

Distributive Property!

Unit 3: Polynomials

3.4 Multiplying Polynomials

Recall:  $(x+2)^2 = (x+2)(x+2) = x^2 + 4x + 4$

$= x^2 + 2x + 2x + 4$

What if there is a coefficient in front of 2 binomials?

Ex.) a)  $5(2x-3)(x-6)$

$= (10x-15)(x-6)$

F:  $10x^2$   
O:  $-60x$   
I:  $-15x$   
L:  $90$

$10x^2 - 75x + 90$

b)  $-8(7p+3)(7p+3)$

$= (-56p-24)(7p+3)$

$= -392p^2 - 168p - 168p - 72$

$-392p^2 - 336p - 72$

**Steps:**

- ① Multiply coefficient into 1st bracket only.
- ② FOIL.

Distributive Property!

Simplifying the sum or difference of polynomial multiplication.

Ex.) Expand and simplify:

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a)  $(x+5)(x-5) - (x+2)(x+8)$



$= x^2 - 5x + 5x - 25 - (x^2 + 10x + 16)$

$= x^2 - 25 + (-x^2 - 10x - 16)$

$= x^2 - 25 - x^2 - 10x - 16$

$= -10x - 41$

Distributive Property!

b)  $(9a+4)(4a-9) - (6a-5)(6a-5)$

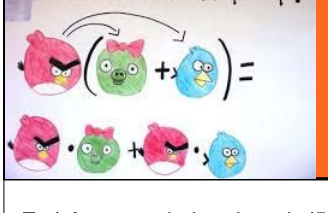

$= 36a^2 - 65a - 36 + (-36a^2 + 60a + 25)$

$= -5a - 61$

9a	+4
4a	36a <sup>2</sup> 16a
-9	-81a -36
36a <sup>2</sup> - 65a - 36	

6a	-5
6a	36a <sup>2</sup> -30a
-5	30a +25
36a <sup>2</sup> - 60a + 25	

Distributive Property!

Ex.) A rectangle has length  $(5x+2)$  and width  $(x^2+2x+1)$ . Find the area of the rectangle.

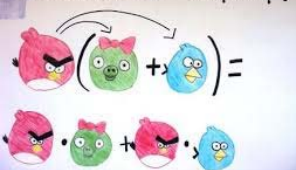

$A = l \cdot w$

$A = (5x+2)(x^2+2x+1)$

$A = 2x^2 + 4x + 2 + 5x^3 + 10x^2 + 5x$

5x+2
x <sup>2</sup> 5x <sup>3</sup> 2x <sup>3</sup>
+2x 10x <sup>2</sup> 4x
+1 5x 2
5x <sup>3</sup> + 12x <sup>2</sup> + 9x + 2

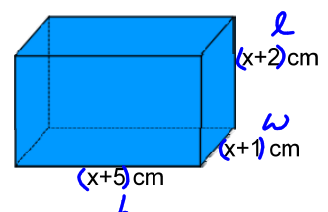
Distributive Property!

Ex.) Consider the prism shown.  $V = l \cdot w \cdot h$

a) Write an expression which represent the volume.

$(x+2)(x+1)(x+5)$



b) Expand the expression in a).

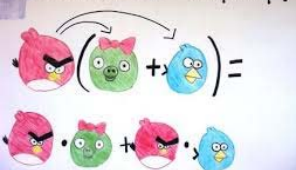

$(x+2)(x^2+6x+5)$

$x^2$	$x$	$+2$
$x^2$	$6x^2$	$2x^2$
$+6x$	$12x$	$12x$
$+5$	$5x$	$10$

$(x+1)(x+5)$   
 $= x^2 + 5x + 1x + 5$   
 $= x^2 + 6x + 5$

$V = x^3 + 8x^2 + 17x + 10 \text{ cm}^3$

Distributive Property!

Ex.) Simplify:

a)  $(x+1)(x-2)(x+3)$

$= (x+1)(x^2+3x-2x-6)$

$= (x+1)(x^2+1x-6)$

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

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

b)  $(2x^2+3x+1)(x+4)$

	$2x^2$	$+3x$	$+1$
$x$	$2x^3$	$3x^2$	$x$
$+4$	$8x^2$	$12x$	$4$

$2x^3 + 11x^2 + 13x + 4$

Practice Test 3.1-3.5  
 #1-7.