

## Exercice 1

(1)  $-(a + b) = -a - b$

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

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

(4)  $-\frac{a}{b} = \frac{-a}{b} = \frac{a}{-b}$

(5) a)  $\frac{x}{2} - \frac{y}{2} + \frac{z}{4} = -\frac{1}{2} \cdot \left(-x + y - \frac{z}{2}\right)$

c)  $\frac{a}{b} - \frac{b}{a} = \frac{1}{ab} \cdot (a^2 - b^2)$

b)  $\frac{a}{b} + ab = ab \cdot \left(\frac{1}{b^2} + 1\right)$

d)  $\frac{3}{2x} - \frac{4}{5y} = \frac{3}{5} \cdot \left(\frac{5}{2x} - \frac{4}{3y}\right)$

## Exercice 2

(1)  $-\left(\frac{3x^6}{2} + \frac{4}{3x^4}\right)^2 = -\left(\frac{9x^{12}}{4} + \frac{2 \cdot 3 \cdot 4x^6}{2 \cdot 3x^4} + \frac{16}{9x^8}\right) = -\frac{9x^{12}}{4} - 4x^2 - \frac{16}{9x^8}$

(2)  $\left(\frac{a}{2} - b\right)\left(\frac{a^2}{4} + b^2\right)\left(-\frac{a}{2} - b\right) = -\left(\frac{a}{2} - b\right)\left(\frac{a}{2} + b\right)\left(\frac{a^2}{4} + b^2\right)$   
 $= -\left(\frac{a^2}{4} - b^2\right)\left(\frac{a^2}{4} + b^2\right)$   
 $= -\left(\frac{a^4}{16} - b^4\right)$   
 $= b^4 - \frac{a^4}{16}$

(3)  $(3a - b + 2c - 1)^2 = (3a - b)^2 + 2(3a - b)(2c - 1) + (2c - 1)^2$   
 $= 9a^2 - 6ab + b^2 + 2(6ac - 3a - 2bc + b) + 4c^2 - 4c + 1$   
 $= 9a^2 + b^2 + 4c^2 + 1 - 6ab + 12ac - 6a - 4bc + 2b - 4c$

(4)  $\left(\frac{1}{2} - a\right)^2 - (a + 3)\left(2a - \frac{2}{3}\right) - \left(\frac{a}{5} - 1\right)^2$   
 $= \left(\frac{1}{4} - 2 \cdot \frac{1}{2} \cdot a + a^2\right) - \left(2a^2 - \frac{2a}{3} + 6a - 2\right) - \left(\frac{a^2}{25} - \frac{2a}{5} + 1\right)$   
 $= \frac{1}{4} - a + a^2 - 2a^2 + \frac{2a}{3} - 6a + 2 - \frac{a^2}{25} + \frac{2a}{5} - 1$   
 $= -\frac{26a^2}{25} - \frac{89a}{15} + \frac{5}{4}$

### Exercise 3

$$(1) \quad -49x^2 - 81y^4 + 126xy^2 = -[(7x)^2 - 2 \cdot 7x \cdot 9y^2 + (9y^2)^2] \\ = -(7x - 9y^2)^2$$

$$(2) \quad -36a^2b^3 - 60a^4b^7 + 132a^3b^2 = -12a^2b^2(3b + 5a^2b^5 - 11a)$$

$$(3) \quad a^8 - 256 = (a^4 - 16)(a^4 + 16) \\ = (a^2 - 4)(a^2 + 4)(a^4 + 16) \\ = (a - 2)(a + 2)(a^2 + 4)(a^4 + 16)$$

$$(4) \quad -125a^2b^3 + 5b = 5b(1 - 25a^2b^2) \\ = 5b(1 - 5ab)(1 + 5ab)$$

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