

Name _____

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.

Millions Period			Thousands Period			Ones Period		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		2,	3	6	7,	0	8	9

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

Name _____

Algebra • Properties

Properties of operations are characteristics of the operations that are always true.

Property	Examples
Commutative Property of Addition or Multiplication	Addition: $3 + 4 = 4 + 3$ Multiplication: $8 \times 2 = 2 \times 8$
Associative Property of Addition or Multiplication	Addition: $(1 + 2) + 3 = 1 + (2 + 3)$ Multiplication: $6 \times (7 \times 2) = (6 \times 7) \times 2$
Distributive Property	$8 \times (2 + 3) = (8 \times 2) + (8 \times 3)$
Identity Property of Addition	$9 + 0 = 9$ $0 + 3 = 3$
Identity Property of Multiplication	$54 \times 1 = 54$ $1 \times 16 = 16$

Use properties to find $37 + 24 + 43$.

$$37 + 24 + 43 = 24 + \underline{37} + 43$$

$$= 24 + (37 + 43)$$

$$= 24 + \underline{80}$$

$$= \underline{104}$$

Use the Commutative Property of Addition to reorder the addends.

Use the Associative Property of Addition to group the addends.

Use mental math to add.

Grouping 37 and 43 makes the problem easier to solve because their sum, 80, is a multiple of 10.

Use properties to find the sum or product.

1. $31 + 27 + 29$

2. $41 \times 0 \times 3$

3. $4 + (6 + 21)$

Complete the equation, and tell which property you used.

4. $(2 \times \underline{\quad}) + (2 \times 2) = 2 \times (5 + 2)$

5. $\underline{\quad} \times 1 = 15$

Name _____

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**.

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6$$

10^6 — exponent
 |
 base

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. 2×10^3

6. 6×10^2

Name _____

Multiply by 1-Digit Numbers

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

Estimate. Then find the product. 378×6

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

Step 1 Multiply the ones.	Step 2 Multiply the tens.	Step 3 Multiply the hundreds.																																																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Thousands</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Hundreds</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Tens</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Ones</td> </tr> <tr> <td></td> <td style="text-align: center;">3</td> <td style="text-align: center;">⁴7</td> <td style="text-align: center;">8</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: right;">×</td> <td></td> <td></td> <td style="text-align: center;">8</td> </tr> <tr> <td colspan="4" style="border-top: 1px solid black;"></td> </tr> </table>	Thousands	Hundreds	Tens	Ones		3	⁴ 7	8				6	×			8					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Thousands</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Hundreds</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Tens</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Ones</td> </tr> <tr> <td></td> <td style="text-align: center;">4 3</td> <td style="text-align: center;">⁴7</td> <td style="text-align: center;">8</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: right;">×</td> <td></td> <td style="text-align: center;">6</td> <td style="text-align: center;">8</td> </tr> <tr> <td colspan="4" style="border-top: 1px solid black;"></td> </tr> </table>	Thousands	Hundreds	Tens	Ones		4 3	⁴ 7	8				6	×		6	8					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Thousands</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Hundreds</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Tens</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Ones</td> </tr> <tr> <td></td> <td style="text-align: center;">⁴3</td> <td style="text-align: center;">⁴7</td> <td style="text-align: center;">8</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: right;">×</td> <td></td> <td></td> <td style="text-align: center;">8</td> </tr> <tr> <td colspan="4" style="border-top: 1px solid black;"></td> </tr> <tr> <td style="text-align: center;">2,</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> <td style="text-align: center;">8</td> </tr> </table>	Thousands	Hundreds	Tens	Ones		⁴ 3	⁴ 7	8				6	×			8					2,	2	6	8
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So, $378 \times 6 = 2,268$.

Complete to find the product.

1. 7×472

Estimate: $7 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

Multiply the ones.

Multiply the tens.

Multiply the hundreds.

$$\begin{array}{r} 472 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ 472 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 51 \\ 472 \\ \times 7 \\ \hline \end{array}$$

Estimate. Then find the product.

2. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 863 \\ \times 8 \\ \hline \end{array}$$

3. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 809 \\ \times 8 \\ \hline \end{array}$$

4. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 932 \\ \times 7 \\ \hline \end{array}$$

5. Estimate:

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 2,767 \\ \times 7 \\ \hline \end{array}$$

Name _____

Multiply by Multi-Digit Numbers

You can use place value and regrouping to multiply.

Find 29×63 .

Step 1 Write the problem vertically.
Multiply by the ones.

$$\begin{array}{r} 2 \\ 63 \\ \times 29 \\ \hline 567 \end{array} \quad \begin{array}{l} 63 \times 9 = (\underline{60} \times 9) + (\underline{3} \times 9) \\ = \underline{540} + \underline{27}, \text{ or } \underline{567} \end{array}$$

Step 2 Multiply by the tens.

$$\begin{array}{r} 2 \\ 63 \\ \times 29 \\ \hline 567 \\ 1,260 \end{array} \quad \begin{array}{l} 63 \times 20 = (\underline{60} \times 20) + (\underline{3} \times 20) \\ = \underline{1,200} + \underline{60}, \text{ or } \underline{1,260} \end{array}$$

Step 3 Add the partial products.

$$\begin{array}{r} 63 \\ \times 29 \\ \hline 567 \\ + 1,260 \\ \hline 1,827 \end{array}$$

So, $29 \times 63 = 1,827$.

Complete to find the product.

1.
$$\begin{array}{r} 57 \\ \times 14 \\ \hline \end{array}$$

_____ $57 \times$ _____

+ _____ $57 \times$ _____

2.
$$\begin{array}{r} 76 \\ \times 45 \\ \hline \end{array}$$

_____ $76 \times$ _____

+ _____ $76 \times$ _____

3.
$$\begin{array}{r} 139 \\ \times 12 \\ \hline \end{array}$$

_____ $139 \times$ _____

+ _____ $139 \times$ _____

4. Find 26×122 . Estimate first.

$$\begin{array}{r} 122 \\ \times 26 \\ \hline \end{array}$$

Estimate: _____

Name _____

Relate Multiplication to Division

Use the Distributive Property to find the quotient of $56 \div 4$.

Step 1

Write a related multiplication sentence for the division problem.

$$56 \div 4 = \square$$

$$4 \times \square = 56$$

Step 2

Use the Distributive Property to break apart the product into lesser numbers that are multiples of the divisor in the division problem. Use a multiple of 10 for one of the multiples.

$$(40 + 16) = 56$$

$$(4 \times 10) + (4 \times 4) = 56$$

$$4 \times (10 + 4) = 56$$

Step 3

To find the unknown factor, find the sum of the numbers inside the parentheses.

$$10 + 4 = 14$$

Step 4

Write the multiplication sentence with the unknown factor you found. Then, use the multiplication sentence to complete the division sentence.

$$4 \times 14 = 56$$

$$56 \div 4 = 14$$

Use multiplication and the Distributive Property to find the quotient.

1. $68 \div 4 =$ _____

2. $75 \div 3 =$ _____

3. $96 \div 6 =$ _____

4. $80 \div 5 =$ _____

5. $54 \div 3 =$ _____

6. $105 \div 7 =$ _____

Name _____

Divide by 1-Digit Divisors

You can use compatible numbers to help you place the first digit in the quotient. Then you can divide and check your answer.

Divide. $4\overline{)757}$

Step 1 Estimate with compatible numbers to decide where to place the first digit.

$$757 \div 4$$



$$800 \div 4 = 200$$

The first digit of the quotient is in the hundreds place.

Step 2 Divide.

$$\begin{array}{r} 189 \text{ r}1 \\ 4\overline{)757} \\ \underline{-4} \\ 35 \\ \underline{-32} \\ 37 \\ \underline{-36} \\ 1 \end{array}$$

Step 3 Check your answer.

$$\begin{array}{r} 189 \leftarrow \text{quotient} \\ \times 4 \leftarrow \text{divisor} \\ \hline 756 \\ + 1 \leftarrow \text{remainder} \\ \hline 757 \leftarrow \text{dividend} \end{array}$$

Since 189 is close to the estimate of 200, the answer is reasonable.

So, $757 \div 4$ is 189 r1.

Divide. Check your answer.

1. $8\overline{)136}$

2. $7\overline{)297}$

3. $5\overline{)8,126}$

4. $7\overline{)4,973}$

5. $3\overline{)741}$

6. $7\overline{)456}$

Name _____

Divide by 2-Digit Divisors

When you divide by a 2-digit divisor, you can use estimation to help you place the first digit in the quotient. Then you can divide.

Divide. $53 \overline{)2,369}$

Step 1 Use compatible numbers to estimate the quotient. Then use the estimate to place the first digit in the quotient.

$$\begin{array}{r} 40 \\ 50 \overline{)2,000} \end{array}$$

The first digit will be in the tens place.

Step 2 Divide the tens.

$$\begin{array}{r} 4 \\ 53 \overline{)2,369} \\ - 212 \\ \hline 24 \end{array}$$

Think:

Divide: $236 \text{ tens} \div 53$

Multiply: $53 \times 4 \text{ tens} = 212 \text{ tens}$

Subtract: $236 \text{ tens} - 212 \text{ tens}$

Compare: $24 < 53$, so the first digit of the quotient is reasonable.

Step 3 Bring down the 9 ones. Then divide the ones.

$$\begin{array}{r} 44 \text{ r}37 \\ 53 \overline{)2,369} \\ - 212 \downarrow \\ \hline 249 \\ - 212 \\ \hline 37 \end{array}$$

Think:

Divide: $249 \text{ ones} \div 53$

Multiply: $53 \times 4 \text{ ones} = 212 \text{ ones}$

Subtract: $249 \text{ ones} - 212 \text{ ones}$

Compare: $37 < 53$, so the second digit of the quotient is reasonable.

So, $2,369 \div 53$ is 44 r37.

Write the remainder to the right of the whole number part of the quotient.

Divide. Check your answer.

1. $52 \overline{)612}$

2. $63 \overline{)917}$

3. $89 \overline{)1,597}$

4. $43 \overline{)641}$

5. $27 \overline{)4,684}$

6. $64 \overline{)8,455}$

Name _____

Place Value of Decimals

You can use a place-value chart to find the value of each digit in a decimal.
Write whole numbers to the left of the decimal point.
Write decimals to the right of the decimal point.

Ones	Tenths	Hundredths	Thousandths
3	• 8	4	7

3×1	• $8 \times \frac{1}{10}$	$4 \times \frac{1}{100}$	$7 \times \frac{1}{1,000}$
3.0	• 0.8	0.04	0.007

Value

The place value of the digit 8 in 3.847 is tenths.

The value of 8 in 3.847 is $8 \times \frac{1}{10}$, or 0.8.

You can write a decimal in different forms.

Standard Form: 3.847

Expanded Form: 3 $\times 1$ + 8 $\times (\frac{1}{10})$ + 4 $\times (\frac{1}{100})$ + 7 $\times (\frac{1}{1,000})$

When you write the decimal in word form, write “and” for the decimal point.

Word Form: three and eight hundred forty-seven thousandths

1. Complete the place-value chart to find the value of each digit.

Ones	Tenths	Hundredths	Thousandths
2	• 6	9	5

2×1	•	$9 \times \frac{1}{100}$	
	0.6		

Value

Write the value of the underlined digit.

2. 0.792

3. 4.691

4. 3.805

Name _____

Compare and Order Decimals

You can use a place-value chart to compare decimals.

Compare. Write $<$, $>$, or $=$.

4.375 ○ 4.382

Write both numbers in a place-value chart. Then compare the digits, starting with the greatest place value. Stop when the digits are different and compare.

Ones	Tenths	Hundredths	Thousandths
4	• 3	7	5
4	• 3	8	2

↑ ↑ ↑
 The ones digits are the same. The tenths digits are the same. The hundredths digits are different.

The digits are different in the hundredths place.

Since 7 hundredths $<$ 8 hundredths, 4.375 ○ $<$ 4.382.

1. Use the place-value chart to compare the two numbers. What is the greatest place-value position where the digits differ?

Ones	Tenths	Hundredths	Thousandths
2	• 8	6	5
2	• 8	6	1

Compare. Write $<$, $>$, or $=$.

2. 5.37 ○ 5.370

3. 9.425 ○ 9.417

4. 7.684 ○ 7.689

**Name the greatest place-value position where the digits differ.
Name the greater number.**

5. 8.675; 8.654

6. 3.086; 3.194

7. 6.243; 6.247

Order from least to greatest.

8. 5.04; 5.4; 5.406; 5.064

9. 2.614; 2.146; 2.46; 2.164

Name _____

Round Decimals

Rounding decimals is similar to rounding whole numbers.

Round 4.682 to the nearest tenth.

Step 1 Write 4.682 in a place-value chart.

Ones	Tenths	Hundredths	Thousandths
4	6	<u>8</u>	2

Step 2 Find the digit in the place to which you want to round.
Circle that digit.

The digit 6 is in the tenths place, so circle it.

Step 3 Underline the digit to the right of the circled digit.

The digit 8 is to the right of the circled digit, so underline it.

Step 4 If the underlined digit is less than 5, the circled digit stays the same.
If the underlined digit is 5 or greater, increase the circled digit by 1.

8 > 5, so increase 6 to 7.

Step 5 After you round the circled digit, drop the digits to the right of the circled digit.

So, 4.682 rounded to the nearest tenth is 4.7.

Write the place value of the underlined digit. Round each number to the place of the underlined digit.

1. 0.392

2. 5.714

3. 16.908

Name the place value to which each number was rounded.

4. 0.825 to 0.83

5. 3.815 to 4

6. 1.546 to 1.5

Name _____

Add Decimals

Add. $4.17 + 9.8$

Step 1 Estimate the sum.

$$\begin{array}{r}
 4.17 + 9.8 \\
 \downarrow \quad \downarrow \\
 \text{Estimate: } 4 + 10 = 14
 \end{array}$$

Step 2 Line up the place values for each number in a place-value chart. Then add.

	Ones	Tenths	Hundredths	
	4	● 1	7	
+	9	● 8		
	13	● 9	7	← sum

Step 3 Use your estimate to determine if your answer is reasonable.

Think: 13.97 is close to the estimate, 14. The answer is reasonable.

So, $4.17 + 9.8 = \underline{13.97}$.

Estimate. Then find the sum.

1. Estimate: _____

$$\begin{array}{r}
 1.20 \\
 + 0.34 \\
 \hline
 \end{array}$$

2. Estimate: _____

$$\begin{array}{r}
 1.52 \\
 + 1.21 \\
 \hline
 \end{array}$$

3. Estimate: _____

$$\begin{array}{r}
 12.25 \\
 + 11.25 \\
 \hline
 \end{array}$$

4. Estimate: _____

$$\begin{array}{r}
 10.75 \\
 + 1.11 \\
 \hline
 \end{array}$$

5. Estimate: _____

$$\begin{array}{r}
 22.65 \\
 + 18.01 \\
 \hline
 \end{array}$$

6. Estimate: _____

$$\begin{array}{r}
 34.41 \\
 + 15.37 \\
 \hline
 \end{array}$$

Name _____

Subtract Decimals

Subtract. $6.56 - 4.33$

Step 1 Estimate the difference.

$$\begin{array}{r}
 6.56 - 4.33 \\
 \downarrow \quad \downarrow \\
 \text{Estimate: } 7 - 4 = 3
 \end{array}$$

Step 2 Line up the place values for each number in a place-value chart. Then subtract.

	Ones	Tenths	Hundredths	
	6	● 5	6	
–	4	● 3	3	
	2	● 2	3	← difference

Step 3 Use your estimate to determine if your answer is reasonable.

Think: 2.23 is close to the estimate, 3. The answer is reasonable.

So, $6.56 - 4.33 = \underline{2.23}$.

Estimate. Then find the difference.

1. Estimate: _____

$$\begin{array}{r}
 1.97 \\
 - 0.79 \\
 \hline
 \end{array}$$

2. Estimate: _____

$$\begin{array}{r}
 4.42 \\
 - 1.26 \\
 \hline
 \end{array}$$

3. Estimate: _____

$$\begin{array}{r}
 10.25 \\
 - 8.25 \\
 \hline
 \end{array}$$

Find the difference. Check your answer.

4.
$$\begin{array}{r}
 5.75 \\
 - 1.11 \\
 \hline
 \end{array}$$

5.
$$\begin{array}{r}
 25.21 \\
 - 19.05 \\
 \hline
 \end{array}$$

6.
$$\begin{array}{r}
 42.14 \\
 - 25.07 \\
 \hline
 \end{array}$$