x^2+6x+9

$(x+3)(x+3)$

$(x+3)^2$

What you will learn about:
Factoring Special Cases

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

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

Factor: $4x^2+12x+9$ $= (2x+3)^2$

$(2x)^2$ $(3)^2$

Factor: $9x^2-24x+16$ $(3x-4)^2$

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

Factor: $4x^2+20x+25$ $(2x+5)^2$

Factor: $9x^2-6x+1$ $(3x-1)^2$

Factor: $4x^2-28xy+49y^2$ $(2x-7y)^2$

$(2x)^2$ $(7y)^2$

Factor: $16x^2+8xy+y^2$ $(4x+y)^2$

Difference of Squares

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

Factor: $50x^2 + 60x + 18$

$2(25x^2+30x+9) = 2(5x+3)^2$

Factor: $36y^2 - 48y + 16$ $(6y-4)^2$

$4(9y^2-12y+4)$ $(6y-4)(6y-4)$

$4(3y-2)^2$

Factor: $8x^2y - 24xy + 18y$

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

Factor: $x^2 - 4$ x^2-4

x^2+0x-4 $(x)^2 \quad (2)^2$

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

Factor: $h^2 - 121$

$(h-11)(h+11)$

Factor: $64y^2 - 1$ $(8y-1)(8y+1)$

$(8y)^2-(1)^2$

Factor: $121x^2 - 49y^2$ $(11x-7y)(11x+7y)$

Factor: $144p^2 - 9q^2$ $(12p+3q)(12p-3q)$

$9(16p^2-q^2)$ $9(4p-q)(4p+q)$

$(x+y)^2$

$x^2+2xy+y^2$

x^2+4

Factor: $x^4 - y^4$

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

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

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

Factor: $x^4 - 16$ $(x^2-4)(x^2+4)$

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

Factor: $8x^2y - 18y$

$2y(4x^2-9)$

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

Factor: $6x^2 + 96$

$6(x^2+16)$

~~$6(x+4)(x+4)$~~

Factor: $45a^2b - 80b$

$5b(9a^2-16)$

$5b(3a-4)(3a+4)$

Sum and Difference of cubes

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$a^3 \mp b^3 = (a \mp b)(a^2 \pm ab + b^2)$

Factor: $x^3 \pm 64$

$(x)^3+(4)^3$

$a=x \quad b=4$

$(x\pm4)(x^2-4x+16)$

$a^3 - b^3$

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

$a=y \quad b=3$

Factor: $y^3 - 27$

$(y)^3 - (3)^3 \quad (y-3)(y^2+3y+9)$

Factor: $t^3 + 8$

$(t+2)(t^2-2t+4)$

Factor: $u^3 - 125$

$(u-5)(u^2+5u+25)$

$-27x^3+64$

Factor: $64 - 27x^3$

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

$(4-3x)(16+12x+9x^2) \quad -(27x^3-64)$

$(-3x+4)(9x^2+12x+16)$

Factor: $27u^3 + 125v^3$

$(3u)^3 + (5v)^3$

$(3u+5v)(9u^2-15uv+25v^2)$

Factor: $5m^3 + 40n^3$

$5(m^3+8n^3)$

$5(m+2n)(m^2-2mn+4n^2)$