# Exercise 1

Factories the following polynomials.

1) $x^3 + 1$

$= x^3 + \square^3$

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

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

2) $z^3 - 1$

$= z^3 - \square^3$

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

$= (z - \square)(z^2 + \square + 1)$

# Exercise 1

Factories the following polynomials.

3) $8x^3 + 27$

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

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

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

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

4) $64x^3 - 1$

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

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

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

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

# Exercise 2

Factories the following polynomials.

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

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

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

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

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

$= (y + \square)^3$

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

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

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

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

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

$= (d - \square)^2$

# Exercise 2

Factories the following polynomials.

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

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

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

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

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

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

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

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

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

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

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

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

# Exercise 3

Factories the following polynomials.

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

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

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

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

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

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

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

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

# Exercise 3

Factories the following polynomials.

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

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

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

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

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

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

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

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

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

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