

GRADE 6

Chapter 2

WHAT WE ARE LEARNING

Operation Sense

VOCABULARY

Here are some of the vocabulary words we use in class:

Numerical expression

A mathematical phrase that includes only numbers and operation symbols

Variable A letter or symbol that can stand for one or more numbers

Algebraic expression

An expression that includes a variable

Evaluate To find a value of a numerical or algebraic expression

Equation A statement showing that two quantities are equal

Solution The value of the variable that makes the equation true

Compensation A mental math strategy you can use for some addition and subtraction problems

Date

Dear Family,

Your child is learning how to evaluate expressions and solve equations.

Your child is also learning to use properties and mental math to simplify finding answers.

Ask questions such as these as you work together.

- Use the Commutative Property.

$$54 + 52 + 6 = 54 + 6 + 52$$

Can you explain the **Commutative Property and the Associative Property to me?** Your child might say: With the Commutative Property I can change the order of the addends and get the same sum.

- Use the Associative Property.

$$\begin{aligned} 54 + 52 + 6 &= (54 + 6) + 52 \\ &= 60 + 52 \\ &= 112 \end{aligned}$$

The Associative Property lets me group addends in any way and get the same sum.

- Use compensation.

$$\begin{aligned} 54 + 52 &= (54 + 6) + (52 - 6) \\ &= 60 + 46 \\ &= 106 \end{aligned}$$

Can you explain the **strategy of compensation?** Your child might respond: When I'm adding, I can change one addend to a multiple of ten and then adjust the other addend by subtracting the same number to keep the balance. When I use compensation to subtract, I have to do the same thing to each number.

Why might you use these properties? Your child might reply: When I use mental math, the properties help me to find the answer more easily.

Exponent An exponent shows how many times a number is used as a factor

Base The base is the number that an exponent shows is used as a factor

Order of operations

The process for evaluating expressions: first perform the operations in parentheses, clear the exponents, perform all multiplication and division, and then perform all addition and subtraction

Algebraic operating system (AOS) Some calculators use an algebraic operating system so they automatically follow the order of operations.

Your child has learned this about exponents.

Step 1: To find the value of a number expressed by a base and an exponent, use the base as a factor the number of times indicated by the exponent.

$$3^4 = 3 \times 3 \times 3 \times 3 \\ = 81$$

Step 2: To represent a number using the base and an exponent, find the equal factors. Write the factor as the base and the number of times it is used as the exponent.

$$81 = 3 \times 3 \times 3 \times 3 \\ = 3^4$$

What is a factor and what is a base? Your child might answer: Factors are numbers that are multiplied to get a product. An exponent shows how many times a number called the base is used as a factor.

Can you show me how to find the value of 7^5 ? Your child might answer: I use 7 as a factor 5 times.
 $7 \times 7 \times 7 \times 7 \times 7 = 16,807.$

How would you write 512 using an exponent and the base 8? Your child might answer: $8 \times 8 \times 8 = 512$, so the base is 8 and the exponent is 3: 8^3 .

As you work with your child, talk about math to help build confidence and understanding.

Sincerely,

Operation Sense

Evaluate each expression.

1. $a - 75$, for $a = 220$ _____
 2. $d \times 40$, for $d = 10$ _____
 3. $240 + b$, for $b = 80$ _____
 4. $c \div 20$, for $c = 300$ _____

Solve each equation by using mental math.

5. $a + 12 = 15$ _____
 6. $b \div 12 = 4$ _____
 7. $c \times 23 = 460$ _____
 8. $a - 7 = 15 + 5$ _____

Find the value of n . Name the property used.

9. $5 \times (6 + 4) = (5 \times n) + 5 \times 4$ _____
 10. $1 \times n = 26$ _____
 11. $48 \times 63 = 63 \times n$ _____

Use mental math to find the values.

12. 25×8 _____
 13. $83 + 42$ _____
 14. $33 + 19 + 7$ _____
 15. $23 + 42 + 61$ _____

Write the equal factors. Then find the value.

16. 6^5 _____
 17. 42^1 _____
 18. 62^2 _____
 19. 10^6 _____
 20. 1^8 _____

Write in exponent form.

21. $17 \times 17 \times 17 \times 17$ _____
 22. $n \times n \times n$ _____

Evaluate the expressions.

23. $26 - (32 - 16) + (23 - 21)^2$ _____
 24. $(5^2 - 4^2) + (6 \times 4) + 2$ _____

Evaluate the expression for $a = 3$ and $b = 8$.

25. $(11 - b) + 3$ _____
 26. $a^2 + 1 \times (4 + 5)$ _____

Answers: 1. 145; 2. 400; 3. 320; 4. 15; 5. $a = 3$; 6. $b = 48$; 7. $c = 20$; 8. $a = 27$; 9. $n = 6$, Distributive Property; 10. 26, Identity Property; 11. 48, Commutative Property; 12. 200; 13. 125; 14. 59; 15. 126; 16. $6 \times 6 \times 6 \times 6 \times 6$; 17. 42; 18. $62 \times 62 \times 62$; 19. $10 \times 10 \times 10 \times 10 \times 10 \times 10$; 20. $1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1$; 21. 17^4 ; 22. n^3 ; 23. 14; 24. 35; 25. 6; 26. 18



Convert the value of the following expressions into letters to read the message. HINT: Pél  said it.

A = 12	B = 5	C = 6	D = 14	E = 8	F = 15	G = 13	H = 2
I = 9	J = 20	K = 51	L = 17	M = 18	N = 7	O = 0	P = 20
Q = 19	R = 3	S = 10	T = 1	U = 5	V = 50	W = 4	X = 16
Y = 21	Z = 62						



1. ____ $(6 + 12) - 9$
2. ____ 2^2
3. ____ $(5 \times 2) + 2$
4. ____ 10^1
5. ____ $25 = n^2, n = \underline{\hspace{1cm}}$
6. ____ $(8 + 12) - (12 + 8)$
7. ____ $(13 - 8) \times 2 - 7$
8. ____ $(10^1 - 3) \times 1^2$
9. ____ $5^2 - 10$
10. ____ $(10 - 8) - 2$
11. ____ What is the exponent in the expression 11^3 ?
12. ____ $17 + 23 - 16 - 7 \times 2$
13. ____ $45 \times 2 + 7 + 3 - 10^2$
14. ____ What is the base in the expression 6^2 ?
15. ____ $48 \div 4 \div 2$
16. ____ One less than 3^2
17. ____ $15 - 4 \times 3$