



Bell Ringer:



If  $(ab) = 37$  and  $(xy) = 1/37$ , what is the product of:  $x \times b \times y \times a$ ?

Give some indication as to how you used the commutative and associative properties of multiplication to evaluate the above expression.

$$x \cdot y \cdot b \cdot a$$

$$(x \cdot y) \cdot (a \cdot b) = \cancel{37} \cdot \cancel{37} = \frac{37}{37} = 1$$

$$\left(\begin{array}{c} + \\ - \end{array}\right) \left(\begin{array}{c} + \\ - \end{array}\right) = \begin{array}{c} 9 \\ - \end{array} x + \begin{array}{c} -3 \\ - \end{array} + 10 + \begin{array}{c} -5 \\ - \end{array} x$$

Assoc. Prop.

$$(9x - 5x) + (-3 + 10)$$

Comm. Prop.

Assoc. Prop.

$$3Sw + 55 - 10w$$

$$~~28w + 75 - Sw + 12~~$$

$$23w$$

$$25w$$

$$48w + 142$$

$$48w + 142 = 350$$
$$48(4) + 142$$
$$192 + 142$$
$$334 \neq 350$$
$$\$16$$

$$\begin{array}{r} 48n + 142 \\ 50n + 25 \\ \hline \end{array}$$

$$98n + 167 = 525$$

$$98(4)$$

$$392 + 167$$

$$\textcircled{559} \neq 525$$

## The Distributive Property

**Exercise #1:** Consider the product  $4 \times 15$ .

(a) Evaluate using the standard algorithm.

$$\begin{array}{r} \phantom{x} 15 \\ \times \phantom{0} 4 \\ \hline 60 \end{array}$$

(b) Represent the equivalent product  $4 \times (10 + 5)$  as repeated addition of 10 and 5. Find the product.

$$(10+5) + (10+5) + (10+5) + (10+5)$$

(60)

Evaluate each product by using the distributive property to make it easier.

$$4(10+5)$$

$$(a) 7(23) \quad 4(10) + 4(5)$$

$$7(20+3)$$

$$7(20) + 7(3)$$

$$140 + 21$$

$$161$$

$$(b) 9(18)$$

$$9(10+8)$$

$$9(10) + 9(8)$$

$$90 + 72$$

$$162$$

The distributive property can be used twice in order to multiply two digit numbers.

find the product  $(12)(28)$  by evaluating  $(10+2)(20+8)$

$$200 + 80 + 40 + 16$$

FOIL

$$336$$



$$(10+2)(20+8)$$

$$10(20) + 10(8) + 2(20) + 2(8)$$
$$200 + 80 + 40 + 16$$

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DOUBLE DISTRIBUTION

$$(10+2)(20+8)$$

$\times$	20		8
10	200		80
2	40		16

$200 + 40 + 80 + 16$

336

Insert parentheses to make each statement true.

a.  $(2 + 3) \times 4^2 + 1 = 81$  ✓

b.  $(2 + 3) \times (4^2 + 1) = 85$  ✓

c.  $2 + (3 \times 4^2) + 1 = 51$  ✓

d.  $2 + 3 \times (4^2 + 1) = 53$

$2 + 3 \times 17$  ✓

$2 + 51 = 53$

Express the following products as **binomial** expressions.

(a)  $5(2x+3)$

$$10x + 15$$

(b)  $-4(5x-8)$

$$-20x + 32$$

$$x^1 \cdot x^1 = x^{1+1} = x^2$$

(c)  $x(x+4)$

$$x^2 + 4x$$

(d)  $5x(2-7x)$

$$10x - 35x^2$$

Express each of the following **quotients** as **binomials** in simplest form.

$$\frac{\cancel{4}8x}{\cancel{2}^1} + \frac{\cancel{4}2}{\cancel{2}^1}$$

$$4x + 2$$

(a)  $\frac{8x+4}{2}$

$$\frac{\cancel{25}x}{\cancel{5}^1} - \frac{\cancel{50}}{\cancel{5}^1}$$

$$5x - 10$$

(b)  $\frac{25x-50}{5}$

$$\frac{2x}{4} - \frac{4/16}{4/1}$$

$$\frac{1}{2}x - \frac{1}{4}$$

$$\frac{1}{2}x + \frac{1}{4}$$

(c)  $\frac{2x-16}{4}$

$\frac{1}{2}x - 4$ , or  $\frac{x}{2} - 4$

(d)  $\frac{-9x+18}{12}$

Fill in the blanks of this proof showing that  $(w + 5)(w + 2)$  is equivalent  $w^2 + 7w + 10$ . Write "commutative property," "associative property," or "distributive property" in each blank.

$(w + 5)(w + 2)$	$= w + 5$	$w + (w + 5) \times 2$	_____
	$= w$	$w + 5 + (w + 5) \times 2$	_____
	$= w$	$w + 5 + 2(w + 5)$	_____
	$= w^2 + w \times 5 + 2(w + 5)$		_____
	$= w^2 + 5w + 2(w + 5)$		_____
	$= w^2 + 5w + 2w + 10$		_____
	$= w^2 + (5w + 2w) + 10$		_____
	$= w^2 + 7w + 10$		_____

Group Work:  
Solve problems 1-6,  
Fluency, Applications, &  
Reasoning