Polynomial Identities

$$x^2 - a^2 = (x - a)(x + a)$$

$$x^3 - a^3 = (x - a)(x^2 + ax + a^2)$$

$$x^3 + a^3 = (x + a)(x^2 - ax + a^2)$$

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

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

$$(x+y)^2 = x^2 + 2xy + y^2$$

$$(x-y)^2 = x^2 - 2xy + y^2$$

$$(x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

$$(x-y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$$

$$(x+y)^4 = x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$$

$$(x-y)^4 = x^4 - 4x^3y + 6x^2y^2 - 4xy^3 + y^4$$

Prove this Polynomial Identity

$$x^3 + a^3 = (x + a)(x^2 - ax + a^2)$$

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

$$x^3 + a^3 = x^3 + a^3$$

Prove this Polynomial Identity

$$x^4 - a^4 = \left(x^2 - a^2\right)\left(x^2 + a^2\right)$$

Practice

Prove this Polynomial Identity

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

$$x^4 - a^4 = x^4 + x^2a^2 - x^2a^2 - a^4$$

$$x^4 - a^4 = x^4 - a^4$$

Practice

Prove this Polynomial Identity

$$(x-y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$$

$(x-y)(x-y)(x-y)$

$(x^2-2xy+y^2)(x-y)$

	x^2	$-2xy$	$+y^2$
x	x^3	$-2x^2y$	xy^2
$-y$	$-x^2y$	$2xy^2$	$-y^3$

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

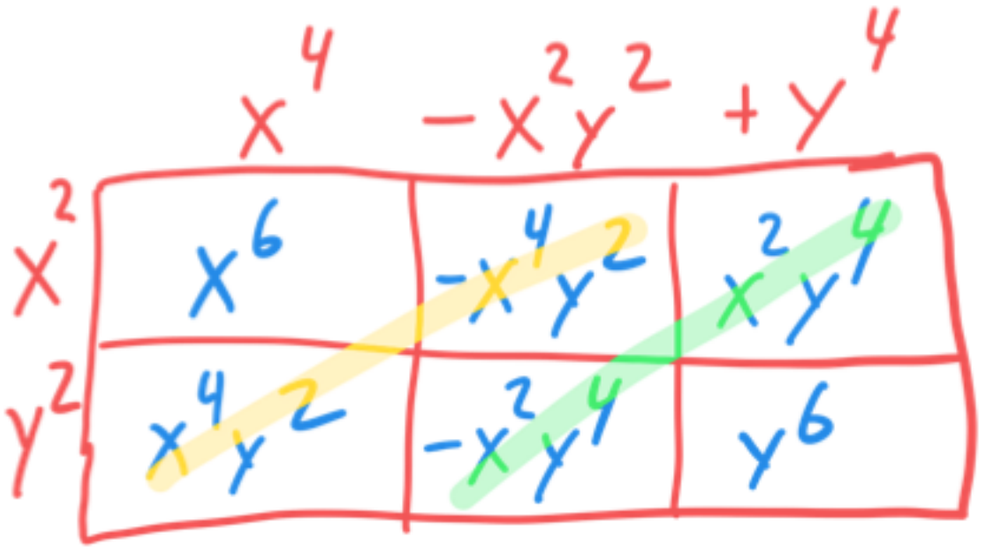
Prove this Polynomial Identity

$$x^6 + y^6 = \left(x^2 + y^2\right)\left(x^4 - x^2y^2 + y^4\right)$$

Practice

Prove this Polynomial Identity

$$x^6 + y^6 = \left(x^2 + y^2\right)\left(x^4 - x^2y^2 + y^4\right)$$



$$x^6 + y^6 = x^6 + y^6$$

Practice