1.3 Factor and Multiply Polynomials Using Polynomial Identities Notes

Polynomial Identities	
Perfect Square Trinomial $(A+B)^2 = A^2 + 2AB + B^2$	$(4x+3y)^2 = (4x)^2 + 2(4x)(3y) + (3y)^2$ $= 16x^2 + 24xy + 9y^2$
Difference of Squares $(A+B)(A-B) = A^2 - B^2$	$(2x+5y)(2x-5y) = (2x)^2 - (5y)^2$ $= 4x^2 - 25y^2$
Cubic Polynomials $(A+B)^3 = A^3 + 3A^2B + 3AB^2 + B^3$ $(A-B)^3 = A^3 - 3A^2B + 3AB^2 - B^3$	$(2x+5y)^3 = (2x)^3 + (3)(2x)^2(5y) + (3)(2x)(5y)^2 + (5y)^3$ $= 8x^3 + 60x^2y + 150xy^2 + 125y^3$ $(2x-5y)^3 = (2x)^3 - (3)(2x)^2(5y) + (3)(2x)(5y)^2 - (5y)^3$ $= 8x^3 - 60x^2y + 150xy^2 - 125y^3$
Sum and Difference of Cubes $A^3 + B^3 = (A+B)(A^2 - AB + B^2)$ $A^3 - B^3 = (A-B)(A^2 + AB + B^2)$	$27x^3 + 64y^3 = (3x+4y)\left[(3x)^2 - (3x)(4y) + (4y)^2\right]$ $= (3x+4y)(9x^2 - 12xy + 16y^2)$ $27x^3 - 64y^3 = (3x-4y)\left[(3x)^2 + (3x)(4y) + (4y)^2\right]$ $= (3x-4y)(9x^2 + 12xy + 16y^2)$
Trinomial Leading Coefficient 1 $x^2 + (a+b)x + ab = (x+a)(x+b)$	$x^2 + 5x + 6 = x^2 + (2+3)x + (2)(3)$ $= (x+2)(x+3)$ $x^2 - 5x + 6 = x^2 + (-2-3)x + (-2)(-3)$ $= (x-2)(x-3)$

Sum of Squares $A^2 + B^2 = (A+Bi)(A-Bi)$	$4x^2 + 9 = (2x+3i)(2x-3i)$

Polynomial Identitites Practice Examples

Find each product.

1) $(4x-6)(4x+6)$

2) $(2+2v)^2$

3) $(3m+6i)(3m-6i)$

4) $(4r+i)(4r-i)$

Factor each.

5) $100x^2-4$

6) $25x^2+49$

7) x^3+27

8) x^3-125

9) $64x^3+27$

10) $64x^3-8$

11) $x^2-20x+100$

12) $25x^2+20x+4$