

Exercise 1

Factorise the following polynomials.



$$1) \quad x^3 + 1$$

$$= x^3 + \boxed{}^3$$

$$= (x + \boxed{})[x^2 - (x)(\boxed{}) + 1^2]$$

$$= (x + \boxed{})(x^2 - \boxed{} + 1)$$

$$2) \quad z^3 - 1$$

$$= z^3 - \boxed{}^3$$

$$= (z - \boxed{})[z^2 + (z)(\boxed{}) + 1^2]$$

$$= (z - \boxed{})(z^2 + \boxed{} + 1)$$

Exercise 1

Factorise the following polynomials.



3) $8x^3 + 27$

$$= \square^3 x^3 + 3^3$$

$$= (2x)^3 + \square^3$$

$$= (2x + \square)[(2x)^2 - (2x)(3) + 3^2]$$

$$= (2x + \square)(4x^2 - 6x + \square)$$

4) $64x^3 - 1$

$$= \square^3 x^3 - 1^3$$

$$= (4x)^3 - \square^3$$

$$= (4x - \square)[(4x)^2 + (4x)(1) + 1^2]$$

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

Exercise 2

Factorise the following polynomials.



1) $y^3 + 15y^2 + 75y + 125$

$$= y^3 + \blacksquare(5y^2) + 3(25y) + 125$$

$$= y^3 + 3(y^2)\blacksquare + 3(y)(25) + 125$$

$$= y^3 + 3(y^2)(5) + 3(y)(5^2) + \blacksquare^3$$

$$= y^3 + 3(y)^2(5) + 3(y)(5)^2 + \blacksquare^3$$

$$= (y + \blacksquare)^3$$

2) $d^3 - 12d^2 + 48d - 64$

$$= d^3 - \blacksquare(4d^2) + 3(16d) - 64$$

$$= d^3 - \blacksquare(d^2)(4) + 3(d)(16) - 64$$

$$= d^3 - 3(d^2)(4) + 3(d)(4^2) - \blacksquare^3$$

$$= d^3 - 3(d)^2(4) + 3(d)(4)^2 - \blacksquare^3$$

$$= (d - \blacksquare)^3$$

Exercise 2

Factorise the following polynomials.



3) $m^3 + 21m^2n + 147mn^2 + 343n^3$

$$= m^3 + \blacksquare(7m^2n) + 3(49mn^2) + 343n^3$$

$$= m^3 + \blacksquare(m^2)(7n) + 3(m)(49n^2) + 343n^3$$

$$= m^3 + \blacksquare(m^2)(7n) + 3(m)(7^2n^2) + \blacksquare^3n^3$$

$$= m^3 + 3(m)^2(7n) + 3(m)(7n)^2 + (7n)^3$$

$$= (m + \blacksquare n)^3$$

4) $216y^3 - 108y^2z + 18yz^2 - z^3$

$$= 216y^3 - \blacksquare(36y^2z) + \blacksquare(6yz^2) - z^3$$

$$= 216y^3 - \blacksquare(36y^2)(z) + 3(6y)(z^2) - z^3$$

$$= 6^3y^3 - \blacksquare(6^2y^2)(z) + 3(6y)(z^2) - z^3$$

$$= (6y)^3 - 3(6y)^2(z) + 3(6y)(z)^2 - z^3$$

$$= (6y - \blacksquare)^3$$

Exercise 3

Factorise the following polynomials.



$$1) \quad x^4 + 16x^2y^2 + 64y^4$$

$$= (x^2)^{\blacksquare} + \blacksquare(8x^2y^2) + 8^2(y^2)^2$$

$$= (x^2)^2 + \blacksquare(x^2)(8y^2) + (\blacksquare y^2)^2$$

$$= (x^2 + \blacksquare y^2)^2$$

$$2) \quad 4a^6 - 20a^3y^4 + 25y^8$$

$$= \blacksquare^2(a^3)^2 - \blacksquare(10a^3y^4) + 5^2(y^4)^2$$

$$= (\blacksquare a^3)^2 - \blacksquare(2a^3)(5y^4) + (5y^4)^2$$

$$= (2a^3 - \blacksquare y^4)^2$$

Exercise 3

Factorise the following polynomials.



$$3) \quad 16m^4 - 32m^2n^5 + 16n^{10}$$

$$= 16(m^4 - \blacksquare m^2n^5 + \blacksquare^{10})$$

$$= 16[(m^2)^2 - \blacksquare(m^2n^5) + \blacksquare^{5})^2]$$

$$= 16[(m^2)^2 - \blacksquare(m^2)(n^5) + (n^5)^2]$$

$$= 16(m^2 - n^5)^2$$

$$4) \quad 72c^6 - 168c^3d^3 + 98d^6$$

$$= 2[36c^6 - \blacksquare c^3d^3 + \blacksquare d^6]$$

$$= 2[6^2(c^3)^2 - 2(\blacksquare c^3d^3) + 7^2(d^3)^2]$$

$$= 2[\blacksquare c^3)^2 - 2(6c^3)(7d^3) + (7d^3)^2]$$

$$= 2(6c^3 - \blacksquare d^3)^2$$