

6th Grade Math Unit 3- Expressions

Name: _____

Period: _____

Calendar:

Monday, October 15th <ul style="list-style-type: none"> Focus: Exponents IXL Topic: D.2 	Tuesday, October 16th <ul style="list-style-type: none"> Focus: Order of Operations IXL Topic: O.3 	Wednesday, October 17th <ul style="list-style-type: none"> Focus: Order of Operations IXL Topic: O.3
Thursday, October 18th <ul style="list-style-type: none"> Focus: Parts of an expression IXL Topic: Y.6 	Friday, October 19th <ul style="list-style-type: none"> Focus: Quiz IXL Topic: D.2, O.3, Y.6 	Monday, October 22nd <ul style="list-style-type: none"> Focus: Writing Numerical Expressions IXL Topics: Y.1, Y.2
Tuesday, October 23rd <ul style="list-style-type: none"> Focus: Distributive Property IXL Topics: Y.10 	Wednesday, October 24th <ul style="list-style-type: none"> Focus: Combining Like Terms IXL Topic: Y.14, Y.15 	Thursday, October 25th <ul style="list-style-type: none"> Focus: Substitution in Expressions IXL Topic: Y.3, Y.4, Y.5
Friday, October 26th <ul style="list-style-type: none"> Focus: Problem Solving IXL Topic: 	Monday, October 29th <ul style="list-style-type: none"> Focus: Study Guide IXL Topic: D.2, O.3, Y.1, Y.2, Y.3, Y.4, Y.5, Y.6, Y.10, Y.14, Y.15 	Tuesday, October 30th <ul style="list-style-type: none"> Focus: Review Game IXL Topic: D.2, O.3, Y.1, Y.2, Y.3, Y.4, Y.5, Y.6, Y.10, Y.14, Y.15
Wednesday, October 31st	IXL Information	
Unit 3 Test: <ul style="list-style-type: none"> Exponents Order of Operations Parts of an expression IXL Topics: D.2, O.3, Y.1, Y.2, Y.3, Y.4, Y.5, Y.6, Y.10, Y.14, Y.15	<ul style="list-style-type: none"> Writing Expressions Distributive Property Combining Like Terms Problem Solving 	Username: FirstnameLastname816 Password: titans

***If Lost, Please Return to: Ms. Rankin (Room-F106)**

Standards:

- **MGSE6.EE.1** Write and evaluate expressions involving whole-number exponents.
- **MGSE6.EE.2** Write, read, and evaluate expressions in which letters stand for numbers.
- **MGSE6.EE.2a** Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as $5-y$.
- **MGSE6.EE.2b** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.
- **MGSE6.EE.2c** Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 12$.
- **MGSE6.EE.3** Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.
- **MGSE6.EE.4** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them.) For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.

Essential Questions:

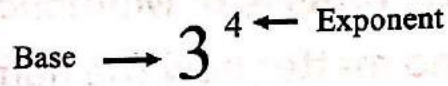
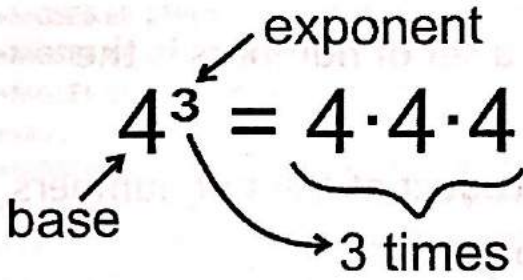
- How are "standard form" and "exponential form" related?
- What is the purpose of an exponent?
- How are exponents used when evaluating expressions?
- How is the order of operations used to evaluate expressions?
- How are exponents useful in solving mathematical and real world problems?
- How are properties of numbers helpful in evaluating expressions?
- What strategies can I use to help me understand and represent real situations using algebraic expressions?
- How are the properties (Identify, Associative and Commutative) used to evaluate, simplify and expand expressions?
- How is the Distributive Property used to evaluate, simplify and expand expressions?
- How can I tell if two expressions are equivalent?

Vocabulary Words:

- **Associative Property of Addition:** The sum of a set of numbers is the same no matter how the numbers are grouped.
- **Associative Property of Multiplication:** The product of a set of numbers is the same no matter how the numbers are grouped.
- **Coefficient:** A number multiplied by a variable in an algebraic expression.
- **Commutative Property of Addition:** The sum of a group of numbers is the same regardless of the order in which the numbers are arranged
- **Commutative Property of Multiplication:** The product of a group of numbers is the same regardless of the order in which the numbers are arranged.
- **Constant:** A quantity that does not change its value.
- **Distributive Property:** The sum of two addends multiplied by a number is the sum of the product of each addend and the number.
- **Exponent:** The number of times a number or expression (called base) is used as a factor of repeated multiplication. Also called the power.
- **Like Terms:** Terms in an algebraic expression that have the same variable raised to the same power. Only the coefficients of like terms are different.
- **Order of Operations:** The rules to be followed when simplifying expressions.
- **Term:** A number, a variable, or a product of numbers and variables.
- **Variable:** A letter or symbol used to represent a number or quantities that vary

Definition of Exponent

• An exponent tells how many times a number is multiplied by itself.



Write each product using an exponent. Solve.

1. 20×20

2. $4 \times 4 \times 4 \times 4$

3. $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

4. $3 \times 3 \times 3 \times 3 \times 3$

5. $10 \times 10 \times 10$

6. $7 \times 7 \times 7 \times 7 \times 7 \times 7$

Write each power as a product of the same factor. Then find the value.

9. 15^3

10. 6^5

11. 0^4

12. 7^4

13. 5^5

14. 1^8

Directions: Answer the following question(s).

- 1 What is the value of this expression?

$$2^2 \times 2^3$$

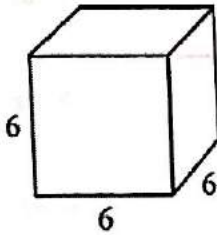
- 2 What is the value of this expression?

$$7^3 + 6^3$$

- 3 What is the value of this expression?

$$8^3 - 4^4$$

- 4 The volume of this cube is 6^3 units.



What is the value of 6^3 ?

- 5 What is the value of $(3^2 + 1)^4$?

- 6 What is the value of this expression?

$$(6 - 2)^3 + (4 + 5)^2$$

- 7 What is the value of this expression?

$$6 + 4(5 - 2)^3$$

- 8 What is the value of $(6^3 + 2^3)^2$?

- A. 9
B. 54
C. 729
D. 4,096

- 9 Which of the following expressions is equal to $3 \times 3 \times 3 \times 3$?

- A. 3^3
B. $3^2 \times 3^2$
C. 4^3
D. 4×4^2

- 10 Which of these expressions is equivalent to $4 \times 4 \times 6 \times 6 \times 6 \times 6$?

- A. 4^6
B. $4^2 \times 6^4$
C. $2^4 \times 4^6$
D. 16×24

Next Level Exponents

Write each as a product of the same factor (expanded), then evaluate (solve).

$$\frac{3^3}{4}$$

Product of the same Factor (expanded): _____

Evaluate: _____

$$0.25^3$$

Product of the same Factor (expanded): _____

Evaluate: _____

Extra Practice → **Homework**
Powers and Exponents

Write each product using an exponent.

1. $4 \times 4 \times 4 \times 4$

2. $10 \times 10 \times 10$

3. 14×14

4. $3 \times 3 \times 3 \times 3$

5. $2 \times 2 \times 2$

6. $6 \times 6 \times 6 \times 6 \times 6$

7. $8.2 \times 8.2 \times 8.2$

8. $7 \times 7 \times 7 \times 7 \times 7 \times 7$

9. $9.5 \times 9.5 \times 9.5$

Write each power as a product of the same factor. Then find the value.

10. 9^4

11. 2^3

12. 3^5

13. 4^3

14. 6^5

15. 5^4

16. 8.5^3

17. 1.3^2

18. 7^4

19. The number of Calories in a small banana can be written as 2^7 . What whole number does 2^7 represent?

Directions: Answer the following question(s).

1 What is the value of this expression?

$$2(3 + 3)^2 + (5 - 3)^3$$

2 Enter the value of $7^2 - 2^4 + 3 \times 5$.

3 What is the value of $(3^4 - 75)^3$?

- A. -68,921
- B. 18
- C. 216
- D. 109,566

4 Which of the following numbers has the **SMALLEST** value?

- A. $(2 \times 10^4) + (2 \times 10^1)$
- B. $(9 \times 10^2) + (7 \times 10^2)$
- C. $(5 \times 10^3) + (4 \times 10^2)$
- D. $(3 \times 10^3) + (5 \times 10^1)$

5 Evaluate:

$$(9 \times 10^3) + (7 \times 10^2) + (8 \times 10^1) + (6 \times 10^0)$$

- A. 978.6
- B. 9,786
- C. 97,806
- D. 9,000,700,806

Extra Practice → Homework

Numerical Expressions

Find the value of each expression.

1. $14 - 5 + 7$
2. $12 + 10 - 5 - 6$
3. $50 - 6 + 12 + 4$
4. $12 - 2 \times 3$
5. $16 + 4 \times 5$
6. $5 + 3 \times 4 - 7$
7. $2 \times 3 + 9 \times 2$
8. $6 \times 8 + 4 \div 2$
9. $7 \times 6 - 14$
10. $8 + 12 \times 4 \div 8$
11. $13 - 6 \times 2 + 1$
12. $80 \div 10 \times 8$
13. $14 - 2 \times 7 + 0$
14. $156 - 6 \times 0$
15. $30 - 14 \times 2 + 8$
16. $54 \div (8 - 5)$
17. $4^2 + 3^3$
18. $(11 - 7) \times 3 - 5$
19. $25 - 9 + 4$
20. $100 \div 10 \times 2$
21. 3×4^3
22. $11 + 4 \times (12 - 7)$
23. $6^2 - 7 \times 4$
24. $12 + 5^2 - 9$

Name: _____

Error Analysis

Steffe, Jesus and Tabitha have the same problem and find different answers. Below is each person's work:

Steffe's Work	Jesus' Work
$16 + 24 \div 8 + 5^2$ $40 \div 8 + 5^2$ $5 + 5^2$ 5^2 $= 100$	$16 + 24 \div 8 + 5^2$ $40 \div 8 + 5^2$ $5 + 5^2$ $5 + 25$ $= 30$
Tabitha's Work	
$16 + 24 \div 8 + 5^2$ $16 + 24 \div 8 + 25$ $16 + 3 + 25$ $= 44$	

1. Evaluate the expression on your own to determine who is correct.

2. Who made what mistakes?

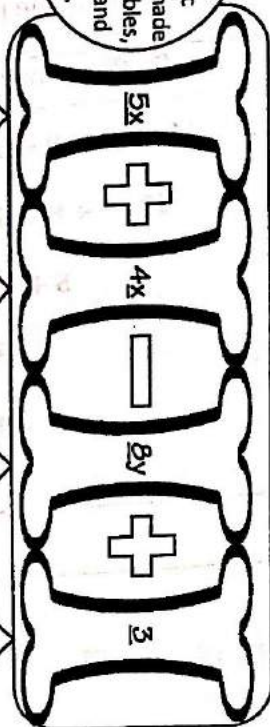
Steffe:

Jesus:

Tabitha:

Algebraic Expressions Anatomy

An algebraic expression is made of terms, variables, coefficients, and constants.



When a variable is "alone," its coefficient is 1 or -1.

A term is a number, variable, or combination of both separated by + or - signs.

A variable is a symbol, such as a letter, that represents an unknown quantity.

A coefficient is the number next to a variable. It is used to multiply a variable.

A constant is a value that does not change. It is usually represented by a number.

Test your knowledge of Algebraic Expressions anatomy by analyzing these bones!

$4x + 3y + 9$

Terms _____
 Variables _____
 Coefficients _____
 Constants _____

$11t + u - 5$

Terms _____
 Variables _____
 Coefficients _____
 Constants _____

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Scattered Bones

You saw that the properties of studying algebra are algebraic expressions, variables, coefficients, and constants. Now it's time to put all of the pieces together. Sort the scattered bones into the correct categories. Label each bone with its own expression, and then label the bones with the correct category. The bones are labeled as follows: Variables (blue), Coefficients (green), Constants (orange).

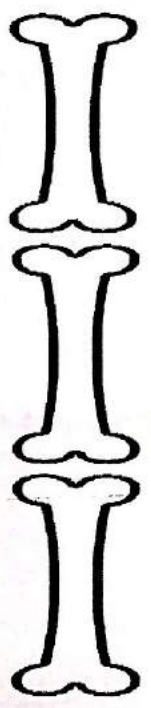
Variables (blue), Coefficients (green), Constants (orange)

Scattered bones containing algebraic expressions and their parts:

- $7z + 10$
- $33 + 5t$
- $7t + 6$
- $-11x$
- $88m - 77$
- 120×4
- $4 + 6y$
- 50
- $9s - 4$
- $32k - 55$
- $12z + 3$
- $-6t - 13$
- $-90v - 90$
- $2d + (-8)$
- $14z + 3$
- $w + 77$

Label the Bones

Some of the bones were pre-labeled. Write expressions on the unlabeled bones that contain no more than 3 terms. Each expression must have at least one variable, one coefficient, and one constant.



Directions: Answer the following question(s).

- 1 How many terms are in the expression $2x^3 + 16x - 12$?

- 2 Which best describes the -2 in the expression $4x^3 - 2x + 9$?

- A. term
- B. factor
- C. product
- D. coefficient

- 3 Which of the following expressions contain 3 terms? Select two that apply.

- A. $8 - 6s + 24z$
- B. $r + 59 - 46k + y^3$
- C. $997 - a^2 - 20e$
- D. $774x - 3p - 18 + 34y$

- 4 Select two expressions that contain a coefficient of 4.

- A. $6y + 4 - 5 \times 8$
- B. $4 + 2w \div 6 + 2$
- C. $4r + 9$
- D. $2 + 4z$

- 5 Which of these are terms of the expression $3x^2 + 2x + 4$?

- A. 3
- B. 4
- C. $2x$
- D. $3x^2$
- E. $2x + 4$
- F. $3x^2 + 4$

- 6 Select all of the following that are coefficients in the expression $a - 3b + 4c + 12$.

- A. a
- B. 1
- C. c
- D. b
- E. 4
- F. 12
- G. -3

1. Label the parts of the expression: **coefficient**, **Constant**, **Variable**

$$8y - 7x + 2y$$

How many TERMS are present in this expression? List them: _____

2.

$$10 + 4 + 2 - 7m + 6$$

How many TERMS are present in this expression? List them: _____

Identify the terms, variables, coefficients, and constants in each expression.

3. $4a - 7b + 5 + c$

Terms: _____

Variables: _____

Coefficients: _____

Constants: _____

5. $5 - 4x - 8y$

Terms: _____

Variables: _____

Coefficients: _____

Constants: _____

4. $7 - 8h - 2 - k$

Terms: _____

Variables: _____

Coefficients: _____

Constants: _____

6. $8k + 7 - k + 4$

Terms: _____

Variables: _____

Coefficients: _____

Constants: _____

When plus or minus signs separate an algebraic expression into parts, each part is a term. The numerical factor of a term that contains a variable is called a **coefficient**. A term that does not contain a variable is called a **constant**.

8 is the coefficient of $8x$.

constant

1 is the coefficient of y because $1y = y$.

Identify the terms, coefficients, and constants in each expression.

17. $3 + 7x + 3x + x$

Terms: _____

Coefficients: _____

Variables: _____

19. $2a + 5c - a + 6a$

Terms: _____

Coefficients: _____

Variable: _____

21. $6m - 2n + 7$

Terms: _____

Coefficients: _____

Constants: _____

Variable: _____

18. $y + 3y + 8y + 2$

Terms: _____

Coefficients: _____

Variable: _____

20. $5c - 2d + 3d - d$

Terms: _____

Coefficients: _____

Variable: _____

22. $7x - 3y + 3z - 2$

Terms: _____

Coefficients: _____

Constants: _____

Variable: _____

Lesson 4: Translating Phrases Into Expressions

Add	Subtract	Multiply	Divide
All together	Take away	Multiply	For each
Sum	Left Over	Product	Divided by
In all	Minus	Times	Per
Plus	Less than	Multiplied by	Quotient
Increased by	Decreased	Of	Each
Total	Difference	Each	Every
More Than	Fewer Than	Per	Shared equally
		Twice	
		Double	

*remember: a variable is a letter used to represent a mystery number

- 5 less than a number _____
- A number plus 7 _____
- 3 times a number _____
- 30 divided by a number _____
- 3 less than twice a number _____
- nine less than a number _____
- five times the number of books in the library _____
- three more pancakes than his brother ate _____
- two more than seven times Lynn's age _____
- 9 minutes less than Frances' time _____
- A plumber charges \$50 to visit a house plus \$40 for every hour of work. Define a variable and write an expression to represent the total cost of hiring a plumber.
- A camp leader figures that she needs one tent for every three campers, plus a tent for herself. Define a variable and write an expression to represent the number of tents needed.

Numerical Expressions Check

Directions: Answer the following question(s).

- 1 The cost of an apple is a dimes, and the cost of a banana is b dimes. Write an expression for the cost of 5 apples and 3 bananas in dimes.
- 2 Sarah is 12 years old. Her sister, Emily, is 8 years less than 3 times Sarah's age. Write an expression for Emily's age in terms of Sarah's age, s .
- 3 Charlie has 6 chocolate bars. Allen has 2 more than half the number of chocolate bars Charlie has. Write an expression for the number of chocolate bars Allen has in terms of the number of chocolate bars Charlie has, c .
- 4 Match each description to the correct expression.
- 5 Daniel has 32 stickers. Daniel's sister, Ashley, has 14 less than twice the number of stickers that Daniel has. Write an expression to represent the number of stickers Ashley has in terms of the number of stickers Daniel has, d .
- 6 Chris bought a pack of 24 pencils. His cousin Michelle has one half of the number of Chris' pencils subtracted from 30. Write an expression to represent the number of pencils Michelle has in terms of the number of pencils Chris has, c .
- 7 Yvette is 18 years old. Her brother George's age is one fourth of 2 years less than Yvette's age. Write an expression that represents George's age in terms of Yvette's age, y .
- 8 James has 7 books. His friend Marcus has 3 less than twice the number of books James has. Write an expression that represents the number of books Marcus has in terms of the number of books James has, j .

Skills Practice

Algebra: Write Expressions

Define a variable. Then write each phrase as an algebraic expression.

1. one more ball than is on the playground
2. three more cookies than are in the jar
3. twelve fewer questions than were on the first test
4. eight dollars more than the shirt costs
5. three times as many drinks on the tray
6. five dollars less than Yumi's pay
7. The English class has half as many students as the math class.
8. one third of Emily's age
9. ten times the minutes spent exercising
10. **MAIL** Spencer bought 3 books of stamps and mailed a package. It cost \$4.50 to mail the package. Define a variable and write an expression to represent the total amount he spent at the post office.

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Five more than twice a number (A)	$30 \div 7n$ (1)
Seven divided by three times a number (B)	$k^3 - 8$ (2)
Three times a number decreased by 11 (C)	$3(n + 15) - 4$ (3)
The product of nine and a number, decreased by six (D)	$2^3 + m$ (4)
Thirty times d (E)	$3x - 11$ (5)
5 decreased by f (F)	$d - 3$ (6)
Eleven less than a number h (G)	$x + 2 + 3$ (7)
Three subtracted from d (H)	$5 - f$ (8)
Thirty divided by 7 times a number (I)	$h - 11$ (9)
The quantity of a number plus 2, increased by 3 (J)	$30d$ (10)
Two to the third power, increased by m (K)	$9x - 6$ (11)
Triple the quantity of n plus 15, decreased by 4 (L)	$7 \div 3x$ (12)
8 less than k cubed (M)	$2x + 5$ (13)

Distributive Property

Use the Distributive Property



Words The **Distributive Property** states that to multiply a sum or difference by a number, multiply each term inside the parentheses by the number outside the parentheses.

Symbols $a(b + c) = ab + ac$

$a(b - c) = ab - ac$

Examples $4(6 + 2) = 4 \cdot 6 + 4 \cdot 2$

$3(7 - 5) = 3 \cdot 7 - 3 \cdot 5$

Use the distributive property to evaluate.

1. $2(16 - 6)$

2. $4(12 + 3)$

3. $3(7 + 2)$

4. $1(8 + 3)$

Use the Distributive Property to rewrite each expression.

7. $8(2 + g)$

8. $4(h - g)$

9. $7(5 - n)$

10. $8(2m + 1)$

Undo the distributive property:

11. $4x + 16$

12. $3x + 15$

13. $7x + 42$

14. $36x + 30$

Homework Practice- The Distributive Property

Use the Distributive Property to rewrite each algebraic expression.

7. $6(n + 4)$

8. $15(2 + r)$

9. $8(s + 5)$

10. $3(b + 8)$

11. $5(6 + b)$

12. $9(3 + v)$

13. $7(r + 7)$

14. $12(4 + v)$

15. $11(3 + s)$

16. MOVIES Use the table that shows the prices of tickets and various food items at the movie theater.

Item	Price
Ticket	\$8.50
Popcorn	\$5.25
Soda	\$4.00
Candy	\$3.75
Nachos	\$6.50

a. Four friends each bought a ticket and a bag of popcorn. How much total money did they spend?

b. How much money will the movie theater make if a birthday party of 12 kids each buys a box of candy and a soda but does not go see a movie?

c. How much more money will a person spend who buys three orders of nachos than a person who buys three bags of popcorn?

Reteach- Equivalent Expressions (Combining Like Terms)

- **Commutative Property:** The order which numbers are added or multiplied does not change the sum or the product.
- $a + b = b + a$ or $a \cdot b = b \cdot a$.
- **Associative Property:** The way in which numbers are grouped does not change the sum or the product.
- $(a + b) + c = a + (b + c)$ or $(a \cdot b) \cdot c = a \cdot (b \cdot c)$
- **Like terms** contain the same variables. Examples: $2y$, y , and $7y$ are all like terms, but $4x$ is not.

Example 1

Simplify the expression $16 + (v + 4)$.

$$\begin{aligned} 16 + (v + 4) &= 16 + (4 + v) \\ &= (16 + 4) + v \\ &= 20 + v \end{aligned}$$

Commutative Property
Associative Property
Add.

So, $16 + (v + 4)$ in simplified form is $20 + v$.

Example 2

Simplify the expression $3x + (6y + 2x)$.

$$\begin{aligned} 3x + (6y + 2x) &= 3x + (2x + 6y) \\ &= (3x + 2x) + 6y \\ &= 5x + 6y \end{aligned}$$

Commutative Property
Associative Property
Combine like terms.

So, $3x + (6y + 2x)$ in simplified form is $5x + 6y$.

Exercises

Simplify each expression. Justify each step.

1. $5 + x + 3$

2. $6 + (x + 4)$

3. $(b + 10) + 15$

4. $8x + 5 + 2x$

5. $(12 + 2u) + 3$

6. $11p + 8 + 7p$

7. $9x + (4z + 3x)$

8. $(8z + 12x) + (2z + 7x)$

9. $5y + 4z + 7z$

Why Did Everybody Hate The Diaper Thief?

Simplify any expression below and find your answer in the corresponding answer column. Write the letter of the exercise in the box that contains the number of the answer. Keep working and you will discover the answer to the title question.

- | | | | |
|--|---|---|---|
| <p>(S) $5x + 2 + 3x$</p> <p>(F) $3 + 7x + 8$</p> <p>(E) $9 + 6x + 2x$</p> <p>(I) $4x + 7 + 4$</p> <p>(O) $9x + 3 + 7x + 4$</p> <p>(T) $x + 3x + 6$</p> <p>(A) $4x + 7 + x$</p> <p>(Y) $9 + x + 1 + 2x$</p> | <p>(15) $4x + 11$</p> <p>(5) $7x + 11$</p> <p>(13) $5x + 7$</p> <p>(28) $8x + 9$</p> <p>(11) $3x + 10$</p> <p>(17) $8x + 2$</p> <p>(23) $16x + 7$</p> <p>(29) $4x + 6$</p> | <p>(I) $4y + 3x + 2y + 9x + 4$</p> <p>(E) $3 + 7x + 7y + 8x + 9$</p> <p>(H) $5x + 8 + 3y + 2x + 8y$</p> <p>(T) $6y + 9 + y + 7x + 6$</p> <p>(X) $1 + 8x + 3y + x + 9y$</p> <p>(L) $x + 7y + 9 + 3y + 6y$</p> <p>(P) $2y + 7 + y + 9y + 4$</p> <p>(B) $5x + 6y + 3x + 7y + x$</p> | <p>(1) $7x + 11y + 8$</p> <p>(24) $12y + 11$</p> <p>(8) $12x + 6y + 4$</p> <p>(9) $9x + 12y + 1$</p> <p>(12) $9x + 13y$</p> <p>(16) $15x + 7y + 12$</p> <p>(3) $x + 16y + 9$</p> <p>(20) $7x + 7y + 15$</p> |
| <p>(I) $3t + 4v + 5t$</p> <p>(A) $7t + 6 + 3v + 6v$</p> <p>(S) $6v + 5t + 8v + 2t$</p> <p>(H) $3t + 9v + 4t + 9v$</p> <p>(E) $t + 5v + 6 + 7t$</p> <p>(O) $8 + 4v + 9t + v$</p> <p>(T) $3t + v + t + 7v$</p> <p>(W) $2v + 8 + t + 7$</p> | <p>(2) $8t + 5v + 6$</p> <p>(21) $7t + 18v$</p> <p>(10) $4t + 8v$</p> <p>(26) $7t + 9v + 6$</p> <p>(18) $t + 2v + 15$</p> <p>(32) $9t + 5v + 8$</p> <p>(19) $8t + 4v$</p> <p>(7) $7t + 14v$</p> | <p>(N) $3z + 6u + 8z + 9 + u$</p> <p>(T) $4 + 3z + 7z + 8 + 4z$</p> <p>(E) $5u + 3z + 9 + 9z + 9u$</p> <p>(C) $z + 6 + 4z + 9 + 8u$</p> <p>(B) $9 + 6u + 3z + 8u + z$</p> <p>(O) $2u + 4 + 3z + 6 + 9$</p> <p>(L) $5u + 7z + 6u + u + 4z$</p> <p>(G) $2z + 8z + 3u + 6z + 4u$</p> | <p>(27) $8u + 5z + 15$</p> <p>(6) $14z + 12$</p> <p>(31) $7u + 16z$</p> <p>(4) $14u + 12z + 9$</p> <p>(25) $12u + 11z$</p> <p>(22) $7u + 11z + 9$</p> <p>(14) $14u + 4z + 9$</p> <p>(30) $2u + 3z + 19$</p> |

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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Directions: Answer the following question(s).

- 1 The perimeter of a square is $20x - 4$ units. What is the unit length of a side of the square, in terms of x ?
-
- 2 Use the distributive property to expand the expression below.
- $6(x - 7)$
-
- 3 Use properties of operations to simplify the expression $24x - y - 2x + 13 - 2 - 4z$.
-
- 4 Create an expression that is equivalent to $5y + 7x - 2y + 3x$, using the fewest terms.
-
- 5 Use properties of operations to simplify the expression below.
- $3(x + 2) + 4y + 9x - 5$
-
- 6 The length of each side of regular pentagon $ABCDE$ is represented by $3x + 1$. Which expression represents the perimeter of the pentagon?
- A. $3x + 5$
B. $15x + 1$
C. $18x + 6$
D. $15x + 5$
- 7 Each side of a regular hexagon is represented by $x + 6$. Which expression represents the perimeter of the hexagon?
- A. $5x + 30$
B. $6x + 6$
C. $36x$
D. $6x + 36$

- 8 The length of a side of an equilateral triangle is represented by $x + 3$. What is the perimeter of the triangle?
- A. $9x$
B. $3x + 3$
C. $3x + 6$
D. $3x + 9$
- 9 Which of these is equivalent to the expression $2x + xy$?
- A. $(2 + x)y$
B. $2x(1 + y)$
C. $x(2 + y)$
D. $3xy$

Reteach- Algebra: Variables and Expressions

- A **variable** is a symbol, usually a letter, used to represent a number.
- In addition to the symbol \times , the other ways to show multiplication are $2 \cdot 3$, $5t$, and st .
- **Algebraic expressions** contain at least one variable and at least one operation.

Example 1

Evaluate $35 + x$ if $x = 6$.

$$35 + x = 35 + 6$$

$$= 41$$

Replace x with 6.
Add 35 and 6.

Example 2

Evaluate $y + x$ if $x = 21$ and $y = 35$.

$$y + x = 35 + 21$$

$$= 56$$

Replace x with 21
and y with 35.
Add 35 and 21.

Example 3

Evaluate $4n + 3$ if $n = 2$.

$$4n + 3 = 4 \cdot 2 + 3$$

$$= 8 + 3$$

of 4 and 2.

$$= 11$$

Replace n with 2.
Find the product

Add 8 and 3.

Example 4

Evaluate $4n - 2$ if $n = 5$.

$$4n - 2 = 4 \cdot 5 - 2$$

$$= 20 - 2$$

$$= 18$$

Replace n with 5.
Find the product
of 4 and 5.
Subtract 2 from 20

Practice:

Evaluate each expression if $y = 4$.

1. $3 + y$

2. $y + 8$

3. $4 \cdot y$

4. $9y$

5. $15y$

6. $300y$

7. y^2

8. $y^2 + 18$

9. $y^2 + 3 \cdot 7$

Evaluate each expression if $m = 3$ and $k = 10$.

10. $16 + m$

11. $4k$

12. $m \cdot k$

13. $m + k$

14. $7m + k$

15. $6k + m$

Directions: Answer the following question(s).

- 1 A ticket broker is selling seats to a rock concert. If the broker's commission is a \$5.00 base fee and \$0.50 extra for every ticket (t), the total cost for the broker's services is calculated by the expression below.

$$\$0.50t + \$5.00$$

How much, in dollars, does the broker earn by selling 12 tickets?

- 2 The soccer club had a party in a private room at a restaurant. The restaurant charged \$25 for the private room, and \$9 per person. The cost, C , for p people to attend the party is modeled by the equation below.

$$C = \$25 + \$9p$$

How much, in dollars, did it cost if 18 people attended the party?

- 3 What is the value of this expression when $z = 7$?

$$5z + 9$$

- 4 What is the value of this expression when $x = 5$?

$$x^2 - 2x$$

- 5 What is the value of the expression $2y^3 - 6y$ when $y = 3$?

- 6 The airport taxi service uses the formula below to compute the cost of a trip.

$$T = \$3.00 + \$0.35m$$

T is the total cost of the trip, \$3 is the base charge, and m is the time in minutes of the trip. Use the formula to find the cost of a trip that lasts 50 minutes.

- 7 What is the value of the expression $7x^3 + 4x - 12$ when $x = 2$?

- 8 What is the value of this expression when $y = 4$?

$$4y^2 + 3y - 8$$

Skills Practice- Algebra: Variables and Expressions

Complete the table.

Algebraic Expressions	Variables	Numbers	Operations
1. $5d + 2c$			
2. $5w - 4y + 28$			
3. $xy \div 4 + 3m - 6$			

Evaluate each expression if $a = 3$ and $b = 4$.

4. $10 + b$

5. $2a + 8$

6. $4b - 5a$

7. $a \cdot b$

8. $7a \cdot 9b$

9. $8a - 9$

10. $b \cdot 22$

11. $a^2 + 1$

12. $18 \div 2a$

13. $a^2 \cdot b^2$

14. $ab \div 3$

15. $15a - 4b$

16. $ab + 7 \cdot 11$

17. $36 \div 6a$

18. $7a + 8b \cdot 2$

Evaluate each expression if $x = 7$, $y = \frac{1}{2}$, and $z = 8$.

19. $x + 2z$

20. $4x - 2z$

21. $4y$

Unit 3 Study Guide: Expressions (Chapter 5 in Textbook)

Name: _____ Period: _____ Due Date: _____

Standard	Problems
EE.1: Write and evaluate expressions with exponents.	<p>Evaluate the following expressions:</p> <p>1. $20 - 36 \div 3^2 \cdot 2$</p> <p>2. $10 - 3 \times 2 + 8 \div (3 - 1)^2$</p> <p>3. Lex evaluated the following expression. His work is shown:</p> $\begin{array}{l} 4 + (16 \div 4) * 2^3 \\ 20 \div 4 * 2^3 \\ 5 * 2^3 \\ 5 * 8 \\ = 40 \end{array}$ <p>Do you agree with his answer?</p> <p>What mistakes were made, if any?</p> <p>4. Evaluate $(\frac{1}{2})^3$</p> <p>5. Evaluate 7^3:</p> <p>6. Evaluate 3^4: _____</p> <p>7. Write $4 \times 4 \times 4 \times 4$ as an exponent.</p>

2a: Write expressions with numbers and variables (translating word phrases into algebraic expressions)

Write an algebraic expression for:

1. six less than some number: _____
2. twice the sum of a number and 5: _____
3. fifteen less m: _____
4. three times a number: _____
5. twice a number: _____
6. h divided by twelve: _____

2b: Identify parts of an expression using mathematical terms.

Term: Each part of an algebraic expression separated by a plus or minus sign

Constant: A term without a variable; a number without a variable (ex. 3)

Coefficient: The numerical factor being multiplied by a variable (ex. $3x$)

Variable: a mystery number represented by a letter.

Identify the parts of the following expressions:

$2m^3 + 4c - 5$

$10x + 16 - 5x^2$

Variables: _____

Variables: _____

Terms: _____

Terms: _____

Coefficients: _____

Coefficients: _____

Constants: _____

Constants: _____

Complete the table below:

Expression	Number of Terms	List the Constants, or write None	List the Coefficients, or write None	List the Variables, or write None
$5x + 2$				
$11y + 3x$				
$b^2 + 5b - 1$				
$x^2 + 3y + 4x$				
$9g + f + 8$				

2c: Evaluate expressions at specific values for their variables.

1. Evaluate $3x^2 - (x + 1)$ when $x=2$. _____

2. There are 3 times as many oranges as apples in a fruit bowl. If a represents the number of apples, how many oranges are there when $a= 5$? Use the expression $3a$

3. Evaluate $x^2 + 5x - 1$ when:

$x = 2$: _____

$x = 4$: _____

4. Evaluate $5(n-2)$ when:

$n = 3$: _____

$n = 5$: _____

$n = 10$: _____

5. Evaluate $k + (5 \cdot 4)$ when:

$k = 5$: _____

$k = 8$: _____

$k = 12$: _____

6. Evaluate $n \cdot (3^2 - n^2) - 1$ when $n = 2$: