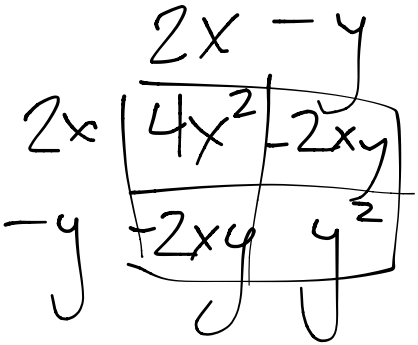
1.3 Polynomial Identities

Perfect Square Trinomials

- $(A + B)^2 = A^2 + 2AB + B^2$
- $(2x - y)^2 = 4x^2 - 4xy + y^2$



$81x^2 - 18xy + y^2 = (9x - y)^2$

Difference of Square

- $(A - B)(A + B) = A^2 - B^2$
- $(3x + 4y)(3x - 4y) =$ $9x^2 - 16y^2$

19) $16x^2 - 100y^2 =$ $(4x + 10y)(4x - 10y)$

$4(2x + 5y)(2x - 5y)$

Cubic Polynomials

- $(A+B)^3 = A^3 + 3A^2B + 3AB^2 + B^3$
- $(5x+y)^3 = (5x)^3 + 3(5x)^2(y) + 3(5x)(y)^2 + (y)^3$

$125x^3 + 75x^2y + 15xy^2 + y^3$

- $(A-B)^3 = A^3 - 3A^2B + 3AB^2 - B^3$

20) $x^3 - 15x^2 + 75x - 125$

$(x-5)^3$

Sum and Difference of Cubes

math #4: 3

- $A^3 + B^3 = (A + B)(A^2 - AB + B^2)$

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

$27x^3 + 8$

- $A^3 - B^3 = (A - B)(A^2 + AB + B^2)$

math #4: 3

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

- $8x^3 - 64 = (2x-4)\left[(2x)^2 + (2x)(4) + (4)^2\right]$

$(2x-4)(4x^2+8x+16)$

Trinomial Leading Coefficient 1

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

- $x^2 - 4x - 12$

$(x-6)(x+2)$

$-6 \cdot 2 = -12$

$-6 + 2 = -4$

$(x+3)(x+4) = x^2 + 7x + 12$

Quadratic Formula

- Given: $ax^2 + bx + c = 0$
- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $2x^2 + 4x - 3 = 0$

- Given: $ax^2 + bx + c = 0$
- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $4x^2 + 9 = 0$

Sum of Squares

Diffrs square
$A^2 - B^2 =$
$(A+B)(A-B)$

- $A^2 + B^2 = (A + Bi)(A - Bi)$

$i^2 = -1$

- $4x^2 + 9 =$

$(4x-2i)(4x+2i) = 16x^2 + 4$

$i = \sqrt{-1}$
$i^2 = \sqrt{-1}^2 = -1$

$4x-2i$

	$4x$	$-8ix$
$+2i$	$8ix$	$-4i^2$

$= 16x^2 - 4i^2$

$16x^2 - 4(-1) = 16x^2 + 4$

27) $x^2+6=\boxed{(x+i\sqrt{6})(x-i\sqrt{6})}$

12) $\underline{4x^2-49}$ $\quad (A-B)(A+B)=\underline{A^2-B^2}$

$(2x)^2-(7)^2=(2x-7)(2x+7)$!!

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

$(x+y)(x+y)(x+y)$

24) $(x^2+5x+6)(x^2+4)$

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

6 / 2 3 / 5

x^2+4 sum of squares

$A^2+B^2=(A+Bi)(A-Bi)$