Warm Up

Find the product of the following expressions:

$2x(x+1)$ $3x(2x)(4x)$ $(2x-1)(3x+2)$

$= 2x^2 + 2x$ $= 24x^3$ $= 6x^2 + 4x - 3x - 2$

$= 6x^2 + x - 2$

Multiplying Polynomials

Lesson objectives

- I know how to prove that two expressions are not equivalent
- I know how to prove that two expressions are equivalent

1.1

Lesson objectives | Teachers' notes | Lesson notes

Nelson Page 95 #s 4def, 6ace, 7 & 11-13

Properties of Multiplication

Commutative Property: the order in which we multiply doesn't matter.

Eg ab = ba or 2(3) = 3(2)

Associative Property: extending commutative from two to terms to three.

Eg (ab)c = a(bc)

Distributive Property: multiplying to remove the brackets

Single: a(b + c) = ab + ac

Double: (a + b)(c + d) = (ac + ad + bc + bd)

Multiplying a Polynomial by a Polynomial

When multiplying a polynomial by a polynomial we need to multiply each term in the first polynomial by each term in the second.

After you multiply you must collect like terms as necessary.

Multiplying Multiple Polynomials

When we find the product of multiple polynomials we must complete the question in parts - we can only multiply two polynomials at once!

We should always collect like terms between steps.

Show the steps...

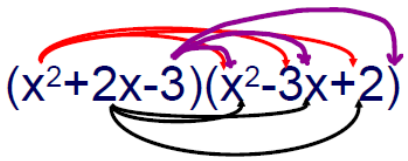
When $(x^2 + 2x - 3)(x^2 - 3x + 2)$ are multiplied together you get $x^4 - x^3 - 7x^2 + 13x - 6$. Just like our binomial multiplication we need to multiply everything in the first bracket by everything in the second bracket.

We could draw a chart with an extra row and column, or we can draw three sets of arrows!

Show how you can get this answer.

	x^2	$2x$	-3
x^2	x^4	$2x^3$	$-3x^2$
$-3x$	$-3x^3$	$-6x^2$	$9x$
2	$2x^2$	$4x$	-6

$= x^4 - x^3 - 7x^2 + 13x - 6$



$= x^4 - 3x^3 + 2x^2 + 2x^3 - 6x^2 + 4x - 3x^2 + 9x - 6$

$= x^4 - x^3 - 7x^2 + 13x - 6$

Show the steps...

When $(2x - 3)(3x + 2)(x - 1)$ are multiplied together you get $6x^3 - 11x^2 - x + 6$. We must multiply in two steps.

Start with any two of the three binomials - which will result in a trinomial. Then multiply the trinomial by the binomial that is left. You can use a chart or arrows.

Show how you can get this answer.

	$2x$	-3
$3x$	$6x^2$	$-9x$
2	$4x$	-6

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

	$6x^2$	$-5x$	-6
x	$6x^3$	$-5x^2$	$-6x$
-1	$-6x^2$	$5x$	6

$= 6x^3 - 11x^2 - x + 6$

Example

Expand and Simplify

a) $(x + 3)^3$ $= (x+3)(x+3)(x+3)$

	x	3
x	x^2	$3x$
3	$3x$	9

$= x^2 + 6x + 9$

	x^2	$6x$	9
x	x^3	$6x^2$	$9x$
3	$3x^2$	$18x$	27

$= x^3 + 9x^2 + 27x + 27$

Example

Expand and Simplify

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

	$2x$	-1
x	$2x^2$	$-x$
3	$6x$	-3

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

	$2x^2$	$5x$	-3
$4x$	$8x^3$	$20x^2$	$-12x$
-2	$-4x^2$	$-10x$	6

$= 8x^3 + 16x^2 - 22x + 6$

Example

Expand and Simplify

c) $(2x + 3)(x^2 + 3x - 4)$

	x^2	$3x$	-4
$2x$	$2x^3$	$6x^2$	$-8x$
3	$3x^2$	$9x$	-12

$= 2x^3 + 9x^2 + x - 12$