Polynomials expressions

Constant term

Graph/sketch

Linear $2x + 3$

Quadratic $x^2 - 2x + 4$

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

Polynomial of degree 5 $1x^5 + 3x^4 + 3$

Coefficient

2. Multiplying polynomial expressions

To multiply algebraic expressions, we use the distributive law, i.e. $a(b + c) = ab + ac$.

Example 2

Simplify the following: $(x - 5)(2x^2 - 3x + 6)$

Step 1: expand

$(x-5)(2x^2-3x+6)$

$x(2x^2-3x+6) - 5(2x^2-3x+6)$

Step 2: Simplify

$2x^3 - 3x^2 + 6x - 10x^2 + 15x - 30$

$2x^3 - 13x^2 + 21x - 30$

Perfect Squares

numbers

$25 = 5^2$
$36 = 6^2$
$144 = 12^2$
$225 = 15^2$

Simple expressions

$x^2 = (x)(x)$
$x^4 = (x^2)(x^2)$
$4x^2 = (2x)(2x)$

Binomial expression

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

Is this a perefect square?

$x^2 - 3x + 2 = (x - 2)(x - 1)$ ✓

$-2x$

$-1x$

Not perfect square

Is this a perfect square?

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

Formula to expand binomial squares

(ii) $\boxed{a^2 + 2ab + b^2} = (a+b)(a+b)$

$+ab$

$+ab$

$= (a+b)^2$ yes

(iii) $a^2 - 2ab + b^2 = (a-b)(a-b)$

$-ab$

$-ab$

$= (a-b)^2$

* use $(a+b)^2 = a^2 + 2ab + b^2$ to expand squares

* $(2x-3)^2 = 4x^2 - 12x + 9$

square 1st term

multiply terms and double

square last term

* $(3-4x)^2 = 9 - 24x + 16x^2$

7. Expand each of the following perfect squares.

(i) $(x + 2)^2$ (ii) $(x - 3)^2$ (iii) $(x + 5)^2$
(iv) $(a + b)^2$ (v) $(x - y)^2$ (vi) $(a + 2b)^2$
(vii) $(3x - y)^2$ (viii) $(x - 5y)^2$ (ix) $(2x + 3y)^2$

Remember

$(a+b)^2 = a^2+2ab+b^2$