

PART I GET STARTED**Today's Mathematics**

We will use properties to rearrange and regroup addition and multiplication.

Essential Question

When can changing order or grouping make calculations easier?

DO NOW

1. Write an expression for 8 more than n .
2. Write an expression for twice the difference of x and 3.
3. Evaluate $4t + 2$ when $t = 5$.

SEE IT

Find $18 + 7 + 2$ mentally. Write a different order or grouping that makes the sum easy.

QUICK WRITE — 2 MINUTES

What is the difference between changing the order and changing the grouping?

PART II INVESTIGATE

BUILD AND COMPARE

Calculate both sides. Decide whether changing the order or grouping preserves the value.

Pair of expressions	Left value	Right value
$3 + 8$ and $8 + 3$		
3×8 and 8×3		
$8 \div 2$ and $2 \div 8$		
$(2 + 6) + 4$ and $2 + (6 + 4)$		

1. Which examples change order? Which changes grouping?

2. Compare $(24 \div 6) \div 2$ and $24 \div (6 \div 2)$. Does regrouping division preserve the value?

3. Write one multiplication example where regrouping makes the calculation easier.

PART III MAKE SENSE AND PRACTICE**WHAT WE CAN CONCLUDE**

Commutative properties change order: $a + b = b + a$ and $ab = ba$. Associative properties change grouping: $(a + b) + c = a + (b + c)$ and $(ab)c = a(bc)$. Adding 0 or multiplying by 1 leaves a value unchanged. Multiplying by 0 gives 0. These rearrangement rules do not apply to subtraction or division.

WORKED MODEL

$8 + (x + 2) = (8 + 2) + x = 10 + x$. Use commutative and associative properties to put the constants together. Also, $4(5y) = (4 \cdot 5)y = 20y$.

MUST DO

1. Name the property: $a + 9 = 9 + a$.
2. Name the property: $(2x)5 = 2(x5)$.
3. Simplify $6 + (p + 4)$. Show the regrouping.
4. Simplify $3(7m)$.
5. Simplify $b + 0$ and $1c$.

READY FOR MORE

A student says $12 \div (3 \div 2) = (12 \div 3) \div 2$. Find both values and explain.

PART IV PUZZLE PRACTICE

Homework — Crack the code

Simplify each expression. Match to the letter bank. Record the letters in problem order.

No.	Problem	Work and result
1	$4 + (x + 6)$	
2	$2(5x)$	
3	$x + 0$	
4	$1(8x)$	
5	$0(9x)$	
6	$7 + (x + 2)$	
7	$3(4x)$	
8	$5 + (x + 8)$	

LETTER BANK

Letter	Expression	Letter	Expression
G	$10 + x$	R	$10x$
O	x	U	$8x$
P	0	N	$9 + x$
O	$12x$	W	$13 + x$

DECODE

1	2	3	4	5	6	7	8