Multiplying Polynomials

Lesson objectives

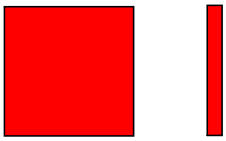
- I know how to expand binomials
- I know how to convert from factored form to standard form

1.1

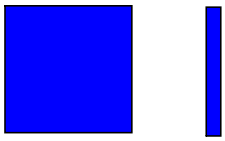
Lesson objectives | Teachers' notes | Lesson notes

MHR Page 217 #s 3aceg, 4bdfh, 5efgh, 6aceg, 7bdf, 8cdef, 9 - 11, 13 & 17

Algebra Tiles - What is the value of each tile?



Red tiles represent **POSITIVE** values.

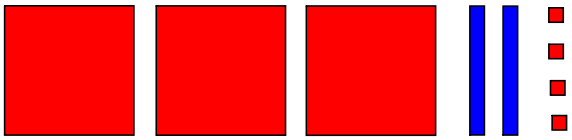


Blue tiles represent **NEGATIVE** values.

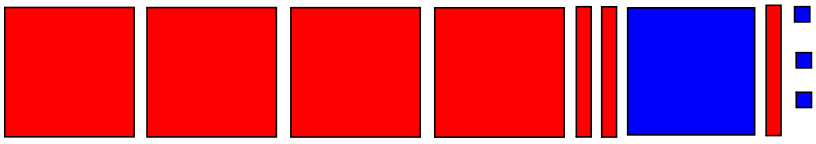
Large squares are x^2, rectangles are x and small squares are 1.

Model the following expressions:

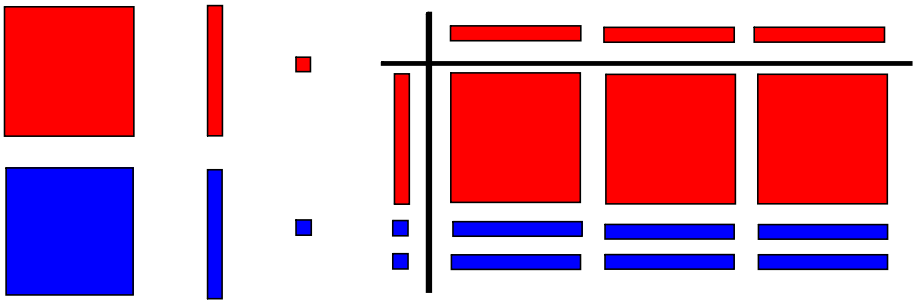
$3x^2 - 2x + 4$



$4x^2 + 2x - x^2 + x - 3$

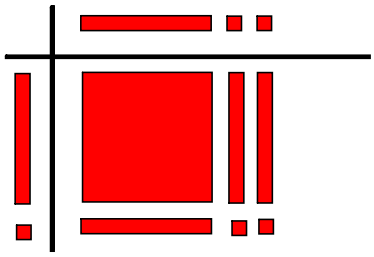


Expand the following with and without tiles: $3x(x-2)$



$= 3x^2 - 6x$

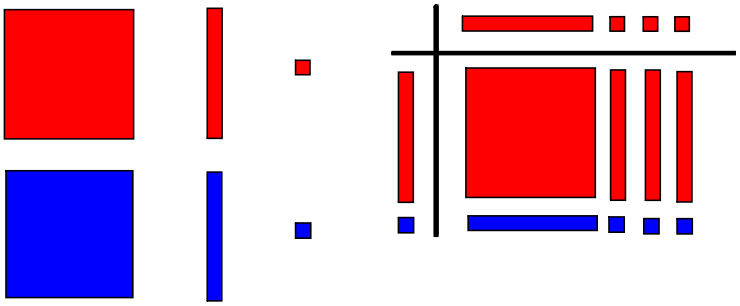
How can we extend this principle to expand: $(x+1)(x+2)$



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

$= x^2 + 3x + 2$

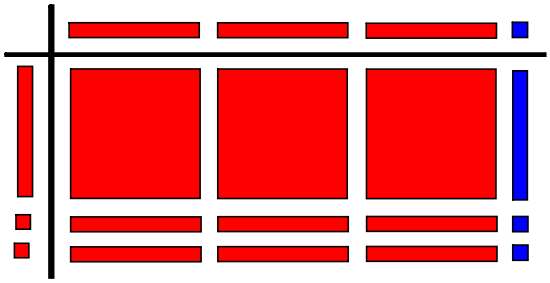
How can we extend this principle to expand: $(x+3)(x-1)$



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

$= x^2 + 2x - 3$

How can we extend this principle to expand: $(x+2)(3x-1)$



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

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

Double Distributive Law

When we expand binomials we have to multiply every term in the first bracket by every term in the second bracket.
We call this the double distributive law because we distribute term one then we distribute term two.

Using a Chart

We can use the chart to expand binomials. We simply add another "division" horizontally and add the extra term in the first bracket in the extra horizontal division.

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

	x	-4
x	x^2	$-4x$
3	$3x$	-12

$= x^2 - x - 12$

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

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

$= 6x^2 + 17x + 12$

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

	$5x$	-1
$2x$	$10x^2$	$-2x$
-5	$-25x$	5

$= 10x^2 - 27x + 5$

Using the "Arrows"

We can also use the arrows to expand binomials.

This technique is commonly called FOIL, where F is the first term times the first term, O is the outside term times the outside term, I is the inside term times the inside term and L is the last term times the last term.

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

$= x^2 + 3x - 4x - 12$

$= x^2 - x - 12$

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

$= 6x^2 + 8x + 9x + 12$

$= 6x^2 + 17x + 12$

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

$= 10x^2 - 25x - 2x + 5$

$= 10x^2 - 27x + 5$

Expand the following using a method of your choice.

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

$= 2(x^2 + 3x - 4x - 12)$

$= 2(x^2 - x - 12)$

$= 2x^2 - 2x - 24$

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

$= 3(6x^2 + 8x + 9x + 12)$

$= 3(6x^2 + 17x + 12)$

$= 18x^2 + 51x + 36$

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

	$5x$	-1
$2x$	$10x^2$	$-2x$
-5	$-25x$	5

$= -1(10x^2 - 27x + 5)$

$= -10x^2 + 27x - 5$