

R4

①

Factoring Difference of Squares

$$\begin{aligned} \text{(a)} \quad 4m^2 - 9 &= (2m)^2 - (3)^2 \\ &= (2m - 3)(2m + 3) \end{aligned}$$

$$\text{(or)} \quad 4m^2 - 0m - 9 \quad \text{Factor by Grouping}$$

$$\text{(b)} \quad 256k^4 - 625m^4$$

$$\begin{aligned} (16k^2)^2 - (25m^2)^2 &= (16k^2 - 25m^2)(16k^2 + 25m^2) \\ &= \boxed{(4k - 5m)(4k + 5m)(16k^2 + 25m^2)} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad (a+2b)^2 - 4c^2 &= (a+2b)^2 - (2c)^2 \\ &= (a+2b-2c)(a+2b+2c) \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad x^2 - 6x + 9 - y^4 \\ (x-3)^2 - (y^2)^2 \end{aligned}$$

$$\boxed{(x-3-y^2)(x-3+y^2)}$$

$$\begin{array}{r} x^2 - 6x + 9 \\ \underline{x \quad -3x \quad +9} \\ x^2 - 3x - 3x + 9 \\ \underline{x \quad -3x \quad +9} \\ x(x-3) - 3(x-3) \\ \hline (x-3)(x-3) = (x-3)^2 \end{array}$$

Ex 6

Sum and Difference of Cubes

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

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

Difference of Squares

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

R4 Ex 6 Sum / Diff of Cubes

(2)

$$\begin{aligned} \text{(a)} \quad x^3 + 27 &= (x)^3 + (3)^3 \\ &= (x+3)(x^2 - 3x + 9) \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad m^3 - 64n^3 &= (m)^3 - (4n)^3 \\ &= (m - 4n)(m^2 + 4mn + 16n^2) \end{aligned}$$

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Ex 7 Factoring by Substitution

$$\text{(b)} \quad (2a-1)^3 + 8 = (2a-1)^3 + 2^3$$

$$\boxed{u = 2a-1} \quad = \overset{x}{u}^3 + \overset{y}{2}^3$$

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

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

$$= (2a-1+2) \left[(2a-1)^2 - 2(2a-1) + 4 \right]$$

$$\begin{aligned} \boxed{(2a-1)(2a-1)} &= (2a+1) (4a^2 - 4a + 1 - 4a + 2 + 4) \\ &= 4a^2 - 4a + 1 \\ &= (2a+1)(4a^2 - 8a + 7) \end{aligned}$$