2a  Multiplying and Dividing by 2

Complete each puzzle.

1. \[3 \times 2 \Rightarrow 6 \times 2 \Rightarrow \square\]
2. \[2 \times 2 \Rightarrow \square \times 2 \Rightarrow 8\]
3. \[\square \times 2 \Rightarrow \square \times 2 \Rightarrow 16\]

Make your own puzzle.

4. \[\square \times 2 \Rightarrow \square \times 2 \Rightarrow \square\]

2b  Multiplying and Dividing by 5 and 10

Solve.

1. \[5 \times 2 \Rightarrow \square \times 4 \Rightarrow \square \times 3 \Rightarrow \square \times 10\]
2. \[\square \times 5 \Rightarrow \square \times 9 \Rightarrow 70 \times 10\]
3. \[\square \times 4 \Rightarrow \square \times 9 \Rightarrow 40 \times 45\]
4. \[\square \times 5 \Rightarrow \square \times 15 \Rightarrow \square \times 25 \Rightarrow 35\]
2c  Multiplying by 1, 3, and 4

Example
You can use multiplication facts of 1 and 2 to find multiplication facts of 3.

\[
\begin{align*}
1 \times 2 &= 2 \\
2 \times 2 &= 4 \\
\text{So, } 3 \times 2 &= 6.
\end{align*}
\]

Solve.

\[
\begin{align*}
1 \times 3 &= \underline{\hspace{2cm}} \\
2 \times 3 &= \underline{\hspace{2cm}} \\
\text{So, } 3 \times 3 &= \underline{\hspace{2cm}}.
\end{align*}
\]

\[
\begin{align*}
1 \times 7 &= \underline{\hspace{2cm}} \\
2 \times 7 &= \underline{\hspace{2cm}} \\
\text{So, } 3 \times 7 &= \underline{\hspace{2cm}}.
\end{align*}
\]

\[
\begin{align*}
1 \times 9 &= \underline{\hspace{2cm}} \\
2 \times 9 &= \underline{\hspace{2cm}} \\
\text{So, } 3 \times 9 &= \underline{\hspace{2cm}}.
\end{align*}
\]

Example
You can double the 2 facts to find the facts of 4.

\[
\begin{align*}
2 \times 2 &= 4 \\
4 + 4 &= 8 \\
\text{So, } 4 \times 2 &= 8.
\end{align*}
\]

Solve.

\[
\begin{align*}
2 \times 4 &= \underline{\hspace{2cm}} \\
8 + 8 &= \underline{\hspace{2cm}} \\
\text{So, } 4 \times 4 &= \underline{\hspace{2cm}}.
\end{align*}
\]

\[
\begin{align*}
2 \times 8 &= \underline{\hspace{2cm}} \\
16 + 16 &= \underline{\hspace{2cm}} \\
\text{So, } 4 \times 8 &= \underline{\hspace{2cm}}.
\end{align*}
\]

\[
\begin{align*}
2 \times 6 &= \underline{\hspace{2cm}} \\
12 + 12 &= \underline{\hspace{2cm}} \\
\text{So, } 4 \times 6 &= \underline{\hspace{2cm}}.
\end{align*}
\]

Example
You can subtract the 1 facts from the 5 facts to find the facts of 4.

\[
\begin{align*}
5 \times 3 &= 15 \\
1 \times 3 &= 3 \\
\text{So, } 4 \times 3 &= 12.
\end{align*}
\]

\[
\begin{align*}
5 \times 5 &= \underline{\hspace{2cm}} \\
1 \times 5 &= \underline{\hspace{2cm}} \\
\text{So, } 4 \times 5 &= \underline{\hspace{2cm}}.
\end{align*}
\]

\[
\begin{align*}
5 \times 9 &= \underline{\hspace{2cm}} \\
1 \times 9 &= \underline{\hspace{2cm}} \\
\text{So, } 4 \times 9 &= \underline{\hspace{2cm}}.
\end{align*}
\]

\[
\begin{align*}
5 \times 7 &= \underline{\hspace{2cm}} \\
1 \times 7 &= \underline{\hspace{2cm}} \\
\text{So, } 4 \times 7 &= \underline{\hspace{2cm}}.
\end{align*}
\]
### Example

You can use multiplication facts of 1, 2, and 5 to find multiplication facts of 6 and 7.

\[
1 \times 2 = 2 \\
5 \times 2 = 10 \\
6 \times 2 = (1 \times 2) + (5 \times 2) \\
5 \times 2 = 10 \\
2 \times 2 = 4 \\
7 \times 2 = (5 \times 2) + (2 \times 2)
\]

---

#### Find the products.

1. 
   \[ 6 \times 4 = \quad 7 \times 4 = \quad 1 \times 4 = \quad 5 \times 4 = \quad 2 \times 4 = \]

2. 
   \[ 6 \times 7 = \quad 7 \times 7 = \quad 1 \times 7 = \quad 5 \times 7 = \quad 2 \times 7 = \]

3. Use the boxes in 2 to help you solve 13 \times 7 = \ldots.

   How did the boxes in 2 help you?
2e  Real-World Multiplication Problems

There are 3 middle schools in Washingtonville. Each school has 837 students and 65 teachers.

Solve. Show your work.

1. How many students are there in the 3 middle schools in all?

2. How many teachers are there in the 3 middle schools in all?

3. Each student in the 3 middle schools brings 5 books to school every day. How many books do all the students in the 3 middle schools bring to school every day?
2f Dividing Multi-Digit Numbers by 1-Digit Numbers

**Example**

48 ÷ 2 = 24

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Tens" /></td>
<td><img src="image2" alt="Ones" /></td>
</tr>
<tr>
<td><img src="image3" alt="Tens" /></td>
<td><img src="image4" alt="Ones" /></td>
</tr>
</tbody>
</table>

48 ÷ 2 means 48 divided into 2 equal groups.

**Complete each sentence.**

1. 36 ÷ 3 means 36 divided into ________ equal groups.
2. 84 ÷ 6 means ________ divided into ________ equal groups.
3. 100 ÷ 4 means ________ divided into ________ equal groups.
4. 3,603 ÷ 3 means ________ divided into ________ equal groups.

**Solve.**

5. 36 ÷ 3 = ________
6. 84 ÷ 6 = ________
7. 100 ÷ 4 = ________
8. 44 ÷ 4 = ________
9. 90 ÷ 3 = ________
10. 46 ÷ 2 = ________
2g  Multiplying by 8 and 9

You can use two methods to find multiplication facts of 8. Method 1: Double the fact of 4.

Facts of 8
1. $4 \times 4 = \underline{\phantom{00}}$  \hspace{1cm} $16 + 16 = \underline{\phantom{00}}$  \hspace{1cm} So, $8 \times 4 = \underline{\phantom{00}}$

Method 2: Use multiplication facts of 10 and then subtract multiplication facts of 2.

2. $10 \times 5 = \underline{\phantom{00}}$  \hspace{1cm} $2 \times 5 = \underline{\phantom{00}}$  \hspace{1cm} So, $8 \times 5 = \underline{\phantom{00}}$

Choose one method to solve.
3. $8 \times 7 = \underline{\phantom{00}}$  \hspace{1cm} 4. $8 \times 6 = \underline{\phantom{00}}$  \hspace{1cm} 5. $8 \times 3 = \underline{\phantom{00}}$

You can use multiplication facts of 10 and then subtract multiplication facts of 1 to find multiplication facts of 9.

Facts of 9
6. $10 \times 4 = \underline{\phantom{00}}$  \hspace{1cm} $1 \times 4 = \underline{\phantom{00}}$  \hspace{1cm} So, $9 \times 4 = \underline{\phantom{00}}$
7. $10 \times 8 = \underline{\phantom{00}}$  \hspace{1cm} $1 \times 8 = \underline{\phantom{00}}$  \hspace{1cm} So, $9 \times 8 = \underline{\phantom{00}}$
8. $10 \times 6 = \underline{\phantom{00}}$  \hspace{1cm} $1 \times 6 = \underline{\phantom{00}}$  \hspace{1cm} So, $9 \times 6 = \underline{\phantom{00}}$
2h Multiplication

Solve.

1. \[ 3 \times 4 = \_ \_ \_ \]

2. \[ 2 \times 9 = \_ \_ \_ \]

3. \[ 4 \times 6 = \_ \_ \_ \]

4. \[ 5 \times 8 = \_ \_ \_ \]

5. \[ 1 \times 7 = \_ \_ \_ \]

6. \[ 6 \times 9 = \_ \_ \_ \]

7. \[ 7 \times 7 = \_ \_ \_ \]

8. \[ 8 \times 2 = \_ \_ \_ \]

9. \[ 9 \times 7 = \_ \_ \_ \]

10. \[ 3 \times 8 = \_ \_ \_ \]

11. \[ 4 \times 5 = \_ \_ \_ \]

12. \[ 5 \times 2 = \_ \_ \_ \]

13. \[ 6 \times 7 = \_ \_ \_ \]

14. \[ 7 \times 8 = \_ \_ \_ \]

15. \[ 9 \times 4 = \_ \_ \_ \]

16. \[ 8 \times 6 = \_ \_ \_ \]

17. \[ 7 \times 3 = \_ \_ \_ \]

18. \[ 8 \times 9 = \_ \_ \_ \]

19. \[ 1 \times 9 = \_ \_ \_ \]

20. \[ 9 \times 2 = \_ \_ \_ \]

21. \[ 8 \times 3 = \_ \_ \_ \]

22. \[ 4 \times 9 = \_ \_ \_ \]

23. \[ 4 \times 3 = \_ \_ \_ \]

24. \[ 5 \times 6 = \_ \_ \_ \]
2i  Division

Solve.

1  16 ÷ 4 = __________  2  20 ÷ 5 = __________  3  30 ÷ 6 = __________  
4  21 ÷ 7 = __________  5  45 ÷ 5 = __________  6  40 ÷ 5 = __________  
7  12 ÷ 2 = __________  8  8 ÷ 4 = __________  9  18 ÷ 9 = __________  
10  64 ÷ 8 = __________  11  48 ÷ 8 = __________  12  9 ÷ 3 = __________  
13  36 ÷ 6 = __________  14  49 ÷ 7 = __________  15  14 ÷ 7 = __________  
16  42 ÷ 7 = __________  17  10 ÷ 2 = __________  18  81 ÷ 9 = __________

2j  Multiplying Multi-Digit Numbers Without Regrouping

Example

\[
\begin{array}{c|c|c}
\text{Hundreds} & \text{Tens} & \text{Ones} \\
\hline
312 & \begin{array}{c}
\text{Bars}
\end{array} & \begin{array}{c}
\text{Points}
\end{array} \\
936 & \begin{array}{c}
\text{Bars}
\end{array} & \begin{array}{c}
\text{Points}
\end{array} \\
\end{array}
\]

312 \times 3 shows 3 groups of 312.

That's 3 groups of 300, 3 groups of 10, and 3 groups of 2.
Draw , , , and ◯ in each table. Then, solve.

1. \(43 \times 2 = \) __________

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

2. \(122 \times 3 = \) __________

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solve.

3. \(\begin{array}{c}
4 \ 3 \ 4 \\
\times \ 2
\end{array}\)

4. \(\begin{array}{c}
3 \ 2 \ 1 \ 2 \\
\times \ 2
\end{array}\)
### 2k  Multiplying Multi-Digit Numbers with Regrouping

**Example**

\[
\begin{array}{c}
425 \\
\times 3 \\
\hline
1,275
\end{array}
\]

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

425 \times 3 shows 3 groups of 425.

That's 3 groups of 400, 3 groups of 20, and 3 groups of 5.

**Draw \ding{200} , \ding{202} , and \ding{203} in each table. Then, solve.**

1. \[35 \times 2 = \underline{70}\]

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. $244 \times 3 = \underline{\hspace{2cm}}$

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solve.

3. \[ 75 \times 3 \]

4. \[ 783 \times 4 \]

21. **Multiplying Multi-Digit Numbers with Regrouping**

Fill in the missing numbers.

1. \[ 502 \times 3 \]

2. \[ 5\underline{3} \times 4 \]

3. \[ 7,\underline{0}1 \times 6 \]

Solve.

4. \[ 98 \times 2 \]

5. \[ 423 \times 6 \]

6. \[ 7,678 \times 3 \]

7. \[ 10,340 \times 6 \]
2m  Multiplying and Dividing by 100

Multiply or divide by 100 to get the numbers on the opposite sides of the circle. Write the missing numbers.

1

\[
\begin{array}{cccc}
5 & 900 \\
700 & 100 \\
8 & 500 \\
\end{array}
\]

2  Write a rule for multiplying by 100.

2n  Dividing 2-Digit Numbers by 1-Digit Numbers

Solve.

1  \(4\div56\)  

2  \(2\div64\)

3  \(3\div69\)

4  \(5\div75\)
5  3)84

6  4)84

7  3)99

8  6)96

9  7)98

10  4)92
2o  Dividing 3-Digit Numbers by 1-Digit Numbers

Fill in the missing numbers. Use each digit only once in each problem.

0 1 2 3 4
5 6 7 8 9

1) 3) 2 9 4
   2
   2 4
   0

2) 4) 3 4 8
   2
   2 8
   0

3) 7) 6 4 4
   3
   1 4
   0

4) 8) 7 5 2
   2
   3
   0

5) 5) 2 1 5
   0
   5
   1
   0

6) 6) 5 8 8
   4
   8
   4 8
   0
2p  Real-World Multiplication and Division Problems

Veronica wants to make fruit salad for her class. The recipe makes 6 servings, but there are 24 students in her class.

**Fruit Salad**

**Ingredients:**
- 2 apples
- 3 peaches
- 5 kiwis
- 4 bananas
- 9 cherries
- 1 small melon

Makes 6 servings.

**Solve.**

How many of each type of fruit does Veronica need to make enough fruit salad so that every student can have a serving?

<table>
<thead>
<tr>
<th>Fruit Type</th>
<th>Quantity Per Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>__________</td>
</tr>
<tr>
<td>Bananas</td>
<td>__________</td>
</tr>
<tr>
<td>Peaches</td>
<td>__________</td>
</tr>
<tr>
<td>Cherries</td>
<td>__________</td>
</tr>
<tr>
<td>Kiwis</td>
<td>__________</td>
</tr>
<tr>
<td>Small melons</td>
<td>__________</td>
</tr>
</tbody>
</table>

2q  Real-World Multiplication and Division Problems

Pablo and Laura plan to mow lawns to earn money to buy art supplies for a project. They each earn $6 for every lawn they mow.

**Answer the following questions.**

1. Pablo needs to buy 2 easels.
   a. How much money does Pablo need to buy 2 easels? $__________
   b. How many lawns does he need to mow to have enough money? ________

2. Laura needs to buy 3 paintbrushes, 2 sets of pencils, and 2 pads of drawing paper.
   a. How much money does Laura need to buy these items? $__________
   b. How many lawns does she need to mow to have enough money? ________
2r  Multiplying and Dividing Multi-Digit Numbers Without Regrouping

Fill in the missing numbers.

1  \( \underline{0} \times 4 = 8 \)

2  \( \underline{3} \times 2 = \underline{6} \)

3  \( 1, \underline{9} \times 3 = \underline{27} \)

Solve.

4  \( 1,111 \times 4 = \underline{4,444} \)

5  \( 2,222 \times \underline{3} = 6,666 \)

6  \( 1,212 \times 3 = \underline{3,636} \)

7  \( 4,141 \times \underline{2} = 8,282 \)

2s  Real-World Division Problems

There are 60 cards in a box. Each card shows one of four animals. There are an equal number of cards with each animal.

Answer the following questions.

1  2 students share the cards equally. Write the division sentence below.
   How many cards does each student get?
   \( \underline{30} \div \underline{2} = \underline{15} \)

2  How many cards show a \( \text{Dog} \)? Write the division sentence below.
   \( \underline{15} \div \underline{3} = \underline{5} \)
3 Is it possible for two students to get an equal number of cards that show 8? Explain.

2t Real-World Division Problems
Audrey is moving to a new apartment. She needs to pack her 46 books in boxes. Each box can hold 12 books.

Answer the following questions.
1 How many boxes can Audrey fill with books? How many books will there be remaining? Draw a picture to explain your answer.

Complete the statements.
Audrey can fill ________ boxes with books.
There will be ________ books remaining.

2 How many boxes does Audrey need to pack all of her books?

3 Audrey's brother, Mason, has some boxes. Each box can hold 15 books. Mason says that Audrey will need fewer boxes if she uses his boxes. Is Mason correct? Explain.
2u Order of Operations

Match the problem on the left to the multiplication fact that gives the same answer on the right. The first one has been done for you.

1. \(5 \times 4 + 2 - 1\)  \(\rightarrow\) \(9 \times 3\)
2. \((12 \div 2) + (3 \times 4)\)  \(\rightarrow\) \(7 \times 3\)
3. \(81 \div 9 + 3 + 2\)  \(\rightarrow\) \(8 \times 3\)
4. \(8 \times 7 - 29\)  \(\rightarrow\) \(6 \times 3\)
5. \(6 \times 6 \div 3 \times 2\)  \(\rightarrow\) \(7 \times 2\)

2v Order of Operations

Write +, −, ×, or ÷ in the circle to make each number sentence true.

1. \(5 \bigcirc 3 \bigcirc 1 \bigcirc 5 = 19\)
2. \(72 \bigcirc 9 \bigcirc 8 = 16\)
3. \(4 \bigcirc 5 \bigcirc 20 \bigcirc 17 = 23\)
4. \(9 \bigcirc 1 \bigcirc 9 \bigcirc 3 = 27\)
5. \(10 \bigcirc 5 \bigcirc 2 \bigcirc 5 = 105\)
6. \(32 \bigcirc 8 \bigcirc 10 \bigcirc 4 = 10\)
7. \(100 \bigcirc 4 \bigcirc (100 \bigcirc 25) \bigcirc 3 \bigcirc 50 = 100\)

Make up a similar problem. Exchange your problem with a partner. Then, solve.

8. ____________________________

______________________________

______________________________

______________________________

______________________________