2.7: The Distributive Property

INVESTIGATION: Consider this chart-

Expression	Addition	Answer
$2(x+1)$	$(x+1)+(x+1)$ $=x+x+1+1$ $=2x+2$	$=2x+2$
$2(m-1)$	$(m-1)+(m-1)$ $= m+m-1-1$ $= 2m-2$	$2m-2$
$3(2y+1)$	$3(2y+1)$ $= 2y+1+2y+1+2y+1$ $= 6y+3$	$6y+3$
$4(a+b)$	$4(a+b)$ $= a+b+a+b+a+b+a+b$ $= 4a+4b$	$4a+4b$

What do you notice about the expression (column 1) and the answer (column 3)?

Multiply each term outside with the terms inside.

What would you predict to be the answer to $25(x-3)$?

$= 25x-75$

The Distributive Property:

Multiply each term outside the bracket by the term inside the bracket.

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

Try these examples. When you are done, show your math teacher. Remember to add the exponents when the bases are the same !!

a. $4(2x^2-3x+1)$

$= 8x^2-12x+4$

c. $-3(2x+3y-z)$

$= -6x-9y+3z$

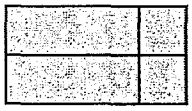
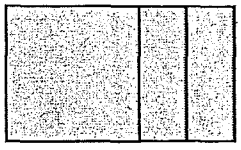
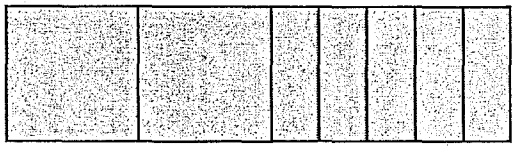
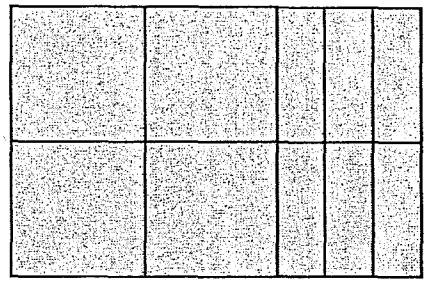
b. $2(-a+5)$

$= -2a+10$

d. $2x^2(3x^3-4x+1)$

$= 6x^5-8x^3+2x^2$

1. In the rectangles below, the short sides have a length of 1. The long sides have a length of x.

Rectangle	Width	Length	Area	Equation
	2	$x+1$	$2x+2$	$2(x+1)=2x+2$
	x	$x+2$	x^2+2x	$x(x+2)$ $=x^2+2x$
	x	$2x+5$	$2x^2+5x$	$x(2x+5)$ $=2x^2+5x$
	$2x$	$2x+3$	$4x^2+6x$	$2x(2x+3)$ $=4x^2+6x$

Example: Expand and simplify. Remember to follow the rules of BEDMAS!

a. $2(5a^2-3a+4)$

$=10a^2-6a+8$

b. $(4x^2-2x+1)(-3y)$

$=-12x^2y+6xy-3y$

c. $-5m(4m-3m+2n)$

$=-20m^2+15m^2-10mn$

$=-5m^2-10mn$

Or Simplify inside the bracket first before expanding.

d. $-2(x+3)+2(2x-1)$

$= -2x+6+4x-2$

$= 2x+4$

e. $\frac{1}{2}(2w-6)-\frac{2}{3}(9w-6)$

$= w-3-6w+4$

$= -5w+1$

f. $3[2x+5(2y+1)]$

$= 3[2x+10y+5]$

$= 6x+30y+15$

g. $-0.7(2w-6)-0.15w[(4w-3)-3]$ $(4w-6)$

$= -1.4w+4.2-0.60w^2+0.9w$

$= -0.60w^2-0.5w+4.2$

h. $3x[2x^2+5x^4]$

$= 6x^3+15x^5$

i. $2[3+2(x-6)]+3[-2(x-5)+(x-3)(-8)]$

$= 2[3+2x-12]+3[-2x+10-8x+24]$

$= 2[2x-9]+3[-10x+34]$

$= 4x-18-30x+102$

$= -26x+84$

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