

1. The Distributive Property

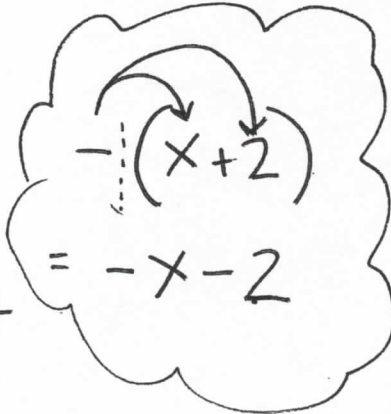
If we have  $a(b + c)$ , we can write

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

We say that the multiplication has been distributed over addition.

**Examples** – Expand the following. Use an area model to justify the result.

1)  $6(y-3)$   
 $= 6y - 18$



3)  $-2(x+7)$   
 $= -2x - 14$

2)  $4(5-m)$   
 $= 20 - 4m$   
 $= -4m + 20$

4)  $-8(-n-9)$   
 $= 8n + 72$

$-2(c+5)$   
 $= -2c - 10$

$(a-6)2$   
 $= 2a - 12$

5) Kyle and 5 friends go The Zone to go bowling and hang out. Each person spends \$7 to bowl one game, including shoe rental, and \$4 each for drinks and snacks.

a) Write 2 different expressions to find the total cost of their evening out.

$6(7) + 4$   
 $= 6(11) = 66$

or  $6(7) + 6(4)$   
 $= 42 + 24$   
 $= 66$

← distributive

b) Evaluate each expression.

**To think about:**

How do you think the distributive property can be applied when there is a sum of 3 terms, such as  $2(a + b + c)$ ? Give an example to justify your answer.

$2(a+b+c)$   
 $= 2a + 2b + 2c$

$3(2x+3x+7)$   
 $= 3(5x+7)$

$4(x^2+y+3)$   
 $= 4x^2 + 4y + 12$  ✓

$= 15x + 21$

Sec 4.5 – Solving Equations Involving The Distributive Property

If an equation has brackets surrounding an expression, you may distribute the number in the front to remove the brackets. However, if the constant on the other side of the equal sign is divisible by the number in front of the brackets, you may choose to divide first. It is your choice!

**Example**

- 1) Solve the following equations algebraically, showing proper steps. Show 2 different methods. Verify the solution.

a)  $4(y+3)=4$

$$4y + 12 = 4 - 12$$

$$\frac{4y}{4} = \frac{-8}{4}$$

$$y = -2$$

Distributing First

verify

$$4(-2+3) = 4$$

$$4(1) = 4$$

$$4 = 4$$

✓ ✓

Dividing First

$$\frac{4(y+3)}{4} = \frac{4}{4}$$

$$y+3 = 1-3$$

$$y = -2$$

b)  $6 = -3(n-7)$

$$6 = -3n + 21$$

$$\frac{-15}{-3} = \frac{-3n}{-3}$$

$$5 = n$$

$$\frac{6}{-3} = \frac{-3(n-7)}{-3}$$

$$-2 = n-7+7$$

$$5 = n$$

c)  $2(x-1)=5$

$$2x - 2 = 5 + 2$$

$$\frac{2x}{2} = \frac{7}{2}$$

$$x = \frac{7}{2} \text{ or } 3\frac{1}{2}$$

$$5(-x + 2x + 3) = 5$$

$$= -5x + 10x + 15 = 5$$

$$= +5x + 15 = 5 - 15$$

$$\frac{5x}{5} = \frac{-10}{5}$$

$$x = -2$$