2,800 kilograms. It is divided equally between 4 trucks. How many kilograms of sand are in each truck?

$$28 \text{ hundreds } \div 4 = 7 \text{ hundreds}$$

There are 700 kilograms of sand in each truck.

5. Ivy has 5 times as many stickers as Adrian has. Ivy has 350 stickers. How many stickers does Adrian have?

$$35 \text{ tens } \div 5 = 7 \text{ tens}$$

Adrian has 70 stickers.

6. An ice cream stand sold $1,600 worth of ice cream on Saturday, which was 4 times the amount sold on Friday. How much money did the ice cream stand collect on Friday?

$$16 \text{ hundreds } \div 4 = 4 \text{ hundreds}$$

The ice cream stand collected $400 on Friday.
1. Divide. Use number disks to model each problem.

<table>
<thead>
<tr>
<th>a. $324 + 2$</th>
<th>b. $344 + 2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hundreds</strong></td>
<td><strong>Hundreds</strong></td>
</tr>
<tr>
<td><strong>Tens</strong></td>
<td><strong>Tens</strong></td>
</tr>
<tr>
<td><strong>Ones</strong></td>
<td><strong>Ones</strong></td>
</tr>
<tr>
<td><img src="image1" alt="Disk Model" /></td>
<td><img src="image2" alt="Disk Model" /></td>
</tr>
<tr>
<td><strong>hundreds</strong></td>
<td><strong>hundreds</strong></td>
</tr>
<tr>
<td><strong>tens</strong></td>
<td><strong>tens</strong></td>
</tr>
<tr>
<td><strong>ones</strong></td>
<td><strong>ones</strong></td>
</tr>
</tbody>
</table>

\[= 162\]

<table>
<thead>
<tr>
<th>c. $483 + 3$</th>
<th>d. $549 + 3$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hundreds</strong></td>
<td><strong>Hundreds</strong></td>
</tr>
<tr>
<td><strong>Tens</strong></td>
<td><strong>Tens</strong></td>
</tr>
<tr>
<td><strong>Ones</strong></td>
<td><strong>Ones</strong></td>
</tr>
<tr>
<td><img src="image3" alt="Disk Model" /></td>
<td><img src="image4" alt="Disk Model" /></td>
</tr>
<tr>
<td><strong>hundreds</strong></td>
<td><strong>hundreds</strong></td>
</tr>
<tr>
<td><strong>tens</strong></td>
<td><strong>tens</strong></td>
</tr>
<tr>
<td><strong>ones</strong></td>
<td><strong>ones</strong></td>
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</table>

\[= 161\]

\[= 183\]
2. Model using number disks and record using the algorithm.

<table>
<thead>
<tr>
<th>Number Disks</th>
<th>Algorithm</th>
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</thead>
<tbody>
<tr>
<td><strong>655 ÷ 5</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>5 ( \sqrt{655} )</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>-5 ( \sqrt{5} )</td>
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<td>15</td>
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<td>-15 ( \sqrt{15} )</td>
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\[ 655 ÷ 5 = 131 \]

<table>
<thead>
<tr>
<th>Number Disks</th>
<th>Algorithm</th>
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<tbody>
<tr>
<td><strong>726 ÷ 3</strong></td>
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</table>

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>3 ( \sqrt{726} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>-12 ( \sqrt{12} )</td>
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<td></td>
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<td>06</td>
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</table>

\[ 726 ÷ 3 = 242 \]

<table>
<thead>
<tr>
<th>Number Disks</th>
<th>Algorithm</th>
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</thead>
<tbody>
<tr>
<td><strong>688 ÷ 4</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
<th>4 ( \sqrt{688} )</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>-28 ( \sqrt{28} )</td>
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<td></td>
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</table>

\[ 688 ÷ 4 = 172 \]
1. Divide. Use number disks to model each problem.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Number</th>
<th>Operation</th>
<th>Quotient</th>
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</thead>
<tbody>
<tr>
<td>a. 324 ÷ 2</td>
<td>324</td>
<td>÷ 2</td>
<td>162</td>
</tr>
<tr>
<td>b. 344 ÷ 2</td>
<td>344</td>
<td>÷ 2</td>
<td>172</td>
</tr>
<tr>
<td>c. 483 ÷ 3</td>
<td>483</td>
<td>÷ 3</td>
<td>161</td>
</tr>
<tr>
<td>d. 549 ÷ 3</td>
<td>549</td>
<td>÷ 3</td>
<td>183</td>
</tr>
</tbody>
</table>
2. Model using number disks and record using the algorithm.

a. $655 \div 5$

Number Disks

<table>
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<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
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</tbody>
</table>

Algorithm

$\begin{array}{c}
5 \sqrt{655} \\
-5 \\
\hline
15 \\
-15 \\
\hline
05 \\
-05 \\
\hline
0 \\
\end{array}$

b. $726 \div 3$

Number Disks

<table>
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<tr>
<th>hundreds</th>
<th>tens</th>
<th>ones</th>
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</table>

Algorithm

$\begin{array}{c}
3 \sqrt{726} \\
-6 \\
\hline
12 \\
-12 \\
\hline
06 \\
-06 \\
\hline
0 \\
\end{array}$

c. $688 \div 4$

Number Disks

<table>
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<th>hundreds</th>
<th>tens</th>
<th>ones</th>
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</tbody>
</table>

Algorithm

$\begin{array}{c}
4 \sqrt{688} \\
-4 \\
\hline
28 \\
-28 \\
\hline
08 \\
-08 \\
\hline
0 \\
\end{array}$
1. Divide. Check your work by multiplying. Draw disks on a place value chart as needed.

<table>
<thead>
<tr>
<th></th>
<th>a. $574 \div 2$</th>
<th>b. $861 \div 3$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$287$</td>
<td>$287$</td>
</tr>
<tr>
<td></td>
<td>$\underline{\text{574}}$</td>
<td>$\underline{\text{287}}$</td>
</tr>
<tr>
<td></td>
<td>$- \underline{4}$</td>
<td>$\times \underline{2}$</td>
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<tr>
<td></td>
<td>$\underline{17}$</td>
<td>$\underline{574}$</td>
</tr>
<tr>
<td></td>
<td>$- \underline{16}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\underline{14}$</td>
<td>$\underline{14}$</td>
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<table>
<thead>
<tr>
<th></th>
<th>c. $354 \div 2$</th>
<th>d. $354 \div 3$</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$177$</td>
<td>$118$</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>e. $873 \div 4$</th>
<th>f. $591 \div 5$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$218 \text{ R}1$</td>
<td>$118 \text{ R}1$</td>
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</table>
### Problem Set

<table>
<thead>
<tr>
<th>g. $275 + 3$</th>
<th>h. $459 + 5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$91 , \text{R}2$</td>
<td>$91 , \text{R}4$</td>
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</table>

<table>
<thead>
<tr>
<th>i. $678 + 4$</th>
<th>j. $955 + 4$</th>
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</thead>
<tbody>
<tr>
<td>$169 , \text{R}2$</td>
<td>$238 , \text{R}3$</td>
</tr>
</tbody>
</table>

2. Zach filled 581 one-liter bottles with apple cider. He distributed the bottles evenly to 4 stores. How many liter bottles did each of the stores receive? Were there any bottles left over? If so, how many?

\[
4 \div 581 = 145 \, \text{R}1
\]

Each of the stores received 145 liter bottles. There was 1 bottle remaining.
1. Divide. Check your work by multiplying. Draw disks on a place value chart as needed.

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<thead>
<tr>
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<tbody>
<tr>
<td>a. $574 \div 2$</td>
<td>b. $861 \div 3$</td>
<td></td>
</tr>
<tr>
<td>$\frac{287}{2}$</td>
<td>$\frac{287}{3}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{215}{2}$</td>
<td>$\frac{287}{3}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{17}{2}$</td>
<td>$\frac{22}{3}$</td>
<td></td>
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<tbody>
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<td>c. $354 \div 2$</td>
<td>d. $354 \div 3$</td>
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</tr>
<tr>
<td>$\frac{177}{2}$</td>
<td>$\frac{177}{3}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{177}{2}$</td>
<td>$\frac{177}{3}$</td>
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<tbody>
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<td>f. $591 \div 5$</td>
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</tr>
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**Lesson 28 Problem Set**

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<tr>
<td>g. (275 \div 3)</td>
<td>h. (459 \div 5)</td>
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</tbody>
</table>
| \[
\begin{array}{c}
3 \overline{) 275} \\
-27 \\
\hline
5 \\
-3 \\
\hline
2
\end{array}
\] | \[
\begin{array}{c}
5 \overline{) 459} \\
-45 \\
\hline
49 \\
-45 \\
\hline
4
\end{array}
\] |
| \(Q = 91\) | \(Q = 91\) |
| \(R = 2\) | \(R = 4\) |

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<tr>
<td>i. (678 \div 4)</td>
<td>j. (955 \div 4)</td>
<td></td>
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</tbody>
</table>
| \[
\begin{array}{c}
4 \overline{) 678} \\
-4 \\
\hline
27 \\
-24 \\
\hline
38 \\
-36 \\
\hline
2
\end{array}
\] | \[
\begin{array}{c}
4 \overline{) 955} \\
-8 \\
\hline
15 \\
-12 \\
\hline
35 \\
-32 \\
\hline
3
\end{array}
\] |
| \(Q = 169\) | \(Q = 238\) |
| \(R = 2\) | \(R = 3\) |

2. Zach filled 581 one-liter bottles with apple cider. He distributed the bottles evenly to 4 stores. How many liter bottles did each of the stores receive? Were there any bottles left over? If so, how many?

Each of the stores received 145 liter bottles. There was 1 bottle remaining.
1. Divide, then check using multiplication.

   a. \[1,672 \div 4\]
      \[
      \begin{array}{c}
      \underline{4}\ \\
      1,672 \\
      \underline{1,600} \\
      \underline{72} \\
      \underline{72} \\
      0
      \end{array}
      \]
      \[\frac{418}{1672} = \frac{1}{4}\]

   b. \[1,578 \div 4\]
      \[
      \begin{array}{c}
      \underline{4}\ \\
      1,578 \\
      \underline{1,200} \\
      \underline{378} \\
      \underline{360} \\
      \underline{18} \\
      \underline{18} \\
      0
      \end{array}
      \]
      \[\frac{394}{1576} = \frac{1}{4}\]

   c. \[6,948 \div 2\]
      \[
      \begin{array}{c}
      \underline{2}\ \\
      6,948 \\
      \underline{6000} \\
      \underline{948} \\
      \underline{948} \\
      0
      \end{array}
      \]
      \[\frac{3474}{6948} = \frac{2}{2}\]

   d. \[8,949 \div 4\]
      \[
      \begin{array}{c}
      \underline{4}\ \\
      8,949 \\
      \underline{8000} \\
      \underline{949} \\
      \underline{8948} \\
      \underline{8948} \\
      0
      \end{array}
      \]
      \[\frac{2237}{8949} = \frac{1}{4}\]

   e. \[7,569 \div 2\]
      \[
      \begin{array}{c}
      \underline{2}\ \\
      7,569 \\
      \underline{6000} \\
      \underline{1569} \\
      \underline{1569} \\
      \underline{0}
      \end{array}
      \]
      \[\frac{3784}{7569} = \frac{1}{2}\]

   f. \[7,569 \div 3\]
      \[
      \begin{array}{c}
      \underline{3}\ \\
      7,569 \\
      \underline{6000} \\
      \underline{1569} \\
      \underline{1569} \\
      \underline{0}
      \end{array}
      \]
      \[\frac{2523}{7569} = \frac{1}{3}\]
2. There are twice as many cows as goats on a farm. All the cows and goats have a total of 1,116 legs. How many goats are there?

\[
x \times 279 = 1,116
\]

\[
\begin{array}{c}
4 \sqrt{1,116} \\
-8 \\
\hline
31 \\
-28 \\
\hline
36 \\
-36 \\
\hline
0
\end{array}
\]

There are 93 goats.
1. Divide, then check using multiplication.

a. \[1,672 \div 4 = 418 \quad \text{Q} = 418 \quad \text{R} = 0\]

\[\begin{array}{c}
4 \quad 1 \quad 8 \\
\hline
1,672 \\
-1,6 \quad 0 \\
\hline
72 \\
-7 \quad 2 \\
\hline
0 \\
\end{array}\]

\[\frac{72}{0} \checkmark\]

b. \[1,578 \div 4 = 394 \quad \text{Q} = 394 \quad \text{R} = 2\]

\[\begin{array}{c}
3 \quad 9 \quad 4 \\
\hline
1,578 \\
-1,2 \quad 0 \\
\hline
37 \\
-3 \quad 6 \\
\hline
18 \\
-1 \quad 6 \\
\hline
2 \\
\end{array}\]

\[\frac{18}{2} \checkmark\]

c. \[6,948 \div 2 = 3,474 \quad \text{Q} = 3,474 \quad \text{R} = 0\]

\[\begin{array}{c}
2 \quad 9 \quad 4 \\
\hline
6,948 \\
-6 \quad 0 \\
\hline
48 \\
-4 \quad 0 \\
\hline
8 \\
\end{array}\]

\[\frac{48}{8} \checkmark\]

d. \[8,949 \div 4 = 2,237 \quad \text{Q} = 2,237 \quad \text{R} = 1\]

\[\begin{array}{c}
2 \quad 2 \quad 3 \quad 7 \\
\hline
8,949 \\
-8 \quad 0 \\
\hline
49 \\
-4 \quad 1 \\
\hline
9 \\
-9 \quad 2 \\
\hline
1 \\
\end{array}\]

\[\frac{9}{1} \checkmark\]

e. \[7,569 \div 2 = 3,784 \quad \text{Q} = 3,784 \quad \text{R} = 1\]

\[\begin{array}{c}
3 \quad 7 \quad 8 \quad 4 \\
\hline
7,569 \\
-6 \quad 0 \\
\hline
15 \\
-1 \quad 4 \\
\hline
16 \\
-1 \quad 6 \\
\hline
0 \\
\end{array}\]

\[\frac{16}{0} \checkmark\]

f. \[7,569 \div 3 = 2,523 \quad \text{Q} = 2,523 \quad \text{R} = 0\]

\[\begin{array}{c}
3 \quad 2 \quad 5 \quad 2 \quad 3 \\
\hline
7,569 \\
-6 \quad 0 \\
\hline
15 \\
-1 \quad 5 \\
\hline
0 \\
\end{array}\]

\[\frac{0}{0} \checkmark\]
2. There are twice as many cows as goats on a farm. All the cows and goats have a total of 1,116 legs. How many goats are there?

\[
\begin{array}{c}
\text{cows} \\
\hline
2 \quad \quad \quad 279 \\
\hline
\text{goats} \\
\end{array}
\]

There are 93 goats.
Divide. Check your solutions by multiplying.

1. \(204 \div 4\)
   \[
   \begin{array}{c}
   51 \\
   \hline
   4 | 204 \\
   \hline
   \cdot 4 \\
   \hline
   04 \\
   - 4 \\
   \hline
   0
   \end{array}
   \]

2. \(704 \div 3\) \(234 \text{ R} 2\)
   \[
   \begin{array}{c}
   3 \sqrt{704} \\
   \hline
   \cdot 6 \\
   \hline
   6 \\
   - 9 \\
   \hline
   14 \\
   - 12 \\
   \hline
   2
   \end{array}
   \]

3. \(627 \div 3\) \(209 \text{ R} 1\)
   \[
   \begin{array}{c}
   3 \sqrt{627} \\
   \hline
   \cdot 6 \\
   \hline
   6 \\
   - 9 \\
   \hline
   14 \\
   - 12 \\
   \hline
   07 \\
   - 6 \\
   \hline
   1
   \end{array}
   \]

4. \(407 \div 2\)
   \[
   \begin{array}{c}
   203 \text{ R} 1 \\
   \hline
   \cdot 4 \\
   \hline
   00 \\
   - 0 \\
   \hline
   07 \\
   - 6 \\
   \hline
   1
   \end{array}
   \]

5. \(760 \div 4\)
   \[
   \begin{array}{c}
   190 \\
   \hline
   \cdot 4 \\
   \hline
   36 \\
   - 36 \\
   \hline
   0
   \end{array}
   \]

6. \(5,120 \div 4\)
   \[
   \begin{array}{c}
   1280 \\
   \hline
   \cdot 4 \\
   \hline
   12 \\
   - 12 \\
   \hline
   32 \\
   - 32 \\
   \hline
   0
   \end{array}
   \]

Solve division problems with a zero in the dividend or with a zero in the quotient.

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7. \(3,070 ÷ 5\)

\[
\begin{array}{r}
5 & 1 & 3 & 4 & 1 & R & 1 \\
\hline
\underline{5} & \underline{3} & 0 & 7 & 0 \\
\underline{3} & 0 & 7 & 0 & \quad \vline & - & 3 & 0 & \quad \vline & - & 2 & 0 & \quad \vline & - & 0 & \\
\end{array}
\]

9. \(8,313 ÷ 4\)

\[
\begin{array}{r}
4 & \underline{2} & 0 & 7 & 8 & R & 1 \\
\hline
\underline{4} & \underline{8} & 3 & 1 & 3 & \quad \vline & - & 8 & \quad \vline & - & 0 & \quad \vline & - & 3 & \quad \vline & - & 2 & \quad \vline & - & 3 & \\
\end{array}
\]

8. \(6,706 ÷ 5\)

\[
\begin{array}{r}
5 & 1 & 3 & 4 & 1 \quad \vline & - & 5 & \quad \vline & - & 2 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \\
\hline
1 & 7 & 1 & 5 & 0 & 6 & \quad \vline & - & 1 & \quad \vline & - & 2 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \\
\end{array}
\]

10. \(9,008 ÷ 3\)

\[
\begin{array}{r}
3 & \underline{3} & 0 & 0 & 2 & R & 2 \\
\hline
\underline{3} & \underline{9} & 0 & 0 & 8 \quad \vline & - & 9 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \quad \vline & - & 0 & \\
\end{array}
\]

11. a. Find the quotient and remainder for \(3,131 ÷ 3\).

\[
\begin{array}{r}
3 & \underline{1} & 0 & 4 & 3 \quad \vline & - & 6 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \\
\hline
1 & 0 & 4 & 3 & \quad \vline & - & 6 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \\
\end{array}
\]

b. How could you change the digit in the ones place of the whole so that there would be no remainder? Explain how you determined your answer.

something divisible by 3

\[\begin{array}{r}
1 & 6 & 4 & 3 \quad \vline & - & 6 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \quad \vline & - & 2 & \\
\hline
5 \quad \text{for} \quad 15
\end{array}\]

\[\begin{array}{r}
2 \quad \text{for} \quad 12
\end{array}\]
Divide. Check your solutions by multiplying.

1. \(204 \div 4\)
   \[
   \begin{array}{c|c|c}
   \text{hundreds} & \text{tens} & \text{ones} \\
   \hline
   & & 4 \\
   \hline
   & 5 & 1 \\
   \hline
   & 5 & 1 \\
   \hline
   & 0 & 4 \\
   \hline
   \end{array}
   \]
   \(Q = 51, \; R = 0\)

2. \(704 \div 3\)
   \[
   \begin{array}{c}
   234 \text{ R } 2 \\
   \hline
   3 | 704 \\
   \hline
   - 6 & 10 \\
   \hline
   14 \\
   \hline
   2 & 2 \\
   \hline
   \end{array}
   \]
   \(Q = 234, \; R = 2\)

3. \(627 \div 3\)
   \[
   \begin{array}{c}
   209 \\
   \hline
   3 | 627 \\
   \hline
   - 6 & 0 \\
   \hline
   27 \\
   \hline
   - 27 \\
   \hline
   0 \\
   \hline
   \end{array}
   \]
   \(Q = 209, \; R = 0\)

4. \(407 \div 2\)
   \[
   \begin{array}{c|c|c}
   \text{hundreds} & \text{tens} & \text{ones} \\
   \hline
   & 4 & 0 \\
   \hline
   \end{array}
   \]
   \(Q = 203, \; R = 1\)

5. \(760 \div 4\)
   \[
   \begin{array}{c}
   190 \\
   \hline
   4 | 760 \\
   \hline
   - 4 & 36 \\
   \hline
   36 \\
   \hline
   - 36 \\
   \hline
   0 \\
   \hline
   \end{array}
   \]
   \(Q = 190, \; R = 0\)

6. \(5120 \div 4\)
   \[
   \begin{array}{c}
   1280 \\
   \hline
   4 | 5120 \\
   \hline
   - 4 & 11 \\
   \hline
   32 \\
   \hline
   - 32 \\
   \hline
   0 \\
   \hline
   \end{array}
   \]
   \(Q = 1280, \; R = 0\)

Lesson 30: Solve division problems with a zero in the dividend or with a zero in the quotient.
7. $3,070 \div 5$

\[
\begin{array}{c|c}
5 & 3070 \\
\hline
2 & 614 \\
-1 & 614 \\
\hline
0 & 0 \\
\end{array}
\]

8. $6,706 \div 5$

\[
\begin{array}{c|c}
2 & 6706 \\
\hline
5 & 1341 \\
-1 & 1341 \\
\hline
0 & 6706 \\
\end{array}
\]

9. $8,313 \div 4$

\[
\begin{array}{c|c}
4 & 8313 \\
\hline
2 & 2078 \\
-1 & 2078 \\
\hline
0 & 8313 \\
\end{array}
\]

10. $9,008 \div 3$

\[
\begin{array}{c|c}
3 & 9008 \\
\hline
3 & 3002 \\
-0 & 3002 \\
\hline
0 & 9008 \\
\end{array}
\]

11. a. Find the quotient and remainder for $3,131 \div 3$.

\[
\begin{array}{c|c}
3 & 3131 \\
\hline
1 & 1043 \\
-0 & 1043 \\
\hline
0 & 3129 \\
\end{array}
\]

b. How could you change the digit in the ones place of the whole so that there would be no remainder?

Explain how you determined your answer. If I changed the digit in the ones place to a 2, there would be no remainder because the last step would be

$12 \div 3$ which has no remainder because $12 \div 3 = 4$. I could also change it to a 5 or 8 because $15 \div 3 = 5$ and $18 \div 3 = 6$. 

---

**Lesson 30: Problem Set**

Solve division problems with a zero in the dividend or with a zero in the quotient.

**Date:** 8/28/13

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This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
Draw a tape diagram and solve. The first two tape diagrams have been drawn for you. Identify if the group size or the number of groups is unknown.

1. Monique needs exactly 4 plates on each table for the banquet. If she has 312 plates, how many tables is she able to prepare?

   \[
   \begin{array}{c}
   \text{312} \\
   \hline
   \text{4} \\
   \text{...?...}
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{\( \phantom{0} \times 78 \)} \\
   \text{\( \phantom{0} \div 312 \)} \\
   \text{\( \phantom{0} -28 \)} \\
   \text{\( \phantom{0} \underline{\phantom{0} -28} \)} \\
   \text{\( \phantom{0} 32 \)} \\
   \text{\( \phantom{0} -32 \)} \\
   \text{\( \phantom{0} \underline{\phantom{0} -32} \)} \\
   \text{\( \phantom{0} 0 \)}
   \end{array}
   \]

   Monique is able to prepare 78 tables. The number of groups is unknown.

2. 2,365 books were donated to an elementary school. If 5 classrooms shared the books equally, how many books did each class receive?

   \[
   \begin{array}{c}
   \text{2,365} \\
   \hline
   \text{?}
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{\( \phantom{0} \times 473 \)} \\
   \text{\( \phantom{0} \div 2,365 \)} \\
   \text{\( \phantom{0} -20 \)} \\
   \text{\( \phantom{0} \underline{\phantom{0} -20} \)} \\
   \text{\( \phantom{0} 36 \)} \\
   \text{\( \phantom{0} -35 \)} \\
   \text{\( \phantom{0} \underline{\phantom{0} -35} \)} \\
   \text{\( \phantom{0} 15 \)} \\
   \text{\( \phantom{0} -15 \)} \\
   \text{\( \phantom{0} 0 \)}
   \end{array}
   \]

   Each class received 473 books. The group size is unknown.

3. If 1,503 kilograms of rice was packed in sacks weighing 3 kilograms each, how many sacks were packed?

   \[
   \begin{array}{c}
   \text{1,503} \\
   \hline
   \text{3} \\
   \text{...?...}
   \end{array}
   \]

   \[
   \begin{array}{c}
   \text{\( \phantom{0} \times 501 \)} \\
   \text{\( \phantom{0} \div 1,503 \)} \\
   \text{\( \phantom{0} -15 \)} \\
   \text{\( \phantom{0} \underline{\phantom{0} -15} \)} \\
   \text{\( \phantom{0} 00 \)} \\
   \text{\( \phantom{0} -00 \)} \\
   \text{\( \phantom{0} \underline{\phantom{0} -00} \)} \\
   \text{\( \phantom{0} 03 \)} \\
   \text{\( \phantom{0} -03 \)} \\
   \text{\( \phantom{0} 0 \)}
   \end{array}
   \]

   501 sacks were packed. The number of groups is unknown.
4. Rita made 5 batches of cookies. There were a total of 2,400 cookies. If there were the same number of cookies in each batch, how many cookies were in 4 batches?

5. Every day, Sarah drives the same distance to work and back home. If Sarah drove 3,000 miles in 5 days, how far did Sarah drive in 3 days?
Draw a tape diagram and solve. The first two tape diagrams have been drawn for you. Identify if the group size or the number of groups is unknown.

1. Monique needs exactly 4 plates on each table for the banquet. If she has 312 plates, how many tables is she able to prepare?

\[
\begin{array}{c}
312 \\
4 \quad \ldots?\ldots \\
\hline
78 \quad \frac{4}{1312} \\
-28 \\
\hline
32 \\
-32 \\
\hline
0
\end{array}
\]

Monique is able to prepare 78 tables.
The number of groups is unknown.

2. 2,365 books were donated to an elementary school. If 5 classrooms shared the books equally, how many books did each class receive?

\[
\begin{array}{c}
2365 \\
? \quad \ldots?\ldots \\
\hline
473 \quad \frac{5}{2365} \\
-20 \\
\hline
36 \\
-35 \\
\hline
15 \\
-15 \\
\hline
0
\end{array}
\]

Each class received 473 books.
The group size is unknown.

3. If 1,503 kilograms of rice was packed in sacks weighing 3 kilograms each, how many sacks were packed?

\[
\begin{array}{c}
1503 \\
3 \quad \ldots?\ldots \\
\hline
501 \quad \frac{3}{1503} \\
-15 \\
\hline
08 \\
-03 \\
\hline
0
\end{array}
\]

501 sacks were packed.
The number of groups is unknown.
misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation
to debrief the Problem Set and process the lesson.

You may choose to use any combination of the
questions below to lead the discussion.

- How and why are the tape diagrams in
Problems 1 and 2 different?
- Share your tape diagrams for Problem 3. What
led you to draw a tape diagram to solve for the
number of groups?
- For Problem 3, if our tape diagram shows the
whole divided into 3 equal groups instead,
would we get the wrong quotient?
- Compare your tape diagrams for Problem 2
and Problem 4. Describe how your tape
diagrams differ between one- and two- step
problems. If there are two unknowns, how do
you determine which one to solve first?
- If for Problem 5 the tape diagram was drawn
to show groups of 5, instead of 5 equal groups,
how might that lead to challenges when
solving the second part of the problem?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you
assess the students’ understanding of the concepts that were presented in the lesson today and plan more
effectively for future lessons. You may read the questions aloud to the students.
4. Rita made 5 batches of cookies. There were a total of 2,400 cookies. If there were the same number of cookies in each batch, how many cookies were in 4 batches?

\[
\begin{align*}
2,400 & \quad 480 \\
5 \sqrt{2,400} & \quad -20 \\
\quad & \quad 40 \\
\quad & \quad -40 \\
\quad & \quad 0 \\
\quad & \quad -0 \\
\quad & \quad 0
\end{align*}
\]

\[
\frac{3}{480} \times \frac{4}{1920}
\]

There were 1,920 cookies in 4 batches.

The group size is unknown.

5. Every day, Sarah drives the same distance to work and back home. If Sarah drove 1,005 miles in 5 days, how far did Sarah drive in 3 days?

\[
\begin{align*}
1,005 & \quad 201 \\
5 \sqrt{1,005} & \quad -10 \\
\quad & \quad 0 \\
\quad & \quad -0 \\
\quad & \quad 5 \\
\quad & \quad 0
\end{align*}
\]

\[
\frac{201}{3}
\]

Sarah drove 603 miles in 3 days.

The group size is unknown.
Solve the following problems. Draw tape diagrams to help you solve. If there is a remainder, shade in a small portion of the tape diagram to represent that portion of the whole.

1. A concert hall contains 8 sections of seats with the same number of seats in each section. If there are 248 seats, how many seats are in each section?

\[
\begin{array}{c}
248 \\
\underline{-24} \\
\hline
8 \\
\underline{-8} \\
\hline
0
\end{array}
\]

There are \( \frac{31}{8} \) seats in each section.

2. In one day, the bakery made 719 bagels. The bagels were divided into 9 equal shipments. A few bagels were left over and given to the baker. How many bagels did the baker get?

\[
\begin{array}{c}
719 \\
\underline{-63} \\
\hline
89 \\
\underline{-81} \\
\hline
8
\end{array}
\]

The baker got 8 bagels.

3. The sweet shop has 614 pieces of candy. They packed the candy into bags with 7 pieces in each bag. How many bags of candy did they fill? How many pieces of candy were left?

\[
\begin{array}{c}
614 \\
\underline{-56} \\
\hline
48 \\
\underline{-49} \\
\hline
5
\end{array}
\]

They filled 87 bags of candy. 5 pieces of candy were left.
4. There were 904 children signed up for the relay race. If there were 6 children on each team, how many teams were made? The remaining children served as referees. How many children served as referees?

\[ \begin{array}{c|c}
\hline
9 & 0 \ldots ? \ldots \\
\hline
6 & \text{remainder of 4} \\
\hline
\end{array} \]

\[ 150 \text{ teams were made} \]

\[ 4 \text{ children served as referees} \]

5. 1,188 kilograms of rice are divided into 7 sacks. How many kilograms of rice are in 6 sacks of rice? How many kilograms of rice remain?

\[ \begin{array}{c|c}
\hline
1 & 188 \\
\hline
7 & \text{remainder of 5} \\
\hline
\end{array} \]

\[ 169 \times 6 = 1,014 \]

There are 1,014 kg of rice in 6 sacks of rice. 5 kg of rice remain.
Solve the following problems. Draw tape diagrams to help you solve. If there is a remainder, shade in a small portion of the tape diagram to represent that portion of the whole.

1. A concert hall contains 8 sections of seats with the same number of seats in each section. If there are 248 seats, how many seats are in each section?

\[
\begin{array}{c}
\text{248} \\
\hline
\text{8} \quad \frac{31}{248} \\
\text{24} \\
\hline
\text{8} \quad \frac{08}{0}
\end{array}
\]

There are 31 seats in each section.

2. In one day, the bakery made 719 bagels. The bagels were divided into 9 equal shipments. A few bagels were left over and given to the baker. How many bagels did the baker get?

\[
\begin{array}{c}
\text{719} \\
\hline
\text{9} \quad \frac{79}{719} \\
\text{63} \\
\hline
\text{89} \quad \frac{81}{8}
\end{array}
\]

The baker got 8 bagels.

3. The sweet shop has 614 pieces of candy. They packed the candy into bags with 7 pieces in each bag. How many bags of candy did they fill? How many pieces of candy were left?

\[
\begin{array}{c}
\text{614} \\
\hline
\text{7} \quad \frac{87}{614} \\
\text{56} \\
\hline
\text{49} \quad \frac{5}{5}
\end{array}
\]

They filled 87 bags of candy. There were 5 pieces of candy left.
4. There were 904 children signed up for the relay race. If there were 6 children on each team, how many teams were made? The remaining children served as referees. How many children served as referees?

\[ \begin{array}{c}
904 \\
\underline{6 \times ? \ldots} \\
\hline
150 \text{ R4}
\end{array} \]

\[ \begin{array}{l}
904 \\
-6 \\
\hline
30 \\
-30 \\
\hline
0
\end{array} \]

There were 150 teams made. 4 children served as referees.

5. 1,188 kilograms of rice are divided into 7 sacks. How many kilograms of rice are in 6 sacks of rice? How many kilograms of rice remain?

\[ \begin{array}{c}
1,188 \text{ kg} \\
\underline{? \ldots} \\
\hline
169 \text{ R5}
\end{array} \]

\[ \begin{array}{l}
1188 \\
-7 \\
\hline
48 \\
-42 \\
\hline
66 \\
-63 \\
\hline
5
\end{array} \]

There are 1,014 kg of rice in 6 sacks. 5 kg of rice remain.
1. Ursula solved the following division problem by drawing an area model.

\[
\begin{array}{c|c|c}
100 & 100 & 20 \\
4 & 400 & 80 \quad 12
\end{array}
\]

a. What division problem did she solve? \[892 \div 4 = 223\]

b. Show a number bond to represent Ursula’s area model and represent the total length using the distributive property.

\[
(400 \div 4) + (400 \div 4) + (80 \div 4) + (12 \div 4)
\]

\[
= \frac{100}{4} + \frac{100}{4} + \frac{20}{4} + \frac{3}{4}
\]

2. a. Solve 960 \div 4 using the area model. There is no remainder in this problem.

\[
\begin{array}{c|c|c}
200 & 40 \\
4 & 800 & 160
\end{array}
\]

\[960 \div 4 = 240\]

b. Draw a number bond and use the long division algorithm to record your work from (a).

\[
\begin{array}{c|c|c|c|c}
960 & \\
800 & 160 \\
\frac{240}{4} & \frac{10}{8} & \frac{16}{16} & \frac{0}{0}
\end{array}
\]
3. a. Draw an area model to solve $774 \div 3$.

\[
\begin{array}{c|cc|c}
& 200 & 50 & 8 \\
3 & 600 & 150 & 24 \\
\hline
& 774 & 3 & 258
\end{array}
\]

b. Draw a number bond to represent this problem.

\[
\begin{array}{c}
774 \\
600 \\
150 \\
24
\end{array}
\]

\[
(600 \div 3) + (150 \div 3) + (24 \div 3)
\]

\[
= 200 + 50 + 8
\]

\[
= 258
\]

c. Record your work using the long division algorithm.

\[
\begin{array}{c|cc|c}
2 & 774 \\
\hline
3 & 774 \\
-6 & 6 \\
\hline
17 & \phantom{0} \\
-15 & \\
\hline
24 & \phantom{0} \\
-24 & \\
\hline
0 & \phantom{0}
\end{array}
\]

4. a. Draw an area model to solve $1,584 \div 2$.

\[
\begin{array}{c|cc|c}
& 700 & 90 & 2 \\
2 & 1,400 & 180 & 4 \\
\hline
& 1,584 & 2 & 792
\end{array}
\]

b. Draw a number bond to represent this problem.

\[
\begin{array}{c}
1,584 \\
1,400 \\
180 \\
4
\end{array}
\]

\[
(1,400 \div 2) + (180 \div 2) + (4 \div 2)
\]

\[
= 700 + 90 + 2
\]

\[
= 792
\]

c. Record your work using the long division algorithm.

\[
\begin{array}{c|cc|c}
2 & 1,584 \\
\hline
792 & 792 \\
14 & 14 \\
\hline
18 & 18 \\
-18 & \\
\hline
0 & 0
\end{array}
\]

\[
3. G. 9
\]
1. Ursula solved the following division problem by drawing an area model.

- What division problem did she solve? \(892 \div 4 = 223\)

- Show a number bond to represent Ursula's area model and represent the total length using the distributive property.

\[
\begin{align*}
892 & = 100 + 400 + 40 + 12 \\
& = (100 \div 4) + (400 \div 4) + (40 \div 4) + (12 \div 4) \\
& = 100 + 100 + 20 + 3 \\
& = 223
\end{align*}
\]

2. a. Solve \(960 \div 4\) using the area model. There is no remainder in this problem.

- Draw a number bond and use the long division algorithm to record your work from (a).

\[
\begin{align*}
960 & \div 4 \\
\hline
4 & 960 \\
- 8 & 880 \\
- 16 & 720 \\
- 16 & 560 \\
- 16 & 40 \\
\hline
& 0
\end{align*}
\]

\[
\begin{align*}
240 & \div 4 \\
\hline
4 & 240 \\
- 8 & 232 \\
- 16 & 216 \\
- 16 & 200 \\
\hline
& 0
\end{align*}
\]

\[
\begin{align*}
960 & = 200 + 160 \\
& = (200 \div 4) + (160 \div 4) \\
& = 200 + 40 \\
& = 240
\end{align*}
\]
3. a. Draw an area model to solve $774 \div 3$.

$$
\begin{array}{c|c|c|c|c|c|c}
& 200 & 50 & 8 \\
3 & 600 & 15 & 24 \\
\hline
\end{array}
$$

$774 \div 3 = 258$

b. Draw a number bond to represent this problem.

$$
\begin{array}{c}
\text{774} \\
\text{600} + \text{150} + \text{24} \\
\text{200} \div 3 + \text{50} \div 3 + \text{8} \div 3 \\
= 200 + 50 + 8 \\
= 258
\end{array}
$$

c. Record your work using the long division algorithm.

$$
\begin{array}{c|cccc}
\text{3} & \text{774} \\
\hline
\text{3}\text{17} \\
\text{-15} \\
\hline
\text{24} \\
\text{-24} \\
\hline
\text{0}
\end{array}
$$

4. a. Draw an area model to solve $1,584 \div 2$.

$$
\begin{array}{c|c|c|c|c|c|c}
& 700 & 90 & 2 \\
2 & 1400 & 18 & 4 \\
\hline
\end{array}
$$

$1,584 \div 2 = 792$

b. Draw a number bond to represent this problem.

$$
\begin{array}{c}
\text{1,584} \\
\text{1400} + \text{180} + \text{4} \\
\text{700} \div 2 + \text{90} \div 2 + \text{2} \div 2 \\
= 700 + 90 + 2 \\
= 792
\end{array}
$$

c. Record your work using the long division algorithm.

$$
\begin{array}{c|cccc}
\text{2}\text{1}\text{1} & \text{1584} \\
\hline
\text{-14} \\
\text{18} \\
\hline
\text{-18} \\
\text{04} \\
\hline
\text{0}
\end{array}
$$
1. Use the associative property to rewrite each expression. Solve using disks and then complete the number sentences.

a. $30 \times 24$

   $= \left( \frac{3}{10} \times 10 \right) \times 24$

   $= \frac{3}{10} \times (10 \times 24)$

   $= 720$

b. $40 \times 43$

   $= (4 \times 10) \times \frac{43}{10}$

   $= 4 \times (10 \times \frac{43}{10})$

   $= 1720$

c. $30 \times 37$

   $= (3 \times 10) \times \frac{37}{10}$

   $= 3 \times (10 \times \frac{37}{10})$

   $= 1110$
2. Use the associative property and number disks to solve.
   
   a. \[20 \times 27 = (2 \times 10) \times 27 = 2 \times (10 \times 27) = 540\]
   
   b. \[40 \times 31 = (4 \times 10) \times 31 = 4 \times (10 \times 31) = 1240\]

3. Use the associative property without number disks to solve.
   
   a. \[40 \times 34 = (4 \times 10) \times 34 = 4 \times (10 \times 34) = 1360\]
   
   b. \[50 \times 43 = (5 \times 10) \times 43 = 5 \times (10 \times 43) = 2150\]

4. Use the distributive property to solve the following problems. Distribute the second factor.
   
   a. \[40 \times 34 = (40 \times 30) + (40 \times 4) = 1200 + 160 = 1360\]
   
   b. \[60 \times 25 = (60 \times 20) + (60 \times 5) = 1200 + 300 = 1500\]
1. Use the associative property to rewrite each expression. Solve using disks and then complete the number sentences.

a. \(30 \times 24\)
   \[= (\frac{3}{10} \times 10) \times 24\]
   \[= \frac{3}{10} \times (10 \times 24)\]
   \[= 720\]

b. \(40 \times 43\)
   \[= (4 \times 10) \times 43\]
   \[= 4 \times (10 \times 43)\]
   \[= 1,720\]

c. \(30 \times 37\)
   \[= (3 \times \frac{10}{1}) \times 37\]
   \[= 3 \times (10 \times 37)\]
   \[= 1,110\]
2. Use the associative property and number disks to solve.
   a. \(20 \times 27\)
      \[= (2 \times 10) \times 27\]
      \[= 2 \times (10 \times 27)\]
      \[= 540\]
   b. \(40 \times 31\)
      \[= (4 \times 10) \times 31\]
      \[= 4 \times (10 \times 31)\]
      \[= 1,240\]

3. Use the associative property without number disks to solve.
   a. \(40 \times 34\)
      \[= (4 \times 10) \times 34\]
      \[= 4 \times (10 \times 34)\]
      \[= 1,360\]
   b. \(50 \times 43\)
      \[= (5 \times 10) \times 43\]
      \[= 5 \times (10 \times 43)\]
      \[= 2,150\]

4. Use the distributive property to solve the following problems. Distribute the second factor.
   a. \(40 \times 34\)
      \[= (40 \times 30) + (40 \times 4)\]
      \[= 1,200 + 160\]
      \[= 1,360\]
   b. \(60 \times 25\)
      \[= (60 \times 20) + (60 \times 5)\]
      \[= 1,200 + 300\]
      \[= 1,500\]
Use an area model to represent the following expressions. Then record the partial products and solve.

1. $20 \times 22$

   \[
   \begin{array}{ccc}
   & 20 & 2 \\
   20 & 20 \times 20 & 2 \times 2 \\
   20 & 2 \times 2 \times 2 & 2 \times 2 \\
   & 4 \text{ hundreds} & 40 \\
   & 400 & 40 \\
   \hline
   22 & 22 \\
   & 2 \times 20 \\
   & 40 \\
   & 400 \\
   \hline
   & 440 \\
   \end{array}
   \]

2. $50 \times 41$

   \[
   \begin{array}{ccc}
   & 40 & 1 \\
   50 & 50 \times 40 & 5 \times 1 \\
   50 & 5 \times 40 & 5 \times 1 \\
   & 20 \text{ hundreds} & 50 \\
   & 2000 & 50 \\
   \hline
   41 & 41 \\
   & 5 \times 50 \\
   & 50 \\
   & 2000 \\
   \hline
   & 2050 \\
   \end{array}
   \]

3. $60 \times 73$

   \[
   \begin{array}{ccc}
   & 70 & 3 \\
   60 & 60 \times 70 & 6 \times 3 \\
   60 & 6 \times 70 & 6 \times 3 \\
   & 42 \text{ hundreds} & 18 \text{ tens} \\
   & 4200 & 180 \\
   \hline
   73 & 73 \\
   & 6 \times 60 \\
   & 180 \\
   & 4200 \\
   \hline
   & 4380 \\
   \end{array}
   \]
Draw an area model to represent the following expressions. Then record the partial products vertically and solve.

4. $80 \times 32$

```
<table>
<thead>
<tr>
<th>80</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

800
160
2400
+2400
2560
```

5. $70 \times 54$

```
<table>
<thead>
<tr>
<th>54</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

280
3500
+3500
3780
```

Visualize the area model and solve the following products numerically.

6. $30 \times 68$

```
<table>
<thead>
<tr>
<th>68</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

240
1800
+2040
```

7. $60 \times 34$

```
<table>
<thead>
<tr>
<th>34</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
</tr>
</tbody>
</table>

240
1800
+2040
```

8. $40 \times 55$

```
<table>
<thead>
<tr>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
</tr>
</tbody>
</table>

200
2000
+2200
```

9. $80 \times 55$

```
<table>
<thead>
<tr>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
</tr>
</tbody>
</table>

400
4000
+4400
```

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Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
1. In each of the two models pictured below, write the expressions that determine the area of each of the four smaller rectangles.

   a. Using the distributive property, rewrite the area of the large rectangle as the sum of the areas of the four smaller rectangles. Express first in number form and then read in unit form.

   \[ 14 \times 12 = (4 \times \underline{2}) + (4 \times \underline{10}) + (10 \times \underline{2}) + (10 \times \underline{10}) \]

2. Use an area model to represent the following expressions. Record the partial products and solve.

   a. \[ 14 \times 22 \]
Draw an area model to represent the following expressions. Record the partial products vertically and solve.

3. \(25 \times 32\)

\[
\begin{array}{ccc|ccc}
5 & & & 30 & & 2 \\
& 150 & & & & 10 \\
20 & 600 & & & & 40 \\
\hline
\end{array}
\]

\[
32 \times 25 =
\begin{array}{ccc}
\hline
10 \\
150 \\
40 \\
\hline
800 \\
\end{array}
\]

4. \(35 \times 42\)

\[
\begin{array}{ccc|ccc}
5 & & & 40 & & 2 \\
& 200 & & & & 10 \\
30 & 1,200 & & & & 60 \\
\hline
\end{array}
\]

\[
42 \times 35 =
\begin{array}{ccc}
\hline
10 \\
200 \\
60 \\
\hline
1,470 \\
\end{array}
\]

Visualize the area model and solve the following numerically using four partial products. (You may sketch an area model if it helps.)

5. \(42 \times 11\)

\[
\begin{array}{c}
11 \\
\times 42 \\
\hline
2 \\
20 \\
40 \\
\hline
462 \\
\end{array}
\]

6. \(46 \times 11\)

\[
\begin{array}{c}
11 \\
\times 46 \\
\hline
6 \\
60 \\
40 \\
\hline
506 \\
\end{array}
\]
1. Solve $14 \times 12$ using 4 partial products and 2 partial products. Remember to think in terms of units as you solve. Write an expression to find the area of each smaller rectangle in the area model.

\[
\begin{array}{c}
12 \\
\times 14 \\
\hline
8 \\
40 \\
20 \\
\hline
100 \\
168
\end{array}
\]

\[
\begin{array}{c}
12 \\
\times 14 \\
\hline
48 \\
120 \\
\hline
168
\end{array}
\]

2. Solve $32 \times 43$ using 4 partial products and 2 partial products. Match each partial product to its area on the models. Remember to think in terms of units as you solve.

\[
\begin{array}{c}
43 \\
\times 32 \\
\hline
1290 \\
1376
\end{array}
\]

\[
\begin{array}{c}
43 \\
\times 32 \\
\hline
86 \\
1290 \\
\hline
1376
\end{array}
\]
3. Solve $57 \times 15$ using 2 partial products. Match each partial product to its rectangle on the area model.

\[
\begin{array}{c}
7 \\
\hline
7 \times 15 \\
\hline
50 \times 15 \\
\end{array}
\]

\[
\begin{array}{c}
15 \\
\hline
7 \times 57 \\
\hline
105 \\
\hline
+ 750 \\
\hline
855 \\
\end{array}
\]

\[
\begin{array}{c}
15 \\
\hline
1 \times 7 \\
\hline
105 \\
\hline
\times 50 \\
\hline
250 \\
\hline
500 \\
\hline
750 \\
\end{array}
\]

4. Solve the following using 2 partial products. Visualize the area model to help you.

a. $25 \times 46$

\[
\begin{array}{c}
25 \\
\hline
3 \times 46 \\
\hline
150 \\
\hline
6 \times 25 \\
\hline
150 \\
\hline
40 \times 25 \\
\hline
1000 \\
\hline
1,150 \\
\end{array}
\]

b. $18 \times 62$

\[
\begin{array}{c}
18 \\
\hline
4 \times 62 \\
\hline
36 \\
\hline
2 \times 18 \\
\hline
36 \\
\hline
60 \times 18 \\
\hline
1080 \\
\hline
1,116 \\
\end{array}
\]

c. $39 \times 46$

\[
\begin{array}{c}
39 \\
\hline
5 \times 46 \\
\hline
234 \\
\hline
6 \times 39 \\
\hline
1560 \\
\hline
40 \times 39 \\
\hline
1560 \\
\end{array}
\]

d. $78 \times 23$

\[
\begin{array}{c}
78 \\
\hline
3 \times 78 \\
\hline
234 \\
\hline
3 \times 78 \\
\hline
234 \\
\hline
78 \times 78 \\
\hline
1560 \\
\end{array}
\]

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1. Express \(23 \times 54\) as two partial products using the distributive property. Solve.

\[
\begin{array}{c|c}
3 & 54 \\
\hline
20 & 20 \times 54 \\
\end{array}
\]

\(23 \times 54 = (3 \text{ fifty-fours}) + (20 \text{ fifty-fours})\)

\[
\begin{array}{c|c|c}
54 & \times 3 & 162 \\
\hline
20 & \times 54 & 1080 \\
\hline
& & 1242
\end{array}
\]

2. Express \(46 \times 54\) as two partial products using the distributive property. Solve.

\[
\begin{array}{c|c}
6 & 54 \\
\hline
40 & 40 \times 54 \\
\end{array}
\]

\(46 \times 54 = (6 \text{ fifty-fours}) + (40 \text{ fifty-fours})\)

\[
\begin{array}{c|c|c}
54 & \times 46 & 324 \\
\hline
6 & \times 54 & 216 \\
\hline
& & 2484
\end{array}
\]

3. Express \(55 \times 47\) using two partial products using the distributive property. Solve.

\[
\begin{array}{c|c}
5 & 47 \\
\hline
50 & 50 \times 47 \\
\end{array}
\]

\(55 \times 47 = (5 \times 47) + (50 \times 47)\)

\[
\begin{array}{c|c|c}
47 & \times 5 & 235 \\
\hline
50 & \times 47 & 2350 \\
\hline
& & 2585
\end{array}
\]
4. Solve the following using 2 partial products.

\[
\begin{array}{c}
58 \\
\times \ 45 \\
\hline
290 \\
\hline
+ 2320 \\
\hline
2610 \\
\end{array}
\]

5. Solve using the multiplication algorithm.

\[
\begin{array}{c}
82 \\
\times \ 55 \\
\hline
410 \\
\hline
+ 4100 \\
\hline
4510 \\
\end{array}
\]

6. \[53 \times 63\]

\[
\begin{array}{c}
63 \\
\times \ 53 \\
\hline
189 \\
\hline
3150 \\
\hline
3339 \\
\end{array}
\]

7. \[84 \times 73\]

\[
\begin{array}{c}
73 \\
\times \ 84 \\
\hline
192 \\
\hline
5840 \\
\hline
6132 \\
\end{array}
\]