

## PROPERTIES

def

**ASSOCIATIVE PROPERTY: THE WAY YOU GROUP NUMBERS WHEN YOU ADD OR MULTIPLY DOES NOT CHANGE THE SUM OR PRODUCT.**

$$(a+b)+c = a+(b+c) \quad (2+3)+4 = 2+(3+4)$$

$$(ab)c = a(bc) \quad (2 \cdot 3)4 = 2(3 \cdot 4)$$

\* THINK ASSOCIATE, "HANG OUT", GROUP

def

**COMMUTATIVE PROPERTY: THE ORDER IN WHICH YOU ADD OR MULTIPLY DOES NOT CHANGE THE SUM OR PRODUCT.**

$$a+b = b+a$$

$$a \times b = b \times a$$

$$3+4 = 4+3$$

$$3 \times 4 = 4 \times 3$$

\* THINK COMMUTE, MOVE, ORDER

def

**IDENTITY PROPERTY OF ADDITION: ADDING ZERO TO ANY NUMBER DOES NOT CHANGE ITS VALUE.**

$$3+0 = 3$$

$$49+0 = 49$$

def

**IDENTITY PROPERTY OF MULTIPLICATION: MULTIPLYING ANY NUMBER TIMES ONE DOES NOT CHANGE ITS VALUE.**

$$3 \times 1 = 3$$

$$49 \times 1 = 49$$

## DISTRIBUTIVE PROPERTY:

$$a \cdot (b+c) = a \cdot b + a \cdot c$$

$$2(4+7)$$

$$2 \cdot 11$$

$$\boxed{22}$$

$$2(4+7)$$

$$2 \cdot 4 + 2 \cdot 7$$

$$8 + 14$$

$$\boxed{22}$$

## EXAMPLES:

1)  $10 \cdot 23$

$$10(20+3)$$

$$10 \cdot 20 + 10 \cdot 3$$

$$200 + 30$$

$$\boxed{230}$$

## REMEMBER

$$10 \cdot 23 = 10 \times 23 = 10(23)$$

2)  $12 \cdot 41$

$$12(40+1)$$

$$12 \cdot 40 + 12 \cdot 1$$

$$480 + 12$$

$$\boxed{492}$$

3)  $11(45)$

$$11(40+5)$$

$$11 \cdot 40 + 11 \cdot 5$$

$$440 + 55$$

$$\boxed{495}$$

4)  $2 \times 123$

$$2(100+20+3)$$

$$2 \cdot 100 + 2 \cdot 20 + 2 \cdot 3$$

$$200 + 40 + 6$$

$$\boxed{246}$$

5)  $2(x+1)$

$$2x + 2 \cdot 1$$

$$\boxed{2x+2}$$

cannot combine  
not like terms  
(variable and  
constant)

6)  $5(5y+5y)$

$$5 \cdot 5y + 5 \cdot 5y$$

$$25y + 30y$$

$$\boxed{55y}$$

can combine  
because like  
terms (both y)

7)  $9(9x+y)$

$$9(9x) + 9(y)$$

$$\boxed{81x+9y}$$

cannot  
combine  
not like  
terms (x+y)

## FACTORING USING DISTRIBUTIVE PROPERTY:

$$12 + 8$$

20

$$4 \overline{) 12 + 8}$$

$$3 + 2$$

$$\boxed{4(3+2)}$$

$$4(5)$$

20

SAME  
ANSWER

FIND GCF  
FOR OUTSIDE

## EXAMPLES:

$$1) 9 + 21$$

$$\boxed{3(3+7)}$$

$$3 \overline{) 9 + 21}$$

$$3 + 7$$

$$2) 14 + 28$$

$$\boxed{14(1+2)}$$

$$7 \overline{) 14 + 28}$$

$$2 \overline{) 2 + 4}$$

$$1 + 2$$

$$3) 5x + 15$$

$$\boxed{5(x+3)}$$

$$5 \overline{) 5x + 15}$$

$$x + 3$$

$$4) 16x + 8y$$

$$\boxed{8(2x+y)}$$

$$8 \overline{) 16x + 8y}$$

$$2x + y$$