1. Estimate the quotient for the following problems. Round the divisor first.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>609 ÷ 21</td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>= 600 ÷ 20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 30</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>141 ÷ 73</td>
<td>e.</td>
</tr>
<tr>
<td></td>
<td>= 140 ÷ 70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 2</td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>656 ÷ 81</td>
<td>h.</td>
</tr>
<tr>
<td></td>
<td>= 640 ÷ 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 8</td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>311 ÷ 76</td>
<td>k.</td>
</tr>
<tr>
<td></td>
<td>= 320 ÷ 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 4</td>
<td></td>
</tr>
<tr>
<td>m.</td>
<td>525 ÷ 25</td>
<td>n.</td>
</tr>
<tr>
<td></td>
<td>= 600 ÷ 30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 20</td>
<td></td>
</tr>
</tbody>
</table>
2. A video game store has a budget of $825, and would like to purchase new video games. If each video game costs $41, estimate the total number of video games the store can purchase with its budget. Explain your thinking.

   budget: 825
   ÷ game: 41

   825 ÷ 800 = 800 ÷ 40 = 20
   41 ÷ 40 = 20

   The store can buy about 20 games.

3. Jackson estimated 637 ÷ 78 as 640 ÷ 80. He reasoned that 64 tens divided by 8 tens should be 8 tens. Is Jackson’s reasoning correct? If so, explain why. If not, explain a correct solution.

   637 ÷ 78 ≈ 640 ÷ 80 = 8

   Jackson seems correct. His rounding is close enough to get acceptable numbers.
1. Estimate the quotient for the following problems. The first one is done for you.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $821 \div 41$</td>
<td>b. $617 \div 23$</td>
<td>c. $821 \div 39$</td>
</tr>
<tr>
<td>$= 800 \div 40$</td>
<td>$= 600 \div 20$</td>
<td>$= 800 \div 40$</td>
</tr>
<tr>
<td>$= 20$</td>
<td>$= 30$</td>
<td>$= 40$</td>
</tr>
<tr>
<td>d. $482 \div 52$</td>
<td>e. $531 \div 48$</td>
<td>f. $141 \div 73$</td>
</tr>
<tr>
<td>$= 500 \div 50$</td>
<td>$= 500 \div 50$</td>
<td>$= 140 \div 70$</td>
</tr>
<tr>
<td>$= 10$</td>
<td>$= 10$</td>
<td>$= 2$</td>
</tr>
<tr>
<td>g. $476 \div 81$</td>
<td>h. $645 \div 69$</td>
<td>i. $599 \div 99$</td>
</tr>
<tr>
<td>$= 500 \div 100$</td>
<td>$= 700 \div 70$</td>
<td>$= 600 \div 100$</td>
</tr>
<tr>
<td>$= 5$</td>
<td>$= 10$</td>
<td>$= 6$</td>
</tr>
<tr>
<td>j. $301 \div 26$</td>
<td>k. $729 \div 81$</td>
<td>l. $636 \div 25$</td>
</tr>
<tr>
<td>$= 300 \div 30$</td>
<td>$= 800 \div 80$</td>
<td>$= 800 \div 30$</td>
</tr>
<tr>
<td>$= 10$</td>
<td>$= 10$</td>
<td>$= 20$</td>
</tr>
<tr>
<td>m. $835 \div 89$</td>
<td>n. $345 \div 72$</td>
<td>o. $559 \div 11$</td>
</tr>
<tr>
<td>$= 900 \div 90$</td>
<td>$= 360 \div 70$</td>
<td>$= 600 \div 10$</td>
</tr>
<tr>
<td>$= 10$</td>
<td>$= 5$</td>
<td>$= 6$</td>
</tr>
</tbody>
</table>
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<th>c. $821 \div 39$</th>
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<tr>
<td></td>
<td>$= 20$</td>
<td>$= 30$</td>
<td>$= 40$</td>
</tr>
<tr>
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<td>$482 \div 52$</td>
<td>$531 \div 48$</td>
<td>$141 \div 73$</td>
</tr>
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<td></td>
<td>$500 \div 50$</td>
<td>$500 \div 50$</td>
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<td>$= 10$</td>
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<td>$645 \div 69$</td>
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<td>$500 \div 100$</td>
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<td>$= 5$</td>
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<td>$729 \div 81$</td>
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<td></td>
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<td>$800 \div 80$</td>
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</tr>
<tr>
<td></td>
<td>$= 10$</td>
<td>$= 10$</td>
<td>$= 20$</td>
</tr>
<tr>
<td>m.</td>
<td>$835 \div 89$</td>
<td>$345 \div 72$</td>
<td>$559 \div 11$</td>
</tr>
<tr>
<td></td>
<td>$900 \div 90$</td>
<td>$350 \div 70$</td>
<td>$600 \div 10$</td>
</tr>
<tr>
<td></td>
<td>$= 10$</td>
<td>$= 5$</td>
<td>$= 6$</td>
</tr>
</tbody>
</table>
2. Mrs. Johnson spent $611 buying lunch for 78 students. If all the lunches cost the same, about how much did she spend on each lunch?

\[
\frac{611}{78} \approx \frac{640}{80} = 8
\]

She would spend about $8.00 per lunch.

3. An oil well produces 172 gallons of oil every day. A standard oil barrel holds 42 gallons of oil. About how many barrels of oil will the well produce in one day? Explain your thinking.

\[
\frac{172}{42} \times 160 \div 40 = 5
\]

Rounding down to 160 helps me to get an estimate closer to the exact quotient. 160 is closer than 200.
1. Estimate the quotients for the following problems. The first one is done for you.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>b.</td>
<td>c.</td>
</tr>
<tr>
<td>5,738 ÷ 21</td>
<td>2,659 ÷ 28</td>
<td>9,155 ÷ 34</td>
</tr>
<tr>
<td>= 6,000 ÷ 20</td>
<td>= 3,000 ÷ 30</td>
<td>= 9,000 ÷ 30</td>
</tr>
<tr>
<td>= 300</td>
<td>= 300</td>
<td>= 300</td>
</tr>
<tr>
<td>d.</td>
<td>e.</td>
<td>f.</td>
</tr>
<tr>
<td>1,463 ÷ 53</td>
<td>2,525 ÷ 64</td>
<td>2,271 ÷ 72</td>
</tr>
<tr>
<td>= 1,500 ÷ 50</td>
<td>= 3,000 ÷ 60</td>
<td>= 2,100 ÷ 70</td>
</tr>
<tr>
<td>= 300</td>
<td>= 500</td>
<td>= 300</td>
</tr>
<tr>
<td>g.</td>
<td>h.</td>
<td>i.</td>
</tr>
<tr>
<td>4,901 ÷ 75</td>
<td>8,515 ÷ 81</td>
<td>8,515 ÷ 89</td>
</tr>
<tr>
<td>= 5,000 ÷ 100</td>
<td>= 9,000 ÷ 100</td>
<td>= 9,000 ÷ 90</td>
</tr>
<tr>
<td>= 50</td>
<td>= 90</td>
<td>= 100</td>
</tr>
<tr>
<td>j.</td>
<td>k.</td>
<td>l.</td>
</tr>
<tr>
<td>3,925 ÷ 68</td>
<td>5,124 ÷ 81</td>
<td>4,945 ÷ 93</td>
</tr>
<tr>
<td>= 4,000 ÷ 100</td>
<td>= 5,000 ÷ 100</td>
<td>= 5,000 ÷ 100</td>
</tr>
<tr>
<td>= 40</td>
<td>= 50</td>
<td>= 50</td>
</tr>
<tr>
<td>m.</td>
<td>n.</td>
<td>o.</td>
</tr>
<tr>
<td>5,397 ÷ 94</td>
<td>6,918 ÷ 86</td>
<td>2,806 ÷ 15</td>
</tr>
<tr>
<td>= 6,000 ÷ 100</td>
<td>= 7,000 ÷ 100</td>
<td>= 3,000 ÷ 10</td>
</tr>
<tr>
<td>= 50</td>
<td>= 70</td>
<td>= 300</td>
</tr>
</tbody>
</table>
2. A swimming pool requires 672 ft² of floor space. The length of the swimming pool is 32 ft. Estimate the width of the swimming pool.

$$A = L \times W$$

$$672 \, \text{ft}^2 = 32 \, \text{ft} \times W$$

$$W \approx \frac{672}{32} \approx 21$$

The width would be 22 ft.

3. Janice bought 28 apps for her phone that, altogether, used 1,348 MB of space.
   a. If each app used the same amount of space, about how many MB of memory did each app use?

   Show how you estimated.

   $$\text{Apps} \quad 28$$
   $$\text{Space} \quad 1,348$$

   $$1,348 \div 28 \approx 48$$

   Each app uses 48 MB or about 50 MB

   b. If half of the apps were free and the other half were $1.99 each, about how much did she spend?

   50 apps
   $1.99 each

   $$\frac{50}{2} = 25$$
   $$25 \times 1.99 \approx 50 \times 2 = 60$$

   Janice would spend about $60.

4. A quart of paint covers about 85 square feet. About how many quarts would you need to cover a fence with an area of 3,817 square feet?

   $$\text{quart covers} \quad 85 \, \text{ft}^2$$
   $$\text{total area} \quad 3,817 \, \text{ft}^2$$

   $$3,817 \div 85 \approx 45 \div 5$$

   About 50 quarts are needed

5. Peggy has saved $9,215. If she is paid $45 an hour, about how many hours did she work?

   $$\text{Saved} \quad 9,215$$
   $$\text{paid} \quad 200$$

   $$\frac{9,215}{45} \approx 10,000 \div 50$$

   She worked about 200 hours.
1. Estimate the quotients for the following problems. The first one is done for you.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 8,328 ÷ 41</td>
<td>b. 2,109 ÷ 23</td>
<td>c. 8,215 ÷ 38</td>
</tr>
<tr>
<td>[ \approx 8,000 \div 40 ]</td>
<td>[ \approx 2,000 \div 20 ]</td>
<td>[ \approx 8,000 \div 40 ]</td>
</tr>
<tr>
<td>[ = 200 ]</td>
<td>[ = 100 ]</td>
<td>[ = 20 ]</td>
</tr>
</tbody>
</table>

| d. 3,861 ÷ 59  | e. 2,899 ÷ 66  | f. 5,576 ÷ 92 |
| \[ \approx 3,600 \div 60 \] | \[ \approx 8,000 \div 60 \] | \[ \approx 6,000 \div 100 \] |
| \[ = 60 \] | \[ = 50 \] | \[ = 60 \] |

| g. 5,086 ÷ 73  | h. 8,432 ÷ 81  | i. 9,032 ÷ 89 |
| \[ \approx 5,000 \div 100 \] | \[ \approx 9,000 \div 80 \] | \[ \approx 9,000 \div 90 \] |
| \[ = 50 \] | \[ = 100 \] | \[ = 100 \] |

| j. 2,759 ÷ 48  | k. 8,194 ÷ 91  | l. 4,368 ÷ 63 |
| \[ \approx 2,500 \div 50 \] | \[ \approx 9,000 \div 90 \] | \[ \approx 4,000 \div 60 \] |
| \[ = 50 \] | \[ = 100 \] | \[ = 70 \] |

| m. 6,537 ÷ 74  | n. 4,998 ÷ 48  | o. 6,106 ÷ 25 |
| \[ \approx 6,300 \div 70 \] | \[ \approx 5,000 \div 50 \] | \[ \approx 6,000 \div 30 \] |
| \[ = 90 \] | \[ = 100 \] | \[ = 200 \] |
2. 91 boxes of apples hold a total of 2,605 apples. Assuming each box has about the same number of apples, estimate the number of apples in each box.

\[
\begin{align*}
\text{boxes} & \quad 2,605 \div 91 \\
\text{total} & \quad \approx 3,000 \div 100 \\
\text{2,605} & \quad \approx 30
\end{align*}
\]

It would be 30 apples by box.

3. A wild tiger can eat up to 55 pounds of meat in a day. About how many days would it take for a tiger to eat the following prey?

<table>
<thead>
<tr>
<th>Prey</th>
<th>Weight of Prey</th>
<th>Number of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eland Antelope</td>
<td>1,754 pounds</td>
<td>34</td>
</tr>
<tr>
<td>Boar</td>
<td>661 pounds</td>
<td>13</td>
</tr>
<tr>
<td>Chital Deer</td>
<td>183 pounds</td>
<td>4</td>
</tr>
<tr>
<td>Water Buffalo</td>
<td>2,322 pounds</td>
<td>46</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
1,754 \div 55 & \approx 170 \div 50 \approx 34 \\
661 \div 55 & \approx 65 \div 50 \approx 13 \\
183 \div 55 & \approx 200 \div 50 \approx 4 \\
2,322 \div 55 & \approx 2,300 \div 50 \approx 46
\end{align*}
\]
1. Divide, and then check. The first problem is done for you.

   a. \[41 \div 30\]
      
      \[
      \begin{array}{c}
      3 \\
      \hline
      41 \\
      -30 \\
      \hline
      11 \\
      \end{array}
      \]
      
      \[\text{Check:}\]
      
      \[30 \times 1 = 30\]
      
      \[30 + 11 = 41\]

   b. \[80 \div 30\]
      
      \[
      \begin{array}{c}
      30 \\
      \hline
      80 \\
      -60 \\
      \hline
      20 \\
      \end{array}
      \]
      
      \[\text{Check:}\]
      
      \[30 \times 2 = 60\]
      
      \[60 + 20 = 80\]

   c. \[71 \div 50\]
      
      \[
      \begin{array}{c}
      50 \\
      \hline
      71 \\
      -50 \\
      \hline
      21 \\
      \end{array}
      \]
      
      \[\text{Check:}\]
      
      \[50 \times 1 = 50\]
      
      \[50 + 21 = 71\]

   d. \[270 \div 30\]
      
      \[
      \begin{array}{c}
      30 \\
      \hline
      270 \\
      -270 \\
      \hline
      0 \\
      \end{array}
      \]
      
      \[\text{Check:}\]
      
      \[3 \times 9 = 270\]

   e. \[643 \div 80\]
      
      \[
      \begin{array}{c}
      80 \\
      \hline
      643 \\
      -640 \\
      \hline
      3 \\
      \end{array}
      \]
      
      \[\text{Check:}\]
      
      \[80 \times 8 = 640\]
      
      \[640 + 3 = 643\]

   f. \[215 \div 90\]
      
      \[
      \begin{array}{c}
      90 \\
      \hline
      215 \\
      -180 \\
      \hline
      35 \\
      \end{array}
      \]
      
      \[\text{Check:}\]
      
      \[90 \times 2 = 180\]
      
      \[180 + 35 = 215\]
2. Terry says the solution to $299 \div 40$ is 6 with a remainder of 59. His work is shown below. Explain Terry's error in thinking, and then find the correct quotient using the space on the right.

\[
\begin{array}{c}
4 & 0 & 2 & 9 & 9 \\
- & 2 & 4 & 0 \\
\hline
5 & 9 \\
\hline
\end{array}
\quad \quad \quad \quad \quad \quad \quad \quad
\begin{array}{c}
4 & 0 & 2 & 9 & 9 \\
7 & 2 & 8 & 0 \\
\hline
1 & 9 \\
\end{array}
\]

Terry has a remainder larger than the divisor. That is his mistake.

3. A number divided by 80 has a quotient of 7 with 4 as a remainder. Find the number.

\[
N \div 80 = 7 \text{ R } 4
\]

\[
\frac{80}{\text{X}} \times 7 + 4 = \frac{560}{564}
\]

The number is 564.

4. While swimming a 2 km race, Adam changes from breaststroke to butterfly every 200 m. How many times did he switch strokes during the first half of the race?

\[
\text{race} \quad 2000 \div 2 = 1000
\]

\[
\text{change every} \quad 1000 \div 200 = 5
\]

\[
\text{200 m} \quad \text{1st half of race}
\]

He changes strokes 5 times.
1. Divide, and then check using multiplication. The first one is done for you.
   a. \(71 \div 20\)
   
   \[
   \begin{array}{c|c c}
   \times & 3 & R 11 \\
   \hline
   20 & 7 & 1 \\
   \hline
   - & 6 & 0 \\
   \hline
   & 1 & 1 \\
   \end{array}
   \]
   \[
   20 \times 3 = 60 \\
   60 + 11 = 71 
   \]
   
   b. \(90 \div 40\)
   
   \[
   \begin{array}{c|c c}
   \times & 2 \\
   \hline
   40 & 9 \frac{10}{60} \\
   \hline
   \frac{10}{10} \\
   \end{array}
   \]
   \[
   40 \times 2 = 80 \\
   80 + 10 = 90 
   \]
   
   c. \(95 \div 60\)
   
   \[
   \begin{array}{c|c c}
   \times & 1 \\
   \hline
   60 & 1 \frac{95}{60} \\
   \hline
   \frac{35}{35} \\
   \end{array}
   \]
   \[
   60 \times 1 = 60 \\
   60 + 35 = 95 
   \]
   
   d. \(280 \div 30\)
   
   \[
   \begin{array}{c|c c}
   \times & 9 \\
   \hline
   30 & 28 \frac{10}{270} \\
   \hline
   \frac{10}{10} \\
   \end{array}
   \]
   \[
   30 \times 9 = 270 \\
   270 + 10 = 280 
   \]
   
   e. \(437 \div 60\)
   
   \[
   \begin{array}{c|c c}
   \times & 7 \\
   \hline
   60 & 43 \frac{7}{420} \\
   \hline
   \frac{17}{17} \\
   \end{array}
   \]
   \[
   60 \times 7 = 420 \\
   420 + 17 = 437 
   \]
   
   f. \(346 \div 80\)
   
   \[
   \begin{array}{c|c c}
   \times & 4 \\
   \hline
   80 & 34 \frac{6}{320} \\
   \hline
   \frac{26}{26} \\
   \end{array}
   \]
   \[
   80 \times 4 = 320 \\
   320 + 26 = 346 
   \]

Lesson 19: Divide two- and three-digit dividends by multiples of 10 with single-digit quotients and make connections to a written method.
2. A number divided by 40 has a quotient of 6 with a remainder of 16. Find the number.

\[ \frac{N}{40} = 6 \text{ R } 16 \]

\[ 40 \times 6 = 240 \]

\[ 240 + 16 = 256 \]

The number is 256.

3. A shipment of 288 reams of paper was delivered. Each of the 30 classrooms received an equal share of the paper. Any extra reams of paper were stored. After the paper was distributed to the classrooms, how many reams of paper were stored?

\[ \frac{288}{30} = \frac{9}{13} \]

There are 18 reams of paper stored.

4. How many groups of sixty are in two hundred forty-four?

\[ \frac{244}{60} = \frac{4}{4} \]

There are 4 groups of 60.
2. A number divided by 40 has a quotient of 6 with a remainder of 16. Find the number.

\[ \frac{N}{40} = 6 \text{ R } 16 \]

\[ 40 \times 6 = 240 \]

\[ 240 + 16 = 256 \]

The number is 256

3. A shipment of 288 reams of paper was delivered. Each of the 30 classrooms received an equal share of the paper. Any extra reams of paper were stored. After the paper was distributed to the classrooms, how many reams of paper were stored?

\[ \begin{array}{r}
\text{reams} \\
288 \\
\hline
\text{classrooms} \\
30 \\
\hline
\end{array} \]

\[ \begin{array}{r}
9 \times 30 \\
288 \\
\hline
18 \\
270 \\
\hline
\end{array} \]

There are 18 reams of paper stored

4. How many groups of sixty are in two hundred forty-four?

\[ \frac{244}{60} = 4 \text{ R } 4 \]

There are 4 groups of 60
1. Divide. Then, check with multiplication. The first one is done for you.
   a. \(65 \div 17\)  
      \[
      \begin{array}{c|c}
      3 & 14 \\
      - & \hspace{1cm} \\
      \hline
      17 & 51 \\
      - & 14 \\
      \hline
      14 & \\
      \end{array}
      \]
      \(17 \times 3 = 51\)
      \(51 + 14 = 65\)
      \(3 \text{ R } 14\)
   b. \(49 \div 21\)
      \[
      \begin{array}{c|c}
      2 & 7 \\
      2 & 49 \\
      \hline
      42 & \\
      \end{array}
      \]
      \(21 \times 2 = 42\)
      \(42 \div 7 = 6\)

   c. \(78 \div 39\)
      \[
      \begin{array}{c}
      2 \\
      \hline
      39 & 78 \\
      \hline
      0 & \hspace{1cm} \\
      \end{array}
      \]
      \(39 \times 2 = 78\)
   d. \(84 \div 32\)
      \[
      \begin{array}{c|c}
      2 & 4 \\
      3 & 84 \\
      \hline
      64 & \\
      \hline
      20 & \\
      \end{array}
      \]
      \(2 \times 32 = 64\)
      \(64 + 20 = 84\)

   e. \(77 \div 25\)
      \[
      \begin{array}{c}
      3 \\
      \hline
      25 & 77 \\
      \hline
      75 & \\
      \hline
      2 & \hspace{1cm} \\
      \end{array}
      \]
      \(25 \times 3 = 75\)
      \(75 \div 2 = 77\)
   f. \(68 \div 17\)
      \[
      \begin{array}{c}
      4 \\
      \hline
      17 & 68 \\
      \hline
      68 & \hspace{1cm} \\
      \end{array}
      \]
      \(17 \times 4 = 68\)
2. When dividing 82 by 43, Linda estimated the quotient to be 2. Examine Linda’s work, and explain what she needs to do next. On the right, show how you would solve the problem.

Linda’s estimation: [2]  
Linda’s work:  
Your work: 

<table>
<thead>
<tr>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
</tr>
<tr>
<td></td>
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<td>-</td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

Linda’s estimation is close. She just needs to correct its algorithm.

3. A number divided by 43 has a quotient of 3 with 28 as a remainder. Find the number. Show your work.

\[
\begin{align*}
N \div 43 &= 3 \text{ R } 28 \\
43 \times 3 &= 129 \\
431 &\div 157 \\
129 &+ 28 \\
28 &\end{align*}
\]

4. Write another division problem that has a quotient of 3 and a remainder of 28.

\[
\begin{align*}
D \div d &= 3 \text{ R } 28 \\
118 &\div 30 = 3 \text{ R } 28 \\
148 &\div 40 = 3 \text{ R } 28 \\
178 &\div 50 = 3 \text{ R } 28 \\
30 \times 3 &= 90 + 28 = 118 \\
40 \times 3 &= 120 + 28 = 148 \\
50 \times 3 &= 150 + 28 = 178 \\
\end{align*}
\]

5. Mrs. Silverstein sold 91 cupcakes at a food fair. The cupcakes were sold in boxes of “a baker’s dozen,” which is 13. She sold all the cupcakes at $15 per box. How much money did she receive?

\[
\begin{align*}
\text{13} \times 91 &= 1,183 \\
\text{3} \times 15 &= 45 \\
\text{91} \times 105 &= 9,605 \\
\text{She received } $105 \\
\end{align*}
\]
1. Divide. Then, check with multiplication. The first one is done for you.

   a. \( 72 \div 31 \)
   
   \[
   \begin{array}{c|c}
   31 & 72 \\
   \hline
   \hline
   2 & 10 \\
   \hline
   31 & 2 \\
   - & 62 \\
   \hline
   62 & 10 \\
   \hline
   \end{array}
   \]

   Check:
   
   \[
   31 \times 2 = 62 \\
   62 + 10 = 72
   \]

   b. \( 89 \div 21 \)
   
   \[
   \begin{array}{c|c}
   21 & 89 \\
   \hline
   \hline
   4 & 5 \\
   \hline
   84 & 4 \\
   \hline
   84 + 5 = 89
   \end{array}
   \]

   c. \( 94 \div 33 \)
   
   \[
   \begin{array}{c|c}
   33 & 94 \\
   \hline
   \hline
   2 & 28 \\
   \hline
   66 & 66 \\
   \hline
   66 + 28 = 94
   \end{array}
   \]

   d. \( 67 \div 19 \)
   
   \[
   \begin{array}{c|c}
   19 & 67 \\
   \hline
   \hline
   3 & 57 \\
   \hline
   57 + 10 = 67
   \end{array}
   \]

   e. \( 79 \div 25 \)
   
   \[
   \begin{array}{c|c}
   25 & 79 \\
   \hline
   \hline
   3 & 75 \\
   \hline
   75 + 4 = 79
   \end{array}
   \]

   f. \( 83 \div 21 \)
   
   \[
   \begin{array}{c|c}
   21 & 83 \\
   \hline
   \hline
   3 & 63 \\
   \hline
   63 + 20 = 83
   \end{array}
   \]
2. A 91 square foot bathroom has a length of 13 feet. What is the width of the bathroom?

\[ 91 \text{ ft}^2 \]
\[ L = 13 \text{ ft} \]

\[ A = L \times W \]
\[ 91 \text{ ft}^2 = 13 \text{ ft} \times ? \]

\[ W = \frac{91}{13} = 7 \text{ ft} \]

The width is 7 ft

3. While preparing for a morning conference, Principal Corsetti is laying out 8 dozen bagels on square plates. Each plate can hold 14 bagels.

a. How many plates of bagels will Mr. Corsetti have?

\[ 8 \text{ dozens} = 96 \text{ bagels} \]

\[ \text{a plate holds} \]
\[ 14 \text{ bagels} \]

\[ \frac{96}{14} = 6 \text{ full plates} \]
\[ 12 \text{ extra bagels} \]

Mr. Corsetti needs 7 plates

b. How many more bagels would be needed to fill the final plate with bagels?

\[ \frac{14}{2} = 7 \text{ extra bagels} \]

2 more bagels would complete another plate
1. Divide. Then, check using multiplication. The first one is done for you.
   a. \(258 \div 47\)
      \[
      \begin{array}{c|cc}
      \hline
      5 & 58 & \\
      \hline
      47 & 2 & 58 \\
      & 2 & 35 \\
      \hline
      & 2 & 3 \\
      \end{array}
      \]
      \[
      \begin{array}{c}
      \text{Check:} \\
      47 \times 5 = 235 \\
      235 + 23 = 258 \\
      \end{array}
      \]
   b. \(148 \div 67\)
      \[
      \begin{array}{c|c}
      \hline
      2 & 148 \\
      \hline
      67 & 134 \\
      \hline
      14 \\
      \end{array}
      \]
      \[
      \begin{array}{c}
      67 \times 2 = 134 \\
      134 + 14 = 148 \\
      \end{array}
      \]
   c. \(591 \div 73\)
      \[
      \begin{array}{c|c}
      \hline
      8 & 591 \\
      \hline
      73 & 584 \\
      \hline
      5 \\
      \end{array}
      \]
      \[
      \begin{array}{c}
      73 \times 8 = 584 \\
      584 + 7 = 591 \\
      \end{array}
      \]
   d. \(759 \div 94\)
      \[
      \begin{array}{c|c}
      \hline
      8 & 759 \\
      \hline
      94 & 752 \\
      \hline
      7 \\
      \end{array}
      \]
      \[
      \begin{array}{c}
      8 \times 9 = 752 \\
      752 + 7 = 759 \\
      \end{array}
      \]
   e. \(653 \div 74\)
      \[
      \begin{array}{c|c}
      \hline
      8 & 61 \\
      \hline
      74 & 592 \\
      \hline
      6 \\
      \end{array}
      \]
      \[
      \begin{array}{c}
      74 \times 8 = 592 \\
      592 + 61 = 653 \\
      \end{array}
      \]
   f. \(257 \div 36\)
      \[
      \begin{array}{c|c}
      \hline
      7 & 257 \\
      \hline
      36 & 252 \\
      \hline
      5 \\
      \end{array}
      \]
      \[
      \begin{array}{c}
      36 \times 7 = 252 \\
      252 + 5 = 257 \\
      \end{array}
      \]
2. Generate and solve at least one more division problem with the same quotient and remainder as the one below. Explain your thought process.

\[
\begin{array}{c}
8 \\
58 \\
\underline{-464} \\
\hline
11 \\
\end{array}
\quad \begin{array}{c}
8 \\
72 \\
\underline{-587} \\
\hline
11 \\
\end{array}
\]

\[(8 \times 72) + 11 = \]

\[
\overset{587}{8} + 11 = \]

3. Assume that Mrs. Giang's car travels 14 miles on each gallon of gas. If she travels to visit her niece who lives 133 miles away, how many gallons of gas will Mrs. Giang need to make the round trip?

14 miles per gallon

133 miles

Mrs. Giang needs 19 gallons

4. Louis brings 79 pencils to school. After he gives each of his 15 classmates an equal number of pencils, he will give any leftover pencils to his teacher.

a. How many pencils will Louis' teacher receive?

\[
\begin{array}{c}
79 \\
15 \\
\hline
5 \\
\end{array}
\]

Louis' teacher will receive 4 pencils

b. If Louis decides instead to take an equal share of the pencils along with his classmates, will his teacher receive more pencils or fewer pencils? Show your thinking.

\[
\begin{array}{c}
4 \\
16 \\
\hline
79 \\
\end{array}
\]

His teacher will receive 15 pencils
1. Divide. Then, check using multiplication. The first one is done for you.

   a. \( 129 \div 21 \)
   \[
   \begin{array}{c|cccc}
   & 1 & 2 & 9 \\
   \hline
   21 & 1 & 2 & 9 \\
   \hline
   & 1 & 2 & 6 \\
   \hline
   & 3 \\
   \end{array}
   \]
   
   \( \text{Check:} \)
   
   \( 21 \times 6 = 126 \)  
   \( 126 + 3 = 129 \)

   b. \( 158 \div 37 \)
   \[
   \begin{array}{c|cccc}
   & 4 & R & 10 \\
   \hline
   37 & 1 & 5 & 8 \\
   \hline
   & 1 & 4 & 8 \\
   \hline
   & 10 \\
   \end{array}
   \]
   
   \( 4 \times 37 = 148 \)  
   \( 148 + 10 = 158 \)

   c. \( 261 \div 49 \)
   \[
   \begin{array}{c|cccc}
   & 5 & R & 16 \\
   \hline
   49 & 2 & 6 & 1 \\
   \hline
   & 2 & 4 & 5 \\
   \hline
   & 16 \\
   \end{array}
   \]
   
   \( 5 \times 49 = 245 \)  
   \( 245 + 16 = 261 \)

   d. \( 574 \div 82 \)
   \[
   \begin{array}{c|cccc}
   & 7 \\
   \hline
   82 & 5 & 7 & 4 \\
   \hline
   & 5 & 7 & 4 \\
   \hline
   & 0 \\
   \end{array}
   \]
   
   \( 7 \times 82 = 574 \)

   e. \( 464 \div 58 \)
2. It takes Juwan exactly 35 minutes by car to get to his grandmother’s. The nearest parking area is a 4-minute walk from her apartment. One week, he realized that he spent 5 hours and 12 minutes traveling to her apartment, and then back home. How many round trips did he make to visit his grandmother?

\[
\begin{align*}
&35 \text{ minutes trip} \quad (35 \times 2) + (4 \times 2) \\
&4 \text{ minutes walk} \quad 78 + 8 \\
&5:12 \text{ total time a week} \\
&5:12 = 312 \text{ minutes} \\
\end{align*}
\]

Juwan made 4 trips

3. How many eighty-fours are in 672?

\[
\begin{align*}
&8 \div 84 \\
&84 \times 7 \quad 672 \\
&672 \\
\end{align*}
\]

There are 8 eighty-fours in 672.
1. Divide. Then, check using multiplication. The first one is done for you.
   a. \( \frac{580}{17} \)
      \[
      \begin{array}{c|c}
      \hline
      17 & 580 \\
      \hline
      -17 & 41 \\
      \hline
      70 & \\
      -68 & \\
      \hline
      2 & \\
      \end{array}
      \]
      Check:
      \[34 \times 17 = 578\]
      \[578 + 2 = 580\]
   b. \( \frac{730}{32} \)
      \[
      \begin{array}{c|c}
      \hline
      22 & 730 \\
      \hline
      -44 & 104 \\
      \hline
      64 & \\
      -64 & \\
      \hline
      0 & \\
      \end{array}
      \]
   c. \( \frac{940}{28} \)
      \[
      \begin{array}{c|c}
      \hline
      33 & 940 \\
      \hline
      -99 & 4 \\
      \hline
      3 & \\
      \end{array}
      \]
   d. \( \frac{553}{23} \)
      \[
      \begin{array}{c|c}
      \hline
      24 & 553 \\
      \hline
      -48 & 72 \\
      \hline
      1 & \\
      \end{array}
      \]
   e. \( \frac{704}{46} \)
      \[
      \begin{array}{c|c}
      \hline
      15 & 704 \\
      \hline
      -45 & 244 \\
      \hline
      23 & \\
      \end{array}
      \]

Lesson 22: Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotients, reasoning about the decomposition of successive remainders in each place value.
2. Halle solved $664 \div 48$ below. She got a quotient of 13 with a remainder of 40. How could she use her work below to solve $659 \div 48$ without redoing the work? Explain your thinking.

\[
\begin{array}{c|c c c}
& 6 & 6 & 4 \\
\hline
4 & 8 & 1 & 3 \\
- & 4 & 8 & 6 \\
\hline
1 & 8 & 4 \\
- & 1 & 4 & 4 \\
\hline
& 4 & 0
\end{array}
\]

Since $659$ is $5$ less than $664$.
The quotient is 13 and the remainder is 35.

3. 27 students are learning to make balloon animals. There are 172 balloons to be shared equally among the students.
   a. How many balloons are left over after sharing them equally?

\[
\begin{array}{c|c c c}
2 & 7 & 1 & 7 & 2 \\
\hline
1 & 6 & 2 \\
- & 1 & 0 & 0 \\
\hline
& 6 & 2
\end{array}
\]

There are 10 balloons left.

b. If each student needs 7 balloons, how many more balloons are needed? Explain how you know.

\[
\begin{array}{c c c}
2 & 7 & \times 7 = 1 & 8 & 9 \\
\hline
& 1 & 8 & 9 \\
- & 1 & 7 & 2 \\
\hline
& & & 1 & 7
\end{array}
\]

They need 17 more balloons.
1. Divide. Then, check using multiplication. The first one is done for you.

   a. \[ 487 \div 21 = 23 \text{ R } 4 \]

      \[ \begin{array}{c|cc} \hline 21 & 4 & 8 \ \\ \hline & 4 & 2 \\ 21 & 4 & 2 \\ \hline & 6 & 7 \\ \hline \end{array} \]

      \[ 21 \times 23 = 483 \]

      \[ 483 + 4 = 487 \]

   b. \[ 485 \div 15 = 32 \text{ R } 5 \]

      \[ \begin{array}{c|cc} \hline 15 & 3 & 2 \ \\ \hline & 4 & 8 \ \\ 4 & 8 & 5 \\ \hline & 3 & 0 \\ \hline \end{array} \]

      \[ 32 \times 15 = 480 \]

      \[ 480 + 5 = 485 \]

   c. \[ 700 \div 21 = 33 \text{ R } 7 \]

      \[ \begin{array}{c|cc} \hline 21 & 3 & 3 \ \\ \hline & 7 & 0 \ \\ 21 & 7 & 0 \ \\ \hline & 6 & 3 \ \\ \hline \end{array} \]

      \[ 33 \times 21 = 693 \]

      \[ 693 + 7 = 700 \]

   d. \[ 399 \div 31 = 12 \text{ R } 27 \]

      \[ \begin{array}{c|cc} \hline 31 & 1 & 2 \ \\ \hline & 3 & 9 \ \\ 3 & 9 & 9 \ \\ \hline & 8 & 9 \ \\ \hline \end{array} \]

      \[ 12 \times 31 = 372 \]

      \[ 372 + 27 = 399 \]

   e. \[ 820 \div 42 = 19 \text{ R } 22 \]

      \[ \begin{array}{c|cc} \hline 42 & 1 & 9 \ \\ \hline & 4 & 2 \ \\ 4 & 2 & 0 \ \\ \hline \end{array} \]

      \[ 42 \times 19 = 798 \]

      \[ 798 + 22 = 820 \]
2. When dividing 878 by 31, a student finds a quotient of 28 with a remainder of 11. Check the student’s work, and use the check to find the error in the solution.

\[
\begin{array}{c}
31 \longdiv{878} \\
62 \\
258 \\
248 \\
10 \\
\end{array}
\]

\[
\begin{array}{c}
28 \times 31 = 868 \\
868 + 11 = 879 \\
\end{array}
\]

\[
\begin{array}{c}
28 \times 31 = 868 \\
28 \\
248 \\
68 \\
\end{array}
\]

2. When dividing 878 by 31, a student finds a quotient of 28 with a remainder of 11. Check the student’s work, and use the check to find the error in the solution.

3. A baker was going to arrange 432 desserts into rows of 28. The baker divides 432 by 28 and gets a quotient of 15 with remainder 12. Explain what the quotient and remainder represent.

There are 15 rows of 28.
There are 12 desserts extra.
1. Divide. Then, check using multiplication.
   a. \[ \frac{4,859}{23} = \frac{211}{46} \times \frac{82}{22} + \frac{29}{6} = 4,859 \]
   b. \[ \frac{4,368}{52} = \frac{84}{416} \times \frac{52}{168} = 4,368 \]
   c. \[ \frac{7,242}{34} = \frac{213}{68} \times \frac{34}{7,242} = 7,242 \]
   d. \[ \frac{3,164}{45} = \frac{70}{315} \times \frac{45}{14} = 3,164 \]
   e. \[ \frac{9,152}{29} = \frac{315}{87} \times \frac{29}{162} = 9,152 \]
   f. \[ \frac{4,424}{63} = \frac{70}{441} \times \frac{63}{14} = 4,424 \]
2. Mr. Riley baked 1,692 chocolate cookies. He sold them in boxes of 36 cookies each. How much money did he collect if he sold them all at $8 per box?

\[
\begin{array}{r}
36 & 1692 \\
& 144 \\
\hline
& 252 \\
& 252 \\
\hline
& 0
\end{array}
\]

\[
\begin{array}{r}
47 & 5 \\
8 & 47 \\
\hline
& 376
\end{array}
\]

Mr. Riley collected $376.

3. 1,092 flowers are arranged into 26 vases, with the same number of flowers in each vase. How many flowers would be needed to fill 130 such vases?

\[
\begin{array}{r}
26 & 1092 \\
& 164 \\
\hline
& 52 \\
& 52 \\
\hline
& 0
\end{array}
\]

\[
\begin{array}{r}
42 & 130 \\
42 & 42 \\
\hline
& 260 \\
& 520 \\
\hline
& 5460
\end{array}
\]

They need 5,460 flowers.

4. The elephant’s water tank holds 2,560 gallons of water. After two weeks, the zookeeper measures and finds that the tank has 1,944 gallons of water left. If the elephant drinks the same amount of water each day, how many days will a full tank of water last?

\[
\begin{array}{r}
tank & 2,560 \\
after 2 weeks & 1,944 \\
\hline
616
\end{array}
\]

\[
\begin{array}{r}
2,560 & 44 \times 616 \\
& 56 \\
\hline
& 56 \\
& 56 \\
\hline
& 0
\end{array}
\]

The tank will last 58 days.
Lesson 23: Divide three- and four-digit dividends by two-digit divisors resulting in two- and three-digit quotients, reasoning about the decomposition of successive remainders in each place value.

1. Divide. Then, check using multiplication.

   a. \( 9,962 \div 41 \)
      \[
      \begin{array}{c|c}
        & \frac{242}{41} \\
        \hline
        9,962 & 9,682 \\
        \hline
        28 & 176 \\
        \hline
        22 & 122 \\
        \hline
        15 & 40
      \end{array}
      \]
      \[
      \begin{array}{c}
        62 \\
        15
      \end{array}
      \]

   b. \( 1,495 \div 45 \)
      \[
      \begin{array}{c|c}
        33 & \frac{45}{1495} \\
        \hline
        135 & 135 \\
        \hline
        0 & 10
      \end{array}
      \]
      \[
      \begin{array}{c}
        32 \\
        0
      \end{array}
      \]

   c. \( 6,691 \div 28 \)
      \[
      \begin{array}{c|c}
        238 & \frac{6691}{28} \\
        \hline
        1904 & 1904 \\
        \hline
        224 & 224 \\
        \hline
        27 & 27
      \end{array}
      \]
      \[
      \begin{array}{c}
        2391 \\
        0
      \end{array}
      \]

   d. \( 2,625 \div 32 \)
      \[
      \begin{array}{c|c}
        82 & \frac{2625}{32} \\
        \hline
        164 & 164 \\
        \hline
        24 & 24 \\
        \hline
        21 & 21
      \end{array}
      \]
      \[
      \begin{array}{c}
        2624 \\
        0
      \end{array}
      \]

   e. \( 2,409 \div 19 \)
      \[
      \begin{array}{c|c}
        126 & \frac{2409}{19} \\
        \hline
        1134 & 1134 \\
        \hline
        38 & 38 \\
        \hline
        14 & 14
      \end{array}
      \]
      \[
      \begin{array}{c}
        2409 \\
        0
      \end{array}
      \]

   f. \( 5,821 \div 62 \)
      \[
      \begin{array}{c|c}
        93 & \frac{5821}{62} \\
        \hline
        186 & 186 \\
        \hline
        55 & 55
      \end{array}
      \]
      \[
      \begin{array}{c}
        5766 \\
        0
      \end{array}
      \]
2. A political gathering in South America was attended by 7,910 people. Each of South America's 14 countries was equally represented. How many representatives attended from each country?

\[
\begin{array}{c}
565 \\
14 \overline{7,910} \\
70 \\
\hline
91 \\
84 \\
\hline
70 \\
70 \\
\hline
\end{array}
\]

Each country had 565 representatives.

3. A candy company packages caramel into containers that hold 32 fluid ounces. In the last batch, 1,848 fluid ounces of caramel were made. How many containers were needed for this batch?

\[
\begin{array}{c}
57 \\
32 \overline{1,848} \\
160 \\
\hline
248 \\
224 \\
\hline
24 \\
\end{array}
\]

The company needs 57 containers.
1. Divide. Show the division in the right-hand column in two steps. The first two have been done for you.
   
a. \(1.2 \div 6 = 0.2\)
   b. \(1.2 \div 60 = (1.2 \div 6) \div 10 = 0.2 \div 10 = 0.02\)
   
c. \(2.4 \div 4 = 0.6\)
   d. \(2.4 \div 40 = (2.4 \div 6) \div 10 = 0.6 \div 10 = 0.06\)
   
e. \(14.7 \div 7 = 2.1\)
   f. \(14.7 \div 70 = (14.7 \div 7) \div 10 = 2.1 \div 10 = 0.21\)
   
g. \(0.34 \div 2 = 0.17\)
   h. \(3.4 \div 20 = (3.4 \div 2) \div 10 = 1.7 \div 10 = 0.17\)
   
i. \(0.45 \div 9 = 0.05\)
   j. \(0.45 \div 90 = (0.45 \div 9) \div 10 = 0.05 \div 10 = 0.005\)
   
k. \(3.45 \div 3 = 1.15\)
   l. \(34.5 \div 300 = (34.5 \div 3) \div 100 = 11.5 \div 100 = 0.115\)
2. Use place value reasoning and the first quotient to compute the second quotient. Explain your thinking.
   a. $46.5 \div 5 = 9.3$
      $46.5 \div 50 = 0.93$
      $50 \text{ is } 5 \times 10$, so it goes from tenths to hundredths.
   b. $0.51 \div 3 = 0.17$
      $0.51 \div 30 = 0.017$
      $30 \text{ is } 3 \times 10$, so it goes from hundredths to thousandths.
   c. $29.4 \div 70 = 0.42$
      $29.4 \div 7 = 4.2$
      $7 \text{ is } 70 \div 10$, so it goes from hundredths to tenths.
   d. $13.6 \div 40 = 0.34$
      $13.6 \div 4 = 3.4$
      $4 \text{ is } 40 \div 10$, so it goes from hundredths to tenths.

3. Twenty polar bears live at the zoo. In four weeks, they eat 9,732.8 pounds of food altogether. Assuming each bear is fed the same amount of food, how much food is used to feed one bear for a week? Round your answer to the nearest pound.
   
   \[
   \begin{array}{c}
   486.6 \\
   \underline{2017} \\
   1328 \\
   \end{array}
   \]
   \[
   121.6 \approx 122
   \]
   Each bear eats 122 pounds a week.

4. The total weight of 30 bags of flour and 4 bags of sugar is 42.6 kg. If each bag of sugar weighs 0.75 kg, what is the weight of each bag of flour?
   
   \[
   \begin{array}{c}
   \text{sugar } 4 \times 0.75 \text{ kg} = 3 \text{ kg} \\
   42.6 \times 1.32 \\
   \end{array}
   \]
   Each bag weighs 1.22 kg.
1. Divide. Show every other division sentence in two steps. The first two have been done for you.

   a. \(1.8 \div 6 = 0.3\)
   b. \(1.8 \div 60 = (1.8 \div 6) \div 10 = 0.3 \div 10 = 0.03\)

   c. \(2.4 \div 8 = \_0 \cdot \_3\)
   d. \(2.4 \div 80 = \frac{2.4}{8} \div 10 = 0.3 \div 10 = 0.03\)

   e. \(14.6 \div 2 = \_7 \cdot \_3\)
   f. \(14.6 \div 20 = \frac{14.6}{2} \div 10 = 7.3 \div 10 = 0.73\)

   g. \(0.8 \div 4 = \_0 \cdot \_2\)
   h. \(80 \div 400 = \frac{80}{4} \div 100 = 20 \div 100 = 0.2\)

   i. \(0.56 \div 7 = \_0 \cdot \_08\)
   j. \(0.56 \div 70 = \frac{0.56}{7} \div 10 = 0.08 \div 10 = 0.08\)

   k. \(9.45 \div 9 = \_1 \cdot \_05\)
   l. \(9.45 \div 900 = \frac{9.45}{9} \div 100 = 1.05 \div 100 = 0.0105\)
1. Estimate the quotients.
   a. \(3.24 \div 82 = 3.2 \div 80 = 0.04\)
   b. \(361.2 \div 61 = 360 \div 60 = 6\)
   c. \(7.15 \div 31 = 7.2 \div 30 = 0.24\)
   d. \(85.2 \div 31 = 90 \div 30 = 3\)
   e. \(27.97 \div 28 = 28 \div 28 = 1\)

2. Estimate the quotient in (a). Use your estimated quotient to estimate (b) and (c).
   a. \(7.16 \div 36 = 7.2 \div 40 = 0.18\)
   b. \(716 \div 36 = 720 \div 40 = 18\)
   c. \(71.6 \div 36 \approx 72 \div 40 = 1.8\)
3. Edward bikes the same route to and from school each day. After 28 school days, he bikes a total distance of 389.2 miles.
   a. Estimate how many miles he bikes in one day.

   \[
   \frac{389.2}{28} \approx 13
   \]

   Edward bikes about 13 miles in one day.

   b. If Edward continues his routine of biking to school, about how many days altogether will it take him to reach a total distance of 500 miles?

   \[
   \frac{500}{13} \approx 38
   \]

   Edward will take about 38 days to reach 500 miles.

4. Xavier goes to the store with $40. He spends $38.60 on 13 bags of popcorn.
   a. About how much does one bag of popcorn cost?

   \[
   \frac{38.60}{13} \approx 3.0
   \]

   Each bag of popcorn cost about $3.90

   b. Does he have enough money for another bag? Use your estimate to explain your answer.

   \[
   \frac{40.00}{38.60} \approx 1.0
   \]

   Xavier does not have enough money. He needs $3.90 and only has $1.40 left.
1. Estimate the quotients.
   a. \(3.53 \div 51 = 0.07\)
   b. \(24.2 \div 42 = 0.6\)
   c. \(9.13 \div 23 = 0.5\)
   d. \(79.2 \div 39 = 2\)
   e. \(7.19 \div 58 = 0.12\)

2. Estimate the quotient in (a). Use your estimated quotient to estimate (b) and (c).
   a. \(9.13 \div 40 = 0.225\)
      \((9.1 \div 40) \div 10 = 0.225 \div 10\)
   b. \(9.13 \div 42 = 0.225\)
   c. \(9.13 \div 42 = 0.225\)
3. Mrs. Huynh bought a bag of 3 dozen toy animals as party favors for her son's birthday party. The bag of toy animals cost $28.97. Estimate the price of each toy animal.

\[
\begin{align*}
28.97 & \approx 30 \\
3 \text{ dozen} & \approx 40 \\
30 \div 40 & = 0.75
\end{align*}
\]

Each toy animal cost $0.75

4. Carter drank 15.75 gallons of water in 4 weeks. He drank the same amount of water each day.

a. Estimate how many gallons he drank in one day.

\[
\begin{align*}
15.75 & \approx 20 \\
4 \text{ weeks} & \approx 30 \\
20 \div 30 & = 0.66
\end{align*}
\]

b. Estimate how many gallons he drank in one week.

\[
\begin{align*}
0.66 \times 7 & = 4.62
\end{align*}
\]

He would drink about 4.6 gallons

c. About how many days altogether will it take him to drink 20 gallons?

\[
\begin{align*}
20 \div 0.66 & = 30.3 \approx 31
\end{align*}
\]

It would take about 31 days to drink 20 gallons
1. 156 + 24 and 102 + 15 both have a quotient of 6 and a remainder of 12.
   a. Are the division expressions equivalent to each other? Use your knowledge of decimal division to justify your answer.

\[
\begin{array}{c|c|c}
24 & 15 & 6.5 \\
\hline
144 & 180 & 6 \\
\hline
20 & 120 & \\
\hline
120 & & \\
\hline
20 & & \\
\end{array}
\]

No. They are not equivalent

b. Construct your own division problem with a two-digit divisor that has a quotient of 6 and a remainder of 12 but is not equivalent to the problems in 1(a).

\[
\begin{array}{c|c|c}
35 & 213 & 6.1 \\
\hline
210 & 210 & 6 \\
\hline
10 & 60 & \\
\hline
60 & & \\
\hline
20 & & \\
\end{array}
\]

2. Divide. Then, check your work with multiplication.
   a. 36.14 ÷ 13

\[
\begin{array}{c|c|c|c}
2 & 2 & 7.8 \\
\hline
2 & 6.5 \\
\hline
27 & 101 & 20 \\
\hline
20 & 91 & 0 \\
\hline
10 & & \\
\hline
10 & & 0 \\
\hline
0 & & \\
\end{array}
\]

2.78

b. 62.79 ÷ 23

\[
\begin{array}{c|c|c|c}
2 & 2.7.3 \\
\hline
2 & 6.79 \\
\hline
23 & 46 & 16 \\
\hline
46 & 16 & 0 \\
\hline
16 & & \\
\hline
16 & & 0 \\
\hline
0 & & \\
\end{array}
\]

2.73

c. 12.21 ÷ 11

\[
\begin{array}{c|c|c|c|c}
1 & 1.11 \\
\hline
1 & 1.11 \\
\hline
11 & 12.21 \\
\hline
11 & 12.21 \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\end{array}
\]

1.09

d. 6.89 ÷ 13

\[
\begin{array}{c|c|c|c|c}
0.53 & 13.53 \\
\hline
0.53 & 6.89 \\
\hline
5.3 & 3.9 \\
\hline
3.9 & 3.9 \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\end{array}
\]

0.53

e. 249.6 ÷ 52

\[
\begin{array}{c|c|c|c|c|c}
4.8 & 249.6 \\
\hline
4.8 & 208 \\
\hline
208 & 416 \\
\hline
416 & 416 \\
\hline
416 & 0 \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\end{array}
\]

4.8

f. 24.96 ÷ 52

\[
\begin{array}{c|c|c|c|c|c}
0.48 & 24.96 \\
\hline
0.48 & 20.8 \\
\hline
20.8 & 41.6 \\
\hline
41.6 & 0 \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\hline
0 & & \\
\end{array}
\]

0.48
3. The weight of 72 identical marbles is 183.6 grams. What is the weight of each marble? Explain how you know the decimal point of your quotient is placed reasonably.

\[
\begin{align*}
183.6 \div 72 &= 2.55 \\
180 \div 72 &= 2.5 \\
18 \div 7 &= \text{about } 2.5
\end{align*}
\]

4. Cameron wants to measure the length of his classroom using his foot as a length unit. His teacher tells him the length of the classroom is 23 meters. Cameron steps across the classroom heel to toe and finds that it takes him 92 steps. How long is Cameron’s foot in meters?

\[
\begin{align*}
23 \times 0.26 &= 6.026 \\
6.026 \div 92 &= 0.0652 \text{ (approx.)}
\end{align*}
\]

Cameroon’s foot is about 0.26 \(\text{m}\).

5. A blue rope is three times as long as a red rope. A green rope is 5 times as long as the blue rope. If the total length of the three ropes is 508.25 meters, what is the length of the blue rope?

\[
\begin{align*}
3x &= r \\
5x &= 5(3x) = 15x \\
15x + r &= 19r \\
&= 508.25
\end{align*}
\]

Blue is 50.25

Green is 401.25

\[
\begin{align*}
\text{Red} &= 26.75 \\
\text{Blue} &= 50.25 \\
\text{Green} &= 401.25
\end{align*}
\]

\[
\begin{align*}
\text{Red} &= 26.75 \times 1.5 = 40.125 \\
\text{Green} &= 401.25 \times 0.25 = 100.3125
\end{align*}
\]

\[
\begin{align*}
\text{Total} &= 508.25 \\
\text{Red} &= 26.75 \\
\text{Blue} &= 50.25 \\
\text{Green} &= 401.25
\end{align*}
\]
1. Create two whole number division problems that have a quotient of 9 and a remainder of 5. Justify which is greater using decimal division.

\[
\begin{align*}
(25 \times 9) + 5 & = 225 + 5 = 230 \\
225 + 5 & = 230 \\
(35 \times 9) + 5 & = 325 + 5 = 330 \\
325 + 5 & = 330 \\
\end{align*}
\]

2. Divide. Then, check your work with multiplication.
   a. \(75.9 \div 22\)
   
   \[
   \begin{array}{c}
   \phantom{0}3.45 \times 22 \\
   \hline
   75.90 \\
   66 \\
   9 \\
   \hline
   75.90 \\
   \end{array}
   \]
   
   b. \(97.28 \div 19\)
   
   \[
   \begin{array}{c}
   \phantom{0}5.12 \times 19 \\
   \hline
   97.28 \\
   95 \\
   22 \\
   \hline
   97.28 \\
   \end{array}
   \]
   
   c. \(77.14 \div 38\)
   
   \[
   \begin{array}{c}
   \phantom{0}2.03 \times 38 \\
   \hline
   77.14 \\
   76 \\
   114 \\
   \hline
   77.14 \\
   \end{array}
   \]
   
   d. \(12.18 \div 29\)
   
   \[
   \begin{array}{c}
   \phantom{0}0.42 \times 29 \\
   \hline
   12.18 \\
   29 \\
   116 \\
   \hline
   12.18 \\
   \end{array}
   \]

3. Divide.
   a. \(97.58 \div 3\)
   
   \[
   \begin{array}{c}
   \phantom{0}32.52 \times 3 \\
   \hline
   97.56 \\
   \hline
   97.58 \\
   \end{array}
   \]
   
   b. \(55.35 \div 45\)
   
   \[
   \begin{array}{c}
   \phantom{0}1.23 \times 45 \\
   \hline
   55.35 \\
   45 \\
   103 \\
   \hline
   55.35 \\
   \end{array}
   \]

Lesson 26: Divide decimal dividends by two-digit divisors, estimating quotients, reasoning about the placement of the decimal point, and making connections to a written method.
4. Use the equations on the left to solve the problems on the right. Explain how you decided where to place the decimal in the quotient.

a. \[520.3 \div 43 = 12.1\]
   \[520.3 \div 43 = \frac{121}{10}\]
   \[520.3 \text{ is ten times larger than } 52.03\]

b. \[19.08 \div 36 = 0.53\]
   \[190.8 \div 36 = \frac{53}{100}\]
   \[19.08 \text{ is ten times less than } 190.8\]

5. You can look up information on the world’s tallest buildings at [http://www.infoplease.com/ipa/A0001338.html](http://www.infoplease.com/ipa/A0001338.html).
   a. The Aon Centre in Chicago, Illinois, is one of the world’s tallest buildings. Built in 1973, it is 1,136 feet high and has 80 stories. If each story is of equal height, how tall is each story?
      \[1136 \div 80 = 14.2\text{ ft}\]
      Each story is 14.2 ft.

   b. Burj al Arab Hotel, another one of the world’s tallest buildings, was finished in 1999. Located in Dubai, it is 1,053 feet high with 60 stories. If each floor is the same height, how much taller or shorter is each floor than the height of the floors in the Aon Center?
      \[1053 \div 60 = 17.55\text{ ft}\]
      \[11053 \div 60 = 183.5\text{ ft}\]
      Burj al Arab Hotel is \[17.55 - 14.2 = 3.35\text{ ft}\] taller than the Aon Center.
1. Divide. Check your work with multiplication.
   a. \( \frac{35}{16} \)
   b. \( \frac{14}{21} \)
   c. \( \frac{24}{48} \)
   d. \( \frac{36}{24} \)
   e. \( \frac{81}{54} \)
   f. \( \frac{15}{6} \)
   g. \( \frac{5.4}{15} \)
   h. \( \frac{16.12}{52} \)
   i. \( \frac{2.8}{16} \)

2. 30.48 kg of beef was placed into 24 packages of equal weight. What is the weight of one package of beef?

\[ \frac{30.48}{24} \]
3. What is the length of a rectangle whose width is 17 inches and whose area is 582.25 in²?

\[
\begin{align*}
L \times W &= 582.25 \text{ in}^2 \\
L \times 17 &= 582.25 \\
L &= 34.25 \text{ in}
\end{align*}
\]

The length is 34.25 in.

4. A soccer coach spent $162 dollars on 24 pairs of socks for his players. How much did five pairs of socks cost?

\[
\begin{align*}
24 \text{ pairs} & \times \frac{162}{5} \text{ dollars} \\
&= 3675 \text{ dollars} \\
5 \text{ pairs} & \times \frac{3675}{180} \text{ dollars} \\
&= 33.75 \text{ dollars}
\end{align*}
\]

5 pairs cost $33.75.

5. A craft club makes 95 identical paperweights to sell. They collect $230.85 from selling all the paperweights. If the profit the club collects on each paperweight is two times as much as the cost to make each one, what does it cost the club to make each paperweight?

\[
\begin{align*}
\text{Paperweights} &= 95 \\
\text{collect} &= 230.85 \\
\text{Profit} &= 2 \times 0.81 = 1.62 \\
\frac{1}{3} \text{ of the cost} &= 2.85
\end{align*}
\]

The cost of each paperweight is $0.81.
1. Divide. Check your work with multiplication.

   a. \( \frac{7}{28} = \frac{1}{4} \)
   
   b. \( \frac{51}{25} = 2.04 \)
   
   c. \( \frac{6.5}{13} = 0.5 \)

   d. \( \frac{132.16}{16} = 8.26 \)
   
   e. \( \frac{561.68}{28} = 20.06 \)
   
   f. \( \frac{604.8}{36} = 16.8 \)

2. In a science class, students water a plant with the same amount of water each day for 28 consecutive days. If the students use a total of 23.8 liters of water over the 28 days, how many liters of water did they use each day? How many milliliters did they use each day?

   \[ \frac{23.8}{28} = 0.85 \]
   
   \[ 0.85 \text{ liters a day} \]
   
   or \[ 850 \text{ milliliters daily} \]
3. A seamstress has a piece of cloth that is 3 yards long. She cuts it into shorter lengths of 16 inches each. How many of the shorter pieces can she cut?

\[3 \text{ yards} = 3 \times 12 = 36 \text{ inches}\]

\[\frac{36}{16} = 2.25\]

She can cut 2 shorter pieces.

4. Jenny filled 12 pitchers with an equal amount of lemonade in each. The total amount of lemonade in the 12 pitchers was 41.4 liters. How many liters of lemonade would be in 7 pitchers?

\[\frac{41.4}{12} = 3.45\]

\[3.45 \times 7 = 24.15\]

7 pitchers hold 24.15 liters of lemonade.
1. Ava is saving for a new computer that costs $1,218. She has already saved half of the money. Ava earns $14.00 per hour. How many hours must Ava work in order to save the rest of the money?

Ava has to work 43.5 hours to save the rest of the money ($609).

2. Michael has a collection of 1,404 sports cards. He hopes to sell the collection in packs of 36 cards, and make $633.75 when all the packs are sold. If each pack is priced the same, how much should Michael charge per pack?

Michael should charge $16.25 per pack.
3. Jim Nasium is building a tree house for his two daughters. He cuts 12 pieces of wood from a board that is 128 inches long. He cuts 5 pieces that measure 15.75 inches each, and 7 pieces evenly cut from what is left. Jim calculates that, due to the width of his cutting blade, he will lose a total of 2 inches of wood after making all of the cuts. What is the length of each of the seven pieces?

\[
\begin{align*}
5 \times 15.75 \text{ inches} &= 78.75 \text{ in} \\
128 - 2 &= 126 \\
78.75 \div 7 &= 11.25 \\
7 \times 11.25 &= 78.75 \\
11.25 \times 5 &= 56.25 \\
56.25 - 78.75 &= -22.50 \\
\end{align*}
\]

Each of the 7 pieces is 11.25 inches long.

4. A load of bricks is twice as heavy as a load of sticks. The total weight of 4 loads of bricks and 4 loads of sticks is 771 kilograms. What is the total weight of 1 load of bricks and 3 loads of sticks?

\[
\begin{align*}
\text{sticks} &= 5 \\
\text{bricks} &= 2 \times 5 \\
4 \times 46 &= 771 \\
4 \times 85 &= 771 \\
125 &= 771 \\
\text{bricks} &= 2 \times 46 \\
2 \times 46 &= 92 \\
2 \times 85 &= 170 \\
85 &= 771 \\
\text{sticks} &= 5 \\
5 \times 46 &= 230 \\
5 \times 85 &= 425 \\
46 &= 771 \\
\end{align*}
\]

The weight of 1 load of bricks and 3 loads of sticks is 321.25 kg.
1. Mr. Rice needs to replace the 166.25 ft of edging on the flower beds in his backyard. The edging is sold in lengths of 19 ft each. How many lengths of edging will Mr. Rice need to purchase?

\[
\begin{array}{c}
\text{19} \\
\times 8.75 \\
\hline
95 \\
133 \\
142 \\
\hline
166.25
\end{array}
\]

Mr. Rice needs to purchase 9 lengths of edging.

2. Olivia is making granola bars. She will use 17.9 ounces of pistachios, 12.6 ounces of almonds, 12.5 ounces of walnuts, and 12.5 ounces of cashews. This amount makes 25 bars. How many ounces of nuts are in each granola bar?

\[
P = 17.9 \text{ ounces} \\
A = 12.6 \text{ ounces} \\
W = 12.5 \text{ ounces} \\
C = 12.5 \text{ ounces}
\]

\[
\begin{array}{c}
12 \\
17.9 \\
12.6 \\
55.5 \\
\hline
1.82 \\
25 \\
20.5 \\
56.0 \\
\hline
56.0
\end{array}
\]

There are 1.82 ounces of nuts in a granola bar.

3. Adam has 16.45 kg of flour, and he uses 6.4 kg to make hot cross buns. The remaining flour is exactly enough to make 15 batches of scones. How much flour, in kg, will be in each batch of scones?

\[
\begin{array}{c}
\text{flour} \ 16.45 \text{ kg} \\
\text{buns} \ 6.4 \text{ kg} \\
\hline
\text{flour for scones} \ 10.05 \text{ kg}
\end{array}
\]

\[
\begin{array}{c}
15 \times 0.67 \\
10.05 \\
9.0 \\
105 \\
\hline
0
\end{array}
\]

There would be 0.67 kg in each batch of scones.
4. There are 90 fifth grade students going on a field trip. Each student gives the teacher $9.25 to cover admission to the theater and for lunch. Admission for all of the students will cost $315, and each student will get an equal amount to spend on lunch. How much will each fifth grader get to spend on lunch?

\[
\begin{align*}
\text{5th graders} & \quad 2 \times 90 \quad 832.50 \\
90 \quad 90 \times 9.25 \quad 517.50 \\
\text{total} & \quad 450 \\
& \quad 675 \\
& \quad 90 \\
& \quad 450 \\
& \quad 0
\end{align*}
\]

Each student will get $5.75 to spend on lunch.

5. Ben is making math manipulatives to sell. He wants to make at least $450. Each manipulative costs $18 to make. He is selling them for $30 each. What is the minimum number he can sell to reach his goal?

\[
\begin{align*}
goal & \quad 30 - 18 = 12 \\
\text{cost} & \quad 450 \div 12 = \\
\$18 \text{ each} & \quad \frac{12}{38} \\
\text{sale price} & \quad \frac{450 \times 38}{90} \\
& \quad \frac{84}{60}
\end{align*}
\]

The minimum he can sell to earn $460 is 38.
Solve.

1. Lamar has 1,354.5 kilograms of potatoes to deliver equally to 18 stores. 12 of the stores are in the Bronx. How many kilograms of potatoes will be delivered to stores in the Bronx?

   \[
   \frac{1,354.5 \text{ Kg}}{18 \text{ stores}} \quad \frac{75.25 \times 12}{903.00}
   \]

   Lamar delivers 903 kg of potatoes to stores in the Bronx.

2. Valerie uses 12 fluid oz of detergent each week for her laundry. If there are 75 fluid oz of detergent in the bottle, in how many weeks will she need to buy a new bottle of detergent? Explain how you know.

   \[
   \frac{12 \text{ ounces}}{75 \text{ ounces per bottle}} \quad \frac{6.25 \times 12}{72}
   \]

   Valerie needs to buy a new bottle after 6 weeks. After that, she only has 0.25 ounces. She needs more.
3. The area of a rectangle is 56.96 m². If the length is 16 m, what is its perimeter?

\[
\begin{align*}
L \times w &= A \\
16 \times w &= 56.96 \\
\frac{3.56}{16} &= 56.96 \\
48 &= 8.9 \\
80 &= 9.6 \\
96 &= 9.6 \\
80 &= 0 \\

P &= 2 \times (L \times w) \\
P &= 2 \times (3.56 + 16) \\
P &= 2 \times 19.56 \\
P &= 39.12 \\

The perimeter is 39.12 m
\end{align*}
\]

4. A city block is 3 times as long as it is wide. If the distance around the block is 0.48 kilometers, what is the area of the block in square meters?

\[
\begin{align*}
L &= 3 \times w \\
2 \times (L + w) &= 0.48 \text{ Km} \\
2 \times (6 + 2) &= 0.48 \text{ Km} \\
14 &= 0.48 \text{ Km} = 480 \\
14 &= 0.48 \text{ Km} = 480 \\

w &= 30 \text{ m} \\
L &= 90 \text{ m} \\
A &= L \times w \\
A &= 90 \times 30 \\
A &= 2700 \text{ m}^2
\end{align*}
\]

The area of the block is 2700 m².
Solve.

1. Michelle wants to save $150 for a trip to the Six Flags amusement park. If she saves $12 each week, how many weeks will it take her to save enough money for the trip?

\[
12 \times 150 = 1800 \\
12 \\
30 \\
24 \\
60 \\
60 \\
0
\]

Michelle will take 13 weeks to save enough money.

2. Karen works for 85 hours throughout a two week period. She earns $1,891.25 throughout this period. How much does Karen earn for 8 hours of work?

\[
\frac{22.25 \times 8}{178.00}
\]

Karen earns $178 for 8 hours.

3. The area of a rectangle is 256.5 m². If the length is 18 m, what is the perimeter of the rectangle?

\[
A = l \times w \\
256.5 = 18 \times w \\
w = 14.025
\]

\[
P = 2(l+w) \\
P = 2(18+14.25) \\
P = 2 \times 32.25 \\
P = 64.50
\]

The perimeter is 64.50
4. Tyler baked 702 cookies. He sold them in boxes of 18. After selling all of the boxes of cookies for the same amount each, he earned $136.50. What was the cost of one box of cookies?

\[
\begin{align*}
\text{702 cookies} & \quad \text{boxes with 18} \\
\text{total sale: $136.50} & \quad \text{39} \\
\text{18} & \quad \text{702} \\
\text{54} & \quad \text{136.50} \\
\text{162} & \quad \text{117} \\
\text{162} & \quad \text{195} \\
\text{0} & \quad \text{195}
\end{align*}
\]

Each box cost $3.50

5. A park is 4 times as long as it is wide. If the distance around the park is 12.5 kilometers, what is the area of the park?

\[
\begin{align*}
P & = 2(L + W) \\
12.5 & = 2(4w + 1w) \\
12.5 & = 2(5w) \\
12.5 & = 10w \\
1.25 & = w \\
L & = 5
\end{align*}
\]

\[
\begin{align*}
P & = 12.5 \text{ Km} \\
A & = L \times w \\
A & = 5 \text{ Km} \times 1.25 \text{ Km} \\
A & = 6.25 \text{ Km}^2
\end{align*}
\]

The area of the park is 6.25 Km²

---

**Lesson 29: Solve division word problems involving multi-division with group size unknown and the number of groups unknown.**