Name _____

Place Value and Patterns

You can use a place-value chart and patterns to write numbers that are 10 times as much as or $\frac{1}{10}$ of any given number.

Each place to the right is $\frac{1}{10}$ of the value of the place to its left.

	$\frac{1}{10}$ of the hundred thousands place	$\frac{1}{10}$ of the ten thousands place	$\frac{1}{10}$ of the thousands place	$\frac{1}{10}$ of the hundreds place	$\frac{1}{10}$ of the tens place
Hundred Thousands	**Ten Thousands**	**Thousands**	**Hundreds**	**Tens**	**Ones**
10 times the ten thousands place	10 times the thousands place	10 times the hundreds place	10 times the tens place	10 times the ones place	

Each place to the left is 10 times the value of the place to its right.

Find $\frac{1}{10}$ of 600.

$\frac{1}{10}$ of 6 hundreds is 6 tens.

So, $\frac{1}{10}$ of 600 is 60.

Find 10 times as much as 600.

10 times as much as 6 hundreds is 6 thousands.

So, 10 times as much as 600 is 6,000.

Use place-value patterns to complete the table.

Number	10 times as much as	$\frac{1}{10}$ of
1. 200		
2. 10		
3. 700		
4. 5,000		

Number	10 times as much as	$\frac{1}{10}$ of
5. 900		
6. 80,000		
7. 3,000		
8. 40		

Name _____

Place-Value Mystery

Find the number that makes each statement true.

1. $\frac{1}{10}$ of 3,000 is 10 times as much as _____.

2. $\frac{1}{10}$ of _____ is 10 times as much as 8.

3. $\frac{1}{10}$ of 50,000 is 10 times as much as _____.

4. $\frac{1}{10}$ of 400,000 is 10 times as much as _____.

5. 10 times as much as _____ is $\frac{1}{10}$ of 900.

6. 10 times as much as _____ is $\frac{1}{10}$ of 60,000.

7. 10 times as much as 70 is $\frac{1}{10}$ of _____.

8. 10 times as much as 2,000 is $\frac{1}{10}$ of _____.

9. **Write Math** Explain how you solved Exercise 8.

_____

_____

_____

_____

_____

_____

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 _____

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.

	Column A	Column B
1.	900,000	thirty million
2.	8,000,000	$5 \times 1{,}000{,}000$
3.	30,000,000	six hundred million
4.	2,000,000	eight hundred thousand
5.	100,000	$9 \times 100{,}000$
6.	5,000,000	three million
7.	60,000,000	sixty million
8.	7,000,000	$2 \times 1{,}000{,}000$
9.	800,000	$5 \times 10{,}000{,}000$
10.	300,000	$3 \times 100{,}000$
11.	1,000,000	seven million
12.	50,000,000	one hundred thousand
13.	600,000,000	one million
14.	3,000,000	eight million

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 • 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	$9 + 0 = 9$ $\quad 0 + 3 = 3$
Identity Property of Multiplication	$54 \times 1 = 54$ $\quad 1 \times 16 = 16$

Use properties to find 37 + 24 + 43.

$37 + 24 + 43 = 24 + \underline{37} + 43$ Use the Commutative Property of Addition to reorder the addends.

$= 24 + (37 + 43)$ Use the Associative Property of Addition to group the addends.

$= 24 + \underline{80}$ Use mental math to add.

$= \underline{104}$

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. $(2 \times \_\_\_\_) + (2 \times 2) = 2 \times (5 + 2)$ _____

5. $\_\_\_\_ \times 1 = 15$ _____

Name _____

Using Properties of Operations

First, use one of the properties shown below to complete each equation. Then, match each equation to its property by writing the equation on the line below the property.

$1 \times 17 =$ ____

$9 \times (5 + 3) =$ _____ $+ (9 \times 3)$

____ $\times 29 = 29 \times 3$

$51 +$ ____ $= 39 + 51$

_____ $\times 11 = 13 \times (8 \times 11)$

____ $+ 0 = 49$

$(7 + 6) +$ ____ $= 7 + (6 + 25)$

Associative Property of Addition _____	**Identity Property of Multiplication** _____
Associative Property of Multiplication _____	**Commutative Property of Addition** _____
Commutative Property of Multiplication _____	**Distributive Property** _____
Identity Property of Addition _____	

1. **Stretch Your Thinking** Use the Distributive Property to rewrite and find $4 \times (25 + 4)$.

_____

2. Write Math **Explain** how the Associative Property of Addition is similar to the Associative Property of Multiplication.

_____

_____

Name _____

Algebra • Powers of 10 and Exponents

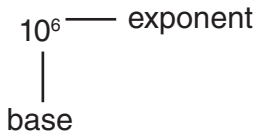
You can represent repeated factors with a base and an exponent.

Write 10 × 10 × 10 × 10 × 10 × 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. 2×10^3 _____

6. 6×10^2 _____

Name _____

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. $24 \times 10^5 =$ _____

Word form: _____

7. $86 \times 10^6 =$ _____

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 × 6,000.

- 9 × 6 is a basic fact. $9 \times 6 = 54$
- Use basic facts, patterns, and powers of 10 to find 90 × 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 × 6,000 = 540,000.

Use mental math to complete the pattern.

1. $3 \times 1 = 3$

$3 \times 10^1 =$ _____

$3 \times 10^2 =$ _____

$3 \times 10^3 =$ _____

2. $8 \times 2 = 16$

$(8 \times 2) \times 10^1 =$ _____

$(8 \times 2) \times 10^2 =$ _____

$(8 \times 2) \times 10^3 =$ _____

3. $4 \times 5 = 20$

$(4 \times 5) \times$ _____ $= 200$

$(4 \times 5) \times$ _____ $= 2{,}000$

$(4 \times 5) \times$ _____ $= 20{,}000$

4. $7 \times 6 =$ _____

$(7 \times 6) \times$ _____ $= 420$

$(7 \times 6) \times$ _____ $= 4{,}200$

$(7 \times 6) \times$ _____ $= 42{,}000$

Name _____

Product Pattern

Look at the pattern of the products below.

$11 \times 11 = \mathbf{121}$
$12 \times 11 = \mathbf{132}$
$13 \times 11 = \mathbf{143}$
$14 \times 11 = \mathbf{154}$

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 × 6

Estimate: 400 × 6 = **2,400**

Step 1 Multiply the ones.

	Thousands	Hundreds	Tens	Ones
		3	$^{4}7$	**8**
×				**6**
				8

Step 2 Multiply the tens.

	Thousands	Hundreds	Tens	Ones
		$^{4}3$	^{4}**7**	8
×				**6**
			6	8

Step 3 Multiply the hundreds.

	Thousands	Hundreds	Tens	Ones
		^{4}**3**	$^{4}7$	8
×				**6**
	2,	**2**	6	8

So, 378 × 6 = **2,268**.

Complete to find the product.

1. 7 × 472 Estimate: 7 × _____ = _____

Multiply the ones.

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

Multiply the tens.

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

Multiply the hundreds.

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

Estimate. Then find the product.

2. Estimate: _____

$$\begin{array}{r} 863 \\ \times\ 8 \\ \hline \end{array}$$

3. Estimate: _____

$$\begin{array}{r} 809 \\ \times\ 8 \\ \hline \end{array}$$

4. Estimate: _____

$$\begin{array}{r} 932 \\ \times\ 7 \\ \hline \end{array}$$

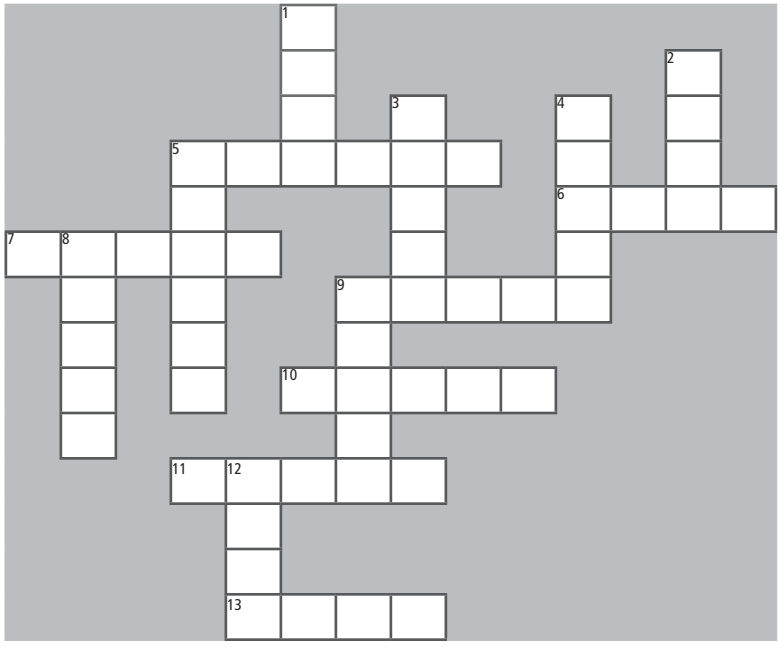
5. Estimate: _____

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

Name _____

Multiplication Number Puzzle

Use the clues to complete the puzzle.



Down

1. 856 × 9 _____

2. 847 × 6 _____

3. 5,082 × 3 _____

4. 7,028 × 6 _____

5. 24,162 × 8 _____

8. 2,127 × 6 _____

9. 3,289 × 5 _____

12. 601 × 6 _____

Across

5. 12,762 × 9 _____

6. 287 × 6 _____

7. 1,326 × 9 _____

9. 4,027 × 4 _____

10. 4,027 × 6 _____

11. 7,028 × 9 _____

13. 1,722 × 4 _____

14. Stretch Your Thinking Write a different clue that has the same product as 1,326 × 9.

_____

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.

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

Step 2 Multiply by the tens.

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

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

— 57 × ____

\+ ____ — 57 × ____

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

— 76 × ____

\+ ____ — 76 × ____

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

— 139 × ____

\+ ____ — 139 × ____

4. Find 26 × 122. Estimate first. $\begin{array}{r} 122 \\ \times\ 26 \end{array}$

Estimate: _____

Name _____

Unknown Digits Multiplication

Find the unknown digits.

1.

$$\begin{array}{r} \square\,4 \\ \times\ 8\,\square \\ \hline \square\,\square\,\square \\ +\ 2\,7\,2\,0 \\ \hline 2,\,9\,5\,8 \end{array}$$

2.

$$\begin{array}{r} 6\,5 \\ \times\ 7\,\square \\ \hline 5\,\square\,5 \\ +\ 4\,5\,5\,0 \\ \hline 5,\,\square\,3\,5 \end{array}$$

3.

$$\begin{array}{r} 9\,\square \\ \times\ 2\,4 \\ \hline 3\,8\,4 \\ +\ 1\,\square\,2\,0 \\ \hline 2,\,\square\,0\,4 \end{array}$$

4.

$$\begin{array}{r} 8\,\square \\ \times\ 6\,8 \\ \hline 6\,\square\,6 \\ +\ \square\,\square\,2\,0 \\ \hline 5,\,5\,7\,6 \end{array}$$

5.

$$\begin{array}{r} 5\,3\,\square \\ \times\ \ \square\,7 \\ \hline 3\,7\,\square\,7 \\ +\ 2\,1\,\square\,\square\,0 \\ \hline \square\,4,\,9\,\square\,\square \end{array}$$

6.

$$\begin{array}{r} 2\,4\,6 \\ \times\ \ \square\,3 \\ \hline 7\,\square\,\square \\ +\ 1\,9\,6\,\square\,0 \\ \hline \square\,\square,\square\,\square\,\square \end{array}$$

7. Stretch Your Thinking What two-digit number multiplied by itself has the product 2,025? **Explain** how you found your answer.

_____

_____

_____

_____

Name _____

Relate Multiplication to Division

Use the Distributive Property to find the quotient of 56 ÷ 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.

$(40 + 16) = 56$

$(4 \times \mathbf{10}) + (4 \times \mathbf{4}) = 56$

$4 \times (\mathbf{10} + \mathbf{4}) = 56$

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.

$4 \times \mathbf{14} = 56$

$56 \div 4 = \mathbf{14}$

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 _____

Number Relationships

Find the unknown number in the group to make related multiplication and division sentences. Write the multiplication and division sentences.

1. 4, ?, 68

_____

_____

_____

_____

2. 5, ?, 65

_____

_____

_____

_____

3. 4, ?, 52

_____

_____

_____

_____

4. 6, ?, 78

_____

_____

_____

_____

5. Write Math Describe how the number sentences in each exercise are related.

_____

_____

_____

6. Stretch Your Thinking How can you use inverse operations to write the related multiplication and division sentences?

_____

_____

_____

Name _____

Problem Solving • Multiplication and Division

In Brett's town, there are 128 baseball players on 8 different teams. Each team has an equal number of players. How many players are on each team?

Read the Problem	Solve the Problem
What do I need to find? I need to find how many players are on each team in Brett's town. **What information do I need to use?** There are 8 teams with a total of 128 players. **How will I use the information?** I can divide the total number of players by the number of teams. I can use a simpler problem to divide.	• First, I use the total number of players. 128 players • To find the number of players on each team, I will need to solve this problem. 128 ÷ 8 = ? • To find the quotient, I break 128 into two simpler numbers that are easier to divide. 128 ÷ 8 = (80 + 48) ÷ 8 = (80 ÷ 8) + (48 ÷ 8) = 10 + 6 = 16 So, there are 16 players on each team.

1. Susan makes clay pots. She sells 125 pots per month to 5 stores. Each store buys the same number of pots. How many pots does each store buy?

125 ÷ 5 = (100 + _____) ÷ 5

= (100 ÷ 5) + (_____ ÷ 5)

= _____ + 5

= _____

_____

2. Lou grows 112 rosemary plants. He ships an equal number of plants to customers in 8 states. How many rosemary plants does he ship to each customer?

112 ÷ 8 = (80 + _____) ÷ 8

= (_____ ÷ 8) + (_____ ÷ 8)

= _____ + 4

= _____

_____

Name _____

Simply Put

Solve. You may find it helpful to use the strategy *solve a simpler problem*.

1. Sal's Pizza uses 720 pounds of flour in 4 weeks. Sal's is open 6 days a week and uses the same amount of flour each day. How much flour does Sal's Pizza use in 1 day?

_____

2. In one 8-hour day, 5 barbers gave a total of 120 haircuts. The barbers gave the same number of haircuts per hour. How many haircuts did each barber give per hour?

_____

3. Dan runs Freddy's Deluxe Car Wash. Nine workers wash a total of 369 cars in one week. Suppose the workers all wash the same number of cars. How many cars does each worker wash that week?

_____

4. Ali sells tomatoes to 9 restaurants. Each restaurant buys the same amount of tomatoes each day. Suppose Ali sells 162 pounds of tomatoes one day. How many pounds does she sell to each restaurant?

_____

5. Dr. Barker and two other dentists work in the same office. In one day, the three dentists saw a total of 51 patients. Suppose each dentist saw the same number of patients. How many patients did each dentist see?

_____

6. Micah uses 2 bags of birdseed to fill up 4 bird feeders. How many bags will he need to fill up 40 feeders?

_____

7. Stretch Your Thinking When is it helpful to use simpler numbers to solve a problem?

_____

_____

_____

Name _____

Algebra • Numerical Expressions

Write words to match the expression.

$$6 \times (12 - 4)$$

Think: Many word problems involve finding the cost of a store purchase.

Step 1 Examine the expression.

• What operations are in the expression? multiplication and subtraction

Step 2 Describe what each part of the expression can represent when finding the cost of a store purchase.

• What can multiplying by 6 represent? buying 6 of the same item

Step 3 Write the words.

• Joe buys 6 DVDs. Each DVD costs $12. If Joe receives a $4 discount on each DVD, what is the total amount of money Joe spends?

1. What is multiplied and what is subtracted?

_____

2. What part of the expression is the price of the item?

_____

3. What can subtracting 4 from 12 represent?

_____

Write words to match the expression.

4. $4 \times (10 - 2)$

_____

_____

_____

_____

5. $3 \times (6 - 1)$

_____

_____

_____

_____

Name _____

Shopping Expressions

The table shows the prices for certain items at a supermarket. Use the information in the table to write problems that match the expressions below.

Supermarket Prices	
Item	**Price**
Loaf of bread	$3
Carton of eggs	$2
Box of cereal	$4
Pound of cheese	$5
Gallon of milk	$3
Can of tuna fish	$2

Write a word problem for each expression. The first word problem has been written for you.

1. $7 - 3$

Jerry has $7 to spend at the supermarket. He buys a loaf of bread for $3. How much money does Jerry have now?

2. $(5 \times 2) + 4$

3. $5 + (4 - 1)$

4. $20 - (6 \times 2)$

Name _____

Algebra • Evaluate Numerical Expressions

A **numerical expression** is a mathematical phrase that includes only numbers and operation symbols.

You **evaluate** the expression when you perform all the computations to find its value.

Order of Operations
1. Parentheses
2. Multiply and Divide
3. Add and Subtract

To evaluate an expression, use the **order of operations.**

Evaluate the expression $(10 + 6 \times 6) - 4 \times 10$.

Step 1 Start with computations inside the parentheses.

$10 + 6 \times 6$

Step 2 Perform the order of operations inside the *parentheses*.

Multiply and divide from left to right.

$10 + 6 \times 6 = 10 + \underline{36}$

Add and subtract from left to right.

$10 + 36 = \underline{46}$

Step 3 Rewrite the expression with the parentheses evaluated.

$46 - 4 \times 10$

Step 4 *Multiply and divide* from left to right.

$46 - 4 \times 10 = 46 - \underline{40}$

Step 5 *Add and subtract* from left to right.

$46 - 40 = \underline{6}$

So, $(10 + 6 \times 6) - 4 \times 10 = 6$.

Evaluate the numerical expression.

1. $8 - (7 \times 1)$

2. $5 - 2 + 12 \div 4$

3. $8 \times (16 \div 2)$

4. $4 \times (28 - 20 \div 2)$

5. $(30 - 9 \div 3) \div 9$

6. $(6 \times 6 - 9) - 9 \div 3$

7. $11 \div (8 + 9 \div 3)$

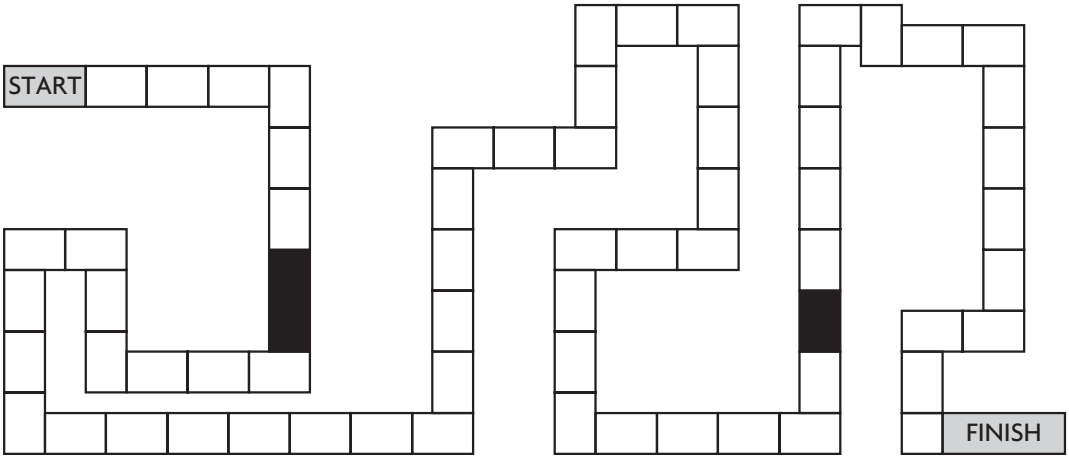
8. $13 \times 4 - 65 \div 13$

9. $9 + 4 \times 6 - 65 \div 13$

Name _____

Order of Operations Game

Three players are playing a board game. Complete the exercises below, and move each player's piece the same number of spaces as the answer for the unknown value. Circle the player who wins the game. Each black space counts as one space.



	Player 1	Player 2	Player 3
1.	$(50 - 2) \div 4 =$ ____	$5 + 10 \div 5 =$ ____	$108 \div (27 - 9) =$ ____
2.	$(343 - 5) \div 26 - 11 =$ ____	$(7 \times 7) \div (3 + 4) =$ ____	$6 + 3 - 7 =$ ____
3.	$(55 - 1) \div 9 =$ ____	$(16 \times 3) \div (4 \times 6)$ = ____	$(64 \div 16) \times (11 - 6)$ = ____
4.	$(15 - 36 \div 4) + (9 \times 2)$ = ____	$2 \times (3 + 51 \div 17)$ = ____	$144 - (10 + 4 \times 5 \times 5)$ = ____
5.	$(64 + 6) \div (\_\_\_\_ \times 5) = 2$	$81 \div (\_\_\_\_ \div 4) = 9$	$(4 \times \_\_\_\_) - (1 + 8 \times 2)$ $= 3$

6. Stretch Your Thinking A fourth player joins the game and is given an expression that moves the game piece directly to the second black space on the board. The expression has a division, a multiplication, and a subtraction operation. Write a possible expression.

Name _____

Algebra • Grouping Symbols

Parentheses ( ), *brackets* [ ], and *braces* { }, are different grouping symbols used in expressions. To evaluate an expression with different grouping symbols, perform the operation in the innermost set of grouping symbols first. Then evaluate the expression from the inside out.

Evaluate the expression $2 \times [(9 \times 4) - (17 - 6)]$.

Step 1 Perform the operations in the *parentheses* first.

$2 \times [(9 \times 4) - (17 - 6)]$

$2 \times [\ 36 \ - \ 11\ ]$

Step 2 Next perform the operations in the *brackets*.

$2 \times [\ 36 - 11\ ]$

$2 \times \ 25$

Step 3 Then multiply.

$2 \times 25 = 50$

So, $2 \times [(9 \times 4) - (17 - 6)] = 50$

Evaluate the numerical expression.

1. $4 \times [(15 - 6) \times (7 - 3)]$

$4 \times [9 \times$ _____ $]$

$4 \times [$ _____ $]$

_____

2. $40 - [(8 \times 7) - (5 \times 6)]$

_____

3. $60 \div [(20 - 6) + (14 - 8)]$

_____

4. $5 + [(10 - 2) + (4 - 1)]$

_____

5. $3 \times [(9 + 4) - (2 \times 6)]$

_____

6. $32 \div [(7 \times 2) - (2 \times 5)]$

_____

Name _____

Missing Symbols

Write +, −, ×, or ÷ in the ◯ to make each equation true.

1. $6 \times [(7 + 3) \bigcirc (4 \times 2)] = 108$

2. $4 \times [(5 \times 3) + (24 \bigcirc 4)] = 84$

3. $5 \times [(12 \bigcirc 3) - (15 - 9)] = 150$

4. $[(40 + 17) + (27 \div 9)] \bigcirc 5 = 12$

5. $[(8 \times 7) \bigcirc (4 \times 9)] + 15 = 35$

6. $100 \div \{[(5 \times 5) - 6] - (12 \bigcirc 2)\} = 20$

7. $4 \times \{[(8 + 5) \times 4] - [(18 \bigcirc 9) \times 3]\} = 100$

8. $\{[(21 - 9) \bigcirc 2] + [(3 \times 7) - 5]\} \div 8 = 5$

9. Stretch Your Thinking Two numbers are unknown in the expression below. If the value of the expression is 98, what are the unknown numbers? (Both numbers are greater than 0.)

$\square \times \{[(12 - 3) \times 3] + (\square \times 6) - 8\}$