GRADERS 3-5

MATHEMATICS

Remote Learning Activities

Expect great things.

Pittsburgh Public Schools
3-5 Mathematics Remote Learning Activities

Below is a list of activities that students can work on during the unexpected closure of schools. Activities are designed to reinforce the learning already facilitated to students during the 2019-2020 Academic School Year. This Remote Learning Activity Packet was created for a minimum of fourteen (14) days of independent practice.

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Additional Online Resources through Clever
- Discovery Education (K-12)
- Edmentum (K-10)
- Everfi STEM Activities (2-12)
- ALEKS (6-12)
- S.O.S. Mathematics (9-12)
- HMH PMT (K-8)
- Math.com (K-12)

External Online Resources
- [https://www.coolmathgames.com/](https://www.coolmathgames.com/)
- [http://www.mathgametime.com/](http://www.mathgametime.com/)
- [https://www.khanacademy.org/](https://www.khanacademy.org/)
- [https://www.stmath.com/](https://www.stmath.com/)
- [https://www.stmath.com/coronavirus](https://www.stmath.com/coronavirus)
Dear PPS Families,

In addition to the print resources enclosed, below are directions to access our online programs to support you and your scholar at home. To access both sites through our single sign-on server, Clever, open your preferred internet browser and go to www.pghschools.org/studentresources.

Click on the “Launch Clever” button. Your child’s Username and Password follows the following format:
Username: st(first initial)(last name)#
Password: st(Student ID number) (Grades 3-5)
OR
Password: PPS(student’s grade level) (Grades K-2)

Student Resources
This year Pittsburgh Public Schools is using Clever as an easy way for your child to access all the learning applications they use at school in one location: the Clever Portal!

Students log on to Clever using their PPS username and password and then select one of their learning tools to launch the application.

Launch Clever

Use of the Google Chrome browser is required, and home-based users will be prompted to install the Clever extension the first time a student logs on from home. First time user? Watch our Clever video here!

Need help accessing your student’s login credentials? Call or email: 412-429-HELP (4357) | support@pghschools.org

ThinkCentral
ThinkCentral connects with your student’s daily math lesson. Each day in school, our teachers introduce the lesson using the ThinkCentral engaging video. You have access the same video. You can use this site to assist you and your scholar with homework or as a review of their learning each night.

Once in the app, select “My Library”, then locate and select “GoMath Interactive Student Edition, G__” Select the Chapter and Lesson from the bottom of the homework page.

Once in the video, you and your child will work through the lesson. There are opportunities to learn and demonstrate their understanding by answering questions.

Edmentum
Edmentum is the district’s math intervention program. Each student takes a math assessment three times per year. The assessment provides teachers with information about your scholar’s strengths and areas of need. Edmentum provides your child with the opportunity to address the areas of need.

Once in the app, select “Learning Path” along the left-hand side.

Once on this screen, listed along the top in the purple rectangles are skills that are identified needs for your child. Each skill has 3 components: Lesson, Practice, and Quiz. Encourage your child to complete one skill at a time. For each quiz, 80% is a passing score.
Tanner visits an animal shelter. There are 4 dogs. He brings 6 treats for each dog. How many treats does Tanner bring in all?

\[ 4 \times 6 = \square \]

There are different ways to find products.

<table>
<thead>
<tr>
<th>Make an array.</th>
<th>Use a multiplication table.</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------</td>
<td>-----------------------------</td>
</tr>
</tbody>
</table>

Find the total number of tiles.

\[ \square \text{ rows of } \square \text{ tiles} \]

\[ 4 \times 6 = \square \]

<table>
<thead>
<tr>
<th>Skip count using a number line.</th>
<th>Draw a picture. 4 groups of 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make 4 jumps of 6 starting at 0.</td>
<td></td>
</tr>
<tr>
<td>6, 12, _<em>, _</em>, __</td>
<td></td>
</tr>
<tr>
<td>[ 4 \times 6 = \square ]</td>
<td></td>
</tr>
</tbody>
</table>

So, Tanner brings \[ \square \] treats in all.

**REASONING** Conner made a \[ 3 \times 9 \] array. Faith made a \[ 4 \times 8 \] array. Who used more tiles? Explain your answer.
1. Malcolm volunteers at the animal shelter. There are 7 puppies. Each puppy gets 3 cups of food each day. How much puppy food does Malcolm need for one day?

   - How many puppies are there? ______
   - How many cups of food does each puppy get? ______ cups
   - Use the number line to skip count.
   - Start at 0. Draw 7 jumps of 3.

   

   0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

   ______, ______, ______, ______, ______, ______, ______

   7 \times 3 = ______

   So, Malcolm needs ______ cups of puppy food for one day.

Find the product.

2. $8 \times 3 = ______$
3. $2 \times 7 = ______$
4. ______ = $9 \times 5$
5. $8 \times 4 = ______$
6. $4 \times 9 = ______$
7. ______ = $8 \times 1$
8. ______ = $4 \times 4$
9. $6 \times 8 = ______$

10. Evan goes to the pet store to buy 2 toys for each of his 9 kittens. How many toys does Evan need to buy in all?

   ______ toys
Algebra • Describe Patterns

The table shows the number of candles in different numbers of packs. How many candles will be in 4 packs?

Describe a pattern in the columns.

Step 1 Look for a pattern by comparing the columns in the table. You can multiply the number of packs by 2 to find the number of candles in all.

<table>
<thead>
<tr>
<th>Packs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candles</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

1 \times 2 = 2

2 \times 2 = 4

3 \times 2 = 6

Multiply by 2 candles for each pack.

Step 2 Use the pattern to find the number of candles in 4 packs.

4 \times 2 = 8

So, there are 8 candles in 4 packs.

Describe a pattern for the table. Then complete the table.

1.

<table>
<thead>
<tr>
<th>Tricycles</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.

<table>
<thead>
<tr>
<th>Boxes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseballs</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Multistep Problems

Solve.

1. Keith bought 2 flats of strawberries. Each flat contains 8 baskets. If he gave away 4 baskets, how many baskets does Keith have left?

2. Tim’s friends gave him $15 for pizza. If he buys 3 pizzas for $7 each, how much more money does Tim need?

3. One bag contains 6 apples. Jeremy bought 5 bags of apples. If Jeremy gave away 5 apples, how many apples does he have left?

4. Greeting cards come in packages of 8 cards for $4. How many greeting cards can Sheila buy for $24?

5. Anna is having a party. She needs 15 invitations. The invitations come in packages of 7. How many packages of invitations does Anna need to buy?

6. Steve is decorating for a party. He wants to have 2 blue balloons and 1 yellow balloon in each corner of a square room. How many balloons does Steve need?

7. Write Math Explain how you solved Problem 2.
Algebra • Find Unknown Numbers

Lily has 20 stuffed animals. She wants to put the same number of stuffed animals on each of 5 shelves. How many stuffed animals will Lily put on each shelf?

Find the unknown number. \(5 \times c = 20\)

You can use counters to find the unknown number.

Step 1 Use 20 counters.

Step 2 Make 5 equal groups. Place 1 counter in each of the groups until you have placed all 20 counters.

Step 3 Count the number of counters in each group. 4 counters

So, Lily will put 4 stuffed animals on each of the 5 shelves.

Find the unknown number.

1. \(3 \times b = 24\)  
   \(b = \) 

2. \(n \times 7 = 21\)  
   \(n = \) 

3. \(36 = 4 \times z\)  
   \(z = \) 

4. \(7 \times s = s\)  
   \(s = \) 

5. \(r \times 5 = 45\)  
   \(r = \) 

6. \(\square \times 4 = 40\)  
   \(\square = \) 

7. \(p = 3 \times 4\)  
   \(p = \) 

8. \(m \times 6 = 42\)  
   \(m = \) 

9. \(6 \times h = 36\)  
   \(h = \) 

10. \(63 = 7 \times d\)  
    \(d = \) 

11. \(3 \times y = 6\)  
    \(y = \) 

12. \(32 = 4 \times \triangle\)  
    \(\triangle = \)
Factor Riddles

Solve the riddles.

1. I have 4 factors. Three of my factors are 1, 2, and 10. What is my fourth factor?

2. I have 4 factors. Three of my factors are 1, 2, and 6. What is my fourth factor?

3. I am the product 30. Two of my factors are 2 and 3. What are my other factors?

4. Our product is equal to $3 + 3 + 3$. What factors are we?

5. Our product is equal to $6 + 2$. What factors are we?

6. One of my factors is equal to $5 - 2$. I am the product 24. What are my other factors?

7. I am a 2-digit product. One of my digits is the same as one of my factors, 8. The other digit doubled is 8. What product am I?

8. My product can be written using repeated addition as $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5$. What are my factors?

9. **Write Math** Explain how you solved the riddle in Exercise 7.

10. **Stretch Your Thinking** Write your own riddle and solve it.
Problem Solving • Use the Distributive Property

There are 6 rows of singers in a performance. There are 20 singers in each row. How many singers are in the performance?

<table>
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<th>Solve the Problem</th>
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<tr>
<td>What do I need to find?</td>
<td>Record the steps you used to solve the problem.</td>
</tr>
<tr>
<td>I need to find how many singers are in the performance</td>
<td>6 + 10 + 10</td>
</tr>
<tr>
<td>What information do I need to use?</td>
<td>First, I draw and label a diagram to show 6 rows of 20 singers.</td>
</tr>
<tr>
<td>There are 6 rows of singers.</td>
<td>Next, I break apart 20 into 10 + 10 and find the products of the two smaller rectangles.</td>
</tr>
<tr>
<td>Each row has 20 singers.</td>
<td>6 × 10 = 60 6 × 10 = 60</td>
</tr>
<tr>
<td>How will I use the information?</td>
<td>Then, I find the sum of the two products.</td>
</tr>
<tr>
<td>I can draw a diagram and use the Distributive Property to break apart the factor 20 into 10 + 10 to use facts I know.</td>
<td>+ =</td>
</tr>
</tbody>
</table>

1. Eight teams play in a Little League series. Each team has 20 players. How many players are in the series?

2. The assembly room has 6 rows with 30 chairs in each row. If third graders fill 3 rows, how many third graders are in the room?
Apply the Distributive Property

Use the Distributive Property to help solve each problem.

Use this problem for 1–3.
An artist sells 4 paintings for $20 each, 4 sculptures for $60 each, and 4 photographs for $10 each at her art show.

1. How much money does the artist make on these sales in all?

2. The artist sells 2 more paintings and 4 more sculptures at the same prices. What is the total amount of money the artist has made so far?

3. How many more paintings, sculptures, and photographs would the artist need to sell to make another $500?

Use this problem for 4–6.
Lee has 6 sheets of stickers with 30 stickers on each sheet. She has 8 sheets with 20 stickers each and 9 sheets with 10 stickers each.

4. How many stickers does Lee have in all?

5. Lee gives 4 sheets with 20 stickers and 3 sheets with 10 stickers to her sister. How many stickers does Lee have left?

6. Now Lee gives some stickers to her friend Myla. What sheets does Lee give to Myla if she has 200 stickers left?

7. How did the Distributive Property help you solve the problems?
You can use place value to multiply with multiples of 10.

Find $5 \times 20$.

**Step 1** Use a multiplication fact you know.

Think: $5 \times 2 = 10$, so $5 \times 2$ ones = 10 ones

**Step 2** Use place value to find the product.

Think: $5 \times 2$ tens = 10 tens, or 100

So, $5 \times 20 = 100$.

You can also use a number line to multiply with multiples of 10.

Find $4 \times 30$.

Think: There are 4 groups of 30. Draw 4 jumps of 30.

So, $4 \times 30 = 120$.

Use place value to find the product.

1. $6 \times 40 = 6 \times \underline{____}$ tens
   
   $= \underline{____}$ tens $= \underline{____}$

2. $50 \times 7 = \underline{____}$ tens $\times 7$
   
   $= \underline{____}$ tens $= \underline{____}$

3. Use a number line to find the product. $3 \times 50 = \underline{____}$
Jump to the Product

Complete the model to find the unknown factor or factors. Then write a multiplication equation that represents the model.

1. The product is 80. One factor is 4.

The unknown factor is _______.

2. The product is 180. One factor is a multiple of 10.

The factors are _______ and _______.

3. Stretch Your Thinking The product is 200. Both factors are multiples of 10.

The factors are _______ and _______.

4. Write Math Look back at Exercise 2. If one factor is a multiple of 10, what other pairs of factors would give you a product of 180?
Learn the Math

Leah is making cookies. She has 4 equal groups with 5 cookies in each group. How many cookies does Leah make in all?

Example 1
Use counters to model the equal groups.

Skip count to find how many cookies Leah makes in all.

5, _____, _____, _____

There are _____ groups with _____ cookies in each group.

So, Leah makes _____ cookies in all.

Example 2
Use a number line to count equal groups.

Cameron has a rock collection. He puts his rocks in 6 equal groups with 3 rocks in each group. How many rocks does Cameron have in all?

Begin at 0. Draw jumps on the number line to skip count by threes.

Make _____ jumps of _____.

So, Cameron has _____ rocks in all.

REASONING If Cameron does not put his rocks in equal groups, will you be able to skip count to find how many rocks he has in all? Explain.

Response to Intervention • Tier 2 IN11
1. There are 4 pencils in a package. If Evan buys 3 packages of pencils, how many pencils does he have?
   - How many equal groups are there? _____
   - How many are in each group? _____
   - Use counters to model 3 groups of 4.
   - Skip count to find how many pencils Evan has.
     _____, _____, _____
   - _____ groups of _____ = _____
   So, Evan has _____ pencils.

Complete each number sentence.

2. _____ groups of _____ = _____

3. _____ groups of _____ = _____

4. _____ groups of _____ = _____

5. _____ jump of _____ = _____

6. _____ jumps of _____ = _____

7. _____ jumps of _____ = _____

8. Kaley has 4 bags of marbles. There are 6 marbles in each bag. How many marbles does Kaley have in all?
   _____
Algebra • Multiplication Comparisons

Tara has 3 times as many soccer medals as Greg. Greg has 4 soccer medals. How many soccer medals does Tara have?

Step 1 Draw a model.

Greg ○ ○ ○ ○ ○
Tara ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Step 2 Use the model to write an equation.

\( n = \frac{3}{4} \times 4 \)  \textbf{Think: } \( n \) is how many soccer medals Tara has.

Step 3 Solve the equation.

\( n = \frac{12}{4} \)
So, Tara has 12 soccer medals.

Draw a model and write an equation.

1. 4 times as many as 7 is 28.
2. 16 is 8 times as many as 2.

3. 3 times as many as 6 is 18.
4. 10 is 2 times as many as 5.
**Multiplication Match-Up**

Match each word problem to a model. Write the equation and solve.

1. Angie has 36 coins. This is 4 times as many coins as Scott has. How many coins does Scott have?
   
   **A.**
   
   [Diagram]
   

2. Cindy bought 20 stamps. This is 5 times the number of postcards that Yoshi bought. How many postcards did Yoshi buy?
   
   **B.**
   
   [Diagram]

3. Jessica has 48 stickers. This is 8 times as many stickers as Taylor has. How many stickers does Taylor have?
   
   **C.**
   
   [Diagram]

4. Joshua picked 24 apples. This is 3 times the number of apples that Carly picked. How many apples did Carly pick?
   
   **D.**
   
   [Diagram]

5. **Stretch Your Thinking** Write four comparison sentences for the product 12.
   
   ____________________________

   ____________________________
Algebra • Comparison Problems

Jamie has 3 times as many baseball cards as Rick. Together, they have 20 baseball cards. How many cards does Jamie have?

**Step 1** Draw a box with the letter n in it to show that Rick has an unknown number of cards. Jamie has 3 times as many cards as Rick, so draw three identical boxes to represent Jamie’s cards.

<table>
<thead>
<tr>
<th>Jamie</th>
<th>n</th>
<th>n</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rick</td>
<td>n</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20

**Step 2** Use the model to write an equation.

**Think:** There are 4 equal boxes. The number in each box is represented by n.

There are a total of 20 cards. So, \(4 \times n = 20\).

**Step 3** Solve the equation to find the value of n.

**Think:** 4 times what number is 20?

Since \(4 \times 5 = 20\), the value of n is 5.

Rick has 5 cards.

**Step 4** Find how many cards Jamie has.

**Think:** Jamie has 3 times as many cards as Rick.

So, Jamie has \(3 \times 5 = 15\) baseball cards.

---

**Draw a model. Write an equation and solve.**

1. Maddie has 2 times as many stickers on her notebook as Meg. Together, they have 15 stickers. How many stickers are on Maddie’s notebook?

2. How many more stickers are on Maddie’s notebook than on Meg’s notebook?
Mixed Models

Solve each problem.

1. Together, Tom and Max have 72 football cards. Tom has 2 more than 4 times as many cards as Max has. How many football cards does Tom have?

2. Naomi has 50 red beads and white beads. The number of red beads is 1 more than 6 times the number of white beads. How many red beads does Naomi have?

3. Javier rode his bike for a total of 41 minutes. Before lunch, he rode for 1 minute less than 5 times the number of minutes he rode after lunch. How many minutes did Javier ride before lunch?

4. Marnie practiced her basketball dribbling. After two tries, she had bounced the ball 88 times. On the second try, she had 2 fewer bounces than 8 times the number of bounces she had on the first try. How many bounces did she have on the second try?

5. How can a multiplication model help you solve Problem 1?
# Multiply Tens, Hundreds, and Thousands

You can use a pattern to multiply with tens, hundreds, and thousands.

Count the number of zeros in the factors.

\[
4 \times 6 = 24 \quad \leftarrow \text{basic fact}
\]

\[
4 \times 60 = 240 \quad \leftarrow \text{When you multiply by tens, the last digit in the product is 0.}
\]

\[
4 \times 600 = 2,400 \quad \leftarrow \text{When you multiply by hundreds, the last two digits in the product are 0.}
\]

\[
4 \times 6,000 = 24,000 \quad \leftarrow \text{When you multiply by thousands, the last three digits in the product are 0.}
\]

When the basic fact has a zero in the product, there will be an extra zero in the final product:

\[
5 \times 4 = 20, \text{ so } 5 \times 4,000 = 20,000
\]

## Complete the pattern.

1. \(9 \times 2 = 18\)
   - \(9 \times 20 = \) 
   - \(9 \times 200 = \) 
   - \(9 \times 2,000 = \) 

2. \(8 \times 4 = 32\)
   - \(8 \times 40 = \) 
   - \(8 \times 400 = \) 
   - \(8 \times 4,000 = \) 

3. \(6 \times 6 = 36\)
   - \(6 \times 60 = \) 
   - \(6 \times 600 = \) 
   - \(6 \times 6,000 = \) 

4. \(4 \times 7 = 28\)
   - \(4 \times 70 = \) 
   - \(4 \times 700 = \) 
   - \(4 \times 7,000 = \) 

## Find the product.

5. \(7 \times 300 = 7 \times \) hundreds
   - \(= \) hundreds

6. \(5 \times 8,000 = 5 \times \) thousands
   - \(= \) thousands
Multiplication Inequalities

Write <, >, or = for each \( \bigcirc \).

1. \( 7 \times 60 \bigcirc 400 \)  
2. \( 700 \bigcirc 90 \times 8 \)

3. \( 3 \times 800 \bigcirc 2,500 \)  
4. \( 2,000 \bigcirc 400 \times 5 \)

5. \( 8 \times 6,000 \bigcirc 40,000 \)  
6. \( 3 \times 9,000 \bigcirc 39,000 \)

7. \( 6 \times 900 \bigcirc 700 \times 8 \)  
8. \( 8 \times 3,000 \bigcirc 6,000 \times 4 \)

9. \( 9 \times 4,000 \bigcirc 6,000 \times 6 \)  
10. \( 800 \times 9 \bigcirc 3,000 \times 3 \)

11. Explain how you found the answer in Exercise 10.
Multiply Using the Distributive Property

You can use rectangular models to multiply 2-digit numbers by 1-digit numbers.

Find $9 \times 14$.

**Step 1** Draw a 9 by 14 rectangle on grid paper.

**Step 2** Use the Distributive Property and products you know to break apart the model into two smaller rectangles.

Think: $14 = 10 + 4$.

**Step 3** Find the product each smaller rectangle represents.

$9 \times 10 = 90$

$9 \times 4 = 36$

**Step 4** Find the sum of the products.

$90 + 36 = 126$

So, $9 \times 14 = 126$.

Model the product on the grid.
Record the product.

1. $3 \times 13$

2. $6 \times 16$

3. $5 \times 17$

4. $4 \times 14$
Shading the Grids

Use the Distributive Property. Shade and label each grid.

1. Show $3 \times 28$ in two different ways.

2. Show $4 \times 23$ in two different ways.

3. **Stretch Your Thinking** Find the partial products for one of your grids in Exercise 1. Then use the Distributive Property to find the product $3 \times 28$. 
Learn the Math

In each row, volunteers place programs for the school assembly on every seat that is a multiple of 6. There are 25 seats in a row. Which seats will have a program?

The product of two counting numbers is a **multiple** of each of those numbers. The number of multiples a number has is endless. To find multiples of any number, skip count on a number line or multiply that number by the counting numbers 1, 2, 3, and so on.

**One Way**  Use a number line.

Draw a number line divided into 25 equal parts to show the seats in a row.

Skip count by 6s to find each seat with a program.

So, programs will be placed on seat numbers 6, 12, _____, and _____.

**Another Way**  Multiply and make a list.

Write the first six nonzero multiples of 7.

\[
\begin{align*}
7 \times 1 &= 7 \\
7 \times 2 &= 14 \\
7 \times 3 &= 21 \\
7 \times 4 &= 28 \\
7 \times 5 &= 35 \\
7 \times 6 &= 42
\end{align*}
\]

So, the first six nonzero multiples of 7 are 7, 14, 21, _____, _____, and _____

**REASONING** What are the first six nonzero multiples of 12?

Explain your answer.

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________
1. As students walk through the door, the teacher assigns every fourth student a task. There are 21 students in the class. Which students are assigned a task?

- Skip count by 4s to find each student with a task.

- What are the first five nonzero multiples of 4?

- Which students are assigned a task?

Use the number line. Write the first six nonzero multiples.

2. 5 ______________________

3. 3 ______________________

Write the first six nonzero multiples.

4. 6 ______________________

5. 8 ______________________

6. 2 ______________________

7. 10 _____________________

8. 9 _____________________

9. On Monday, 36 customers enter the video store and Kari gives every fifth customer a door prize as they come in. How many customers receive door prizes?

______________________
Place Value of Whole Numbers

You can use a place-value chart to help you understand whole numbers and the value of each digit. A period is a group of three digits within a number separated by a comma.

<table>
<thead>
<tr>
<th>Millions Period</th>
<th>Thousands Period</th>
<th>Ones Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hundreds</td>
<td>Tens</td>
<td>Ones</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

**Standard form:** 2,367,089

**Expanded Form:** Multiply each digit by its place value, and then write an addition expression.

\[(2 \times 1,000,000) + (3 \times 100,000) + (6 \times 10,000) + (7 \times 1,000) + (8 \times 10) + (9 \times 1)\]

**Word Form:** Write the number in words. Notice that the millions and the thousands periods are followed by the period name and a comma.

two million, three hundred sixty-seven thousand, eighty-nine

To find the value of an underlined digit, multiply the digit by its place value. In 2,367,089, the value of 2 is \(2 \times 1,000,000\), or 2,000,000.

Write the value of the underlined digit.

1. 153,732,991

2. 236,143,802

3. 264,807

4. 78,209,146

Write the number in two other forms.

5. 701,245

6. 40,023,032
Place-Value Match

Match the standard form of the number given in Column A with either the word form or the expanded form of the number in Column B.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 900,000</td>
<td>thirty million</td>
</tr>
<tr>
<td>2. 8,000,000</td>
<td>$5 \times 1,000,000$</td>
</tr>
<tr>
<td>3. 30,000,000</td>
<td>six hundred million</td>
</tr>
<tr>
<td>4. 2,000,000</td>
<td>eight hundred thousand</td>
</tr>
<tr>
<td>5. 100,000</td>
<td>$9 \times 100,000$</td>
</tr>
<tr>
<td>6. 5,000,000</td>
<td>three million</td>
</tr>
<tr>
<td>7. 60,000,000</td>
<td>sixty million</td>
</tr>
<tr>
<td>8. 7,000,000</td>
<td>$2 \times 1,000,000$</td>
</tr>
<tr>
<td>9. 800,000</td>
<td>$5 \times 10,000,000$</td>
</tr>
<tr>
<td>10. 300,000</td>
<td>$3 \times 100,000$</td>
</tr>
<tr>
<td>11. 1,000,000</td>
<td>seven million</td>
</tr>
<tr>
<td>12. 50,000,000</td>
<td>one hundred thousand</td>
</tr>
<tr>
<td>13. 600,000,000</td>
<td>one million</td>
</tr>
<tr>
<td>14. 3,000,000</td>
<td>eight million</td>
</tr>
</tbody>
</table>

15. **Write Math**: Explain the method you used to match the standard form of a number to either its word form or its expanded form.
Algebra • Powers of 10 and Exponents

You can represent repeated factors with a base and an exponent.

Write \(10 \times 10 \times 10 \times 10 \times 10 \times 10\) in exponent form.

10 is the repeated factor, so 10 is the base.
The base is repeated 6 times, so 6 is the exponent.
\(10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6\)
A base with an exponent can be written in words.

Write \(10^6\) in words.
The exponent 6 means “the sixth power.”
\(10^6\) in words is “the sixth power of ten.”
You can read \(10^2\) in two ways: “ten squared” or “the second power of ten.”
You can also read \(10^3\) in two ways: “ten cubed” or “the third power of ten.”

Write in exponent form and in word form.

1. \(10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10\)
   - exponent form: ________
   - word form: ________________________

2. \(10 \times 10 \times 10\)
   - exponent form: ________
   - word form: ________________________

3. \(10 \times 10 \times 10 \times 10 \times 10\)
   - exponent form: ________
   - word form: ________________________

Find the value.

4. \(10^4\)
   - ________

5. \(2 \times 10^3\)
   - ________

6. \(6 \times 10^2\)
   - ________
Powers and Words

Find the value. Then write the value in word form.

1. $70 \times 10^3 =$
   Word form: ________________________________

2. $35 \times 10^2 =$
   Word form: ________________________________

3. $14 \times 10^3 =$
   Word form: ________________________________

4. $60 \times 10^7 =$
   Word form: ________________________________

5. $51 \times 10^4 =$
   Word form: ________________________________

6. $24 \times 10^6 =$
   Word form: ________________________________

7. $86 \times 10^8 =$
   Word form: ________________________________

8. $19 \times 10^7 =$
   Word form: ________________________________

9. **Stretch Your Thinking** What is another way to write the number in Exercise 1 using a whole number and a power of 10?
Algebra • Multiplication Patterns

You can use basic facts, patterns, and powers of 10 to help you multiply whole numbers by multiples of 10, 100, and 1,000.

Use mental math and a pattern to find $90 \times 6,000$.

- $9 \times 6$ is a basic fact. $9 \times 6 = 54$
- Use basic facts, patterns, and powers of 10 to find $90 \times 6,000$.

\[
9 \times 60 = (9 \times 6) \times 10^1 \\
= 54 \times 10^1 \\
= 54 \times 10 \\
= 540
\]

\[
9 \times 600 = (9 \times 6) \times 10^2 \\
= 54 \times 10^2 \\
= 54 \times 100 \\
= 5,400
\]

\[
9 \times 6,000 = (9 \times 6) \times 10^3 \\
= 54 \times 10^3 \\
= 54 \times 1,000 \\
= 54,000
\]

\[
90 \times 6,000 = (9 \times 6) \times (10 \times 1,000) \\
= 54 \times 10^4 \\
= 54 \times 10,000 \\
= 540,000
\]

So, $90 \times 6,000 = 540,000$.

Use mental math to complete the pattern.

1. $3 \times 1 = 3$
   \[
   3 \times 10^1 = \underline{\hspace{2cm}} \\
   3 \times 10^2 = \underline{\hspace{2cm}} \\
   3 \times 10^3 = \underline{\hspace{2cm}}
   \]

2. $8 \times 2 = 16$
   \[
   (8 \times 2) \times 10^1 = \underline{\hspace{2cm}} \\
   (8 \times 2) \times 10^2 = \underline{\hspace{2cm}} \\
   (8 \times 2) \times 10^3 = \underline{\hspace{2cm}}
   \]

3. $4 \times 5 = 20$
   \[
   (4 \times 5) \times \underline{\hspace{2cm}} = 200 \\
   (4 \times 5) \times \underline{\hspace{2cm}} = 2,000 \\
   (4 \times 5) \times \underline{\hspace{2cm}} = 20,000
   \]

4. $7 \times 6 = \underline{\hspace{2cm}}$
   \[
   (7 \times 6) \times \underline{\hspace{2cm}} = 420 \\
   (7 \times 6) \times \underline{\hspace{2cm}} = 4,200 \\
   (7 \times 6) \times \underline{\hspace{2cm}} = 42,000
   \]
Product Pattern

Look at the pattern of the products below.

\[ 11 \times 11 = 121 \]
\[ 12 \times 11 = 132 \]
\[ 13 \times 11 = 143 \]
\[ 14 \times 11 = 154 \]

Use the pattern above to find the product.

1. \[ 15 \times 11 = \] 2. \[ 16 \times 11 = \]

3. \[ 17 \times 11 = \] 4. \[ 18 \times 11 = \]

5. \[ 150 \times 11 = \] 6. \[ 120 \times 11 = \]

7. \[ 170 \times 11 = \] 8. \[ 140 \times 11 = \]

9. **Stretch Your Thinking** How does the product \[ 110 \times n \] compare to the product \[ 11 \times n \]? (Hint: \( n \) represents any number.)
Multiply by 1-Digit Numbers

You can use place value to help you multiply by 1-digit numbers.

**Estimate.** Then find the product. $378 \times 6$

**Estimate:** $400 \times 6 = 2,400$

**Step 1** Multiply the ones.

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

$\times$ 6

<table>
<thead>
<tr>
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<th>Hundreds</th>
<th>Tens</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

$\times$ 6

<table>
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<tbody>
<tr>
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<td>4</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

$\times$ 6

So, $378 \times 6 = 2,268$.

**Complete to find the product.**

1. $7 \times 472$

   Multiply the ones. Multiply the tens. Multiply the hundreds.

   $472$

   $\times 7$

   $1$

   $472$

   $\times 7$

   $51$

   $472$

   $\times 7$

   Estimate: $7 \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

2. **Estimate:**

   **Estimate:**

   **Estimate:**

   **Estimate:**

   **Estimate:**

3. Estimate:

   $809 \times 8$

   $932 \times 7$

   $2,767 \times 7$
Multiplication Number Puzzle

Use the clues to complete the puzzle.

**Down**

1. $856 \times 9$
2. $847 \times 6$
3. $5,082 \times 3$
4. $7,028 \times 6$
5. $24,162 \times 8$
6. $2,127 \times 6$
7. $3,289 \times 5$
8. $601 \times 6$

**Across**

5. $12,762 \times 9$
6. $287 \times 6$
7. $1,326 \times 9$
9. $4,027 \times 4$
10. $4,027 \times 6$
11. $7,028 \times 9$
13. $1,722 \times 4$

14. **Stretch Your Thinking** Write a different clue that has the same product as $1,326 \times 9$.