

# FACTORS HIGHER DEGREE POLYNOMIALS

FACTOR COMPLETELY!

8  
27  
64  
125  
216

SUM & DIFFERENCE OF CUBES

$$u^3 - v^3 = (u - v)(u^2 + uv + v^2)$$

$$u^3 + v^3 = (u + v)(u^2 - uv + v^2)$$

$$\textcircled{1} \quad t^3 - 64 = (t - 4)(t^2 + 4t + 16)$$

$$u = t \\ v = 4$$

$$\textcircled{2} \quad 8p^3 + 125 = (2p + 5)(4p^2 - 10p + 25)$$

$$u = 2p \\ v = 5$$

$$\textcircled{3} \quad x^{3n} - y^{3n} = (x^n - y^n)(x^{2n} + x^n y^n + y^{2n})$$

$$u = x^n \\ v = y^n$$

$$\textcircled{4} \quad 250x^2 - 2x^5 = 2x^2(125 - x^3) \quad \begin{matrix} u = 5 \\ v = x \end{matrix}$$

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

GCF?

$$(5) \quad x^{2n} - 4 = \boxed{(x^n + 2)(x^n - 2)}$$

Diff.  
of  
squares!

$$(6) \quad x^{4n} - x^{2n} y^{2n} = x^{2n} (x^{2n} - y^{2n})$$

$$= \boxed{x^{2n} (x^n + y^n)(x^n - y^n)}$$

GCF??  
Diff. of  
squares

$$(7) \quad x^2 - (y-2)^2$$

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

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

Diff. of  
squares!

$$(8) \quad (x^2 + 2x + 1) - w^2$$

$$(x+1)(x+1) - w^2$$

$$(x+1)^2 - w^2$$

$$\boxed{(x+1+w)(x+1-w)}$$

$$(9) \quad y^4 - 5y^2 + 4$$

$$(y^2 - 1)(y^2 - 4)$$

$$\boxed{(y+1)(y-1)(y+2)(y-2)}$$

$$(10) \quad (x-2)^3 - (x-2)$$

⑩

$$(x-2)^3 - (x-2) \rightarrow a = x-2$$

GCF!

$$\frac{a^3}{a} - \frac{a}{a}$$

$$a(a^2 - 1)$$

$$a(a+1)(a-1)$$

$$\frac{(x-2)(x-2+1)(x-2-1)}{(x-2)(x-1)(x-3)}$$

⑪

$$(y+5)^3 - 9(y+5) = (y+5)(y+8)(y+2)$$

⑫

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

$$[(x-1)(x-2)]^3$$

$$[(x-1)^3(x-2)^3]$$

⑬

$$(y^2 - 9)^3$$

$$[(y+3)^3(y-3)^3]$$