

**CORRIGE – LA MERCI**

**EXERCICE 3A.1** Ecrire sous la forme d'une puissance de 2 ou de 3 :

$$A = 2 \times 2 \times 2 \times 2 = 2^4$$

$$B = 27 = 3^3$$

$$C = \frac{1}{32} = \frac{1}{2^5} = 2^{-5}$$

$$D = \frac{3 \times 3 \times 3 \times 3 \times 3}{3 \times 3 \times 3} = \frac{3^5}{3^3} = 3^2$$

$$E = \frac{2}{128} = \frac{2}{2^7} = \frac{1}{2^6} = 2^{-6}$$

$$F = (3 \times 3)^3 = (3^2)^3 = 3^6$$

**EXERCICE 3A.2** Ecrire sous la forme d'un entier ou d'une fraction irréductible :

$$A = 7^{-1} = \frac{1}{7}$$

$$B = 2^3 \times 3^2 = 8 \times 9 = 72$$

$$C = \frac{2^5}{2^9} = \frac{1}{2^4} = \frac{1}{16}$$

$$D = \frac{2^{-3}}{5^{-2}} = \frac{5^2}{2^3} = \frac{25}{8}$$

$$E = \left(\frac{3}{2}\right)^2 = \left(\frac{3}{4}\right)^2 = \frac{9}{16}$$

$$F = (2^{-4} \times 5^2)^2 = \left(\frac{5^2}{2^4}\right)^2 = \left(\frac{25}{16}\right)^2 = \frac{625}{256}$$

**EXERCICE 3A.3** Soit  $a$  un nombre réel non nul. Ecrire sous la forme d'une puissance de  $a$ .

$$A = a^7 \times a^2 \times a^5 = a^{14}$$

$$B = \frac{1}{a^3 \times a^4} = \frac{1}{a^7}$$

$$C = \frac{a^{-5} \times a^2}{a^3 \times a^{-7}} = \frac{a^{-4}}{a^{-3}} = a^{-4-(-3)} = a^{-1} = \frac{1}{a}$$

$$D = (a^{-2} \times a^7)^3 = (a^5)^3 = a^{15}$$

$$E = \frac{(a^7)^3}{(a^2)^6} = \frac{a^{21}}{a^{12}} = a^9$$

$$F = \left(\frac{a^{-3}}{5}\right)^7 = (a^{-8})^7 = a^{-56}$$

**EXERCICE 3A.4** Soit  $a, b, c$  trois nombres réels non nuls. Ecrire sous la forme d'une puissance de  $a^n b^p c^q$ .

$$A = \frac{a^2 \times b^5 \times c^7}{a^3 \times b^2 \times c^2} = \frac{b^3 \times c^5}{a^1} = a^{-1} b^3 c^5$$

$$B = \frac{1}{b^3} \times \frac{ac}{b^2} \times \frac{a^3 b^2}{c^4} = \frac{ac \times a^3 \boxed{b^2}}{b^3 \times \boxed{b^2} \times c^4} = \frac{a^4 c}{b^3 c^4} = \frac{a^4}{b^3 c^3} = a^4 b^{-3} c^{-3}$$

$$C = \left(\frac{a}{b}\right)^3 \times \frac{a^{-2}}{c^{-3}} \times \left(\frac{b^{-2}}{c^3}\right)^{-2} = \frac{a^3 \times a^{-2} \times b^4}{b \times c^{-3} \times c^{-6}} = \frac{ab^4}{bc^{-9}} = ab^3 c^9$$

$$D = (ac)^3 \times \frac{1}{b^4} \times \left(\frac{b}{ac}\right)^{-1} = \frac{a^3 c^3 \times 1 \times b^{-1}}{1 \times b^4 \times a^{-1} c^{-1}} = \frac{a^3 c^3 \times a^1 c^1}{b^4 \times b} = \frac{a^4 c^4}{b^5} = a^4 b^{-5} c^4$$

$$E = \left(\frac{b}{ac}\right)^{-1} \times (ab)^3 \times \frac{1}{c^4} = \frac{b^{-1} \times a^3 b^3 \times 1}{a^{-1} c^{-1} \times 1 \times c^4} = \frac{a^3 b^2}{a^{-1} c^3} = \frac{a^4 b^2}{c^3} = a^4 b^2 c^{-3}$$

$$F = \left(\frac{b}{ac}\right)^{-1} \times \left(\frac{c^2}{a^3 b}\right)^{12} = \frac{b^{-1} \times c^{24}}{a^{-1} c^{-1} \times a^{36} b^{12}} = \frac{b^{-1} c^{24}}{a^{35} b^{12} c^{-1}} = \frac{c^{25}}{a^{35} b^{13}} = a^{-35} b^{-13} c^{25}$$

**EXERCICE 3A.5** Ecrire sous forme d'une seule fraction.

$$A = \frac{1}{a} + \frac{1}{a^2} + \frac{1}{a^3} = \frac{1 \times a^2}{a \times a^2} + \frac{1 \times a}{a^2 \times a} + \frac{1}{a^3} = \frac{a^2}{a^3} + \frac{a}{a^3} + \frac{1}{a^3} = \frac{a^2 + a + 1}{a^3}$$

$$B = \frac{1}{ab} + \frac{1}{ac} + \frac{1}{bc} = \frac{1 \times c}{ab \times c} + \frac{1 \times b}{ac \times b} + \frac{1 \times a}{bc \times a} = \frac{a + b + c}{abc}$$

$$C = \frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab} = \frac{a \times a}{bc \times a} + \frac{b \times b}{ac \times b} + \frac{c \times c}{ab \times c} = \frac{a^2 + b^2 + c^2}{abc}$$

$$D = \frac{1}{a^2 b^5} + \frac{1}{a^3 b^3} = \frac{1 \times a}{a^2 b^5 \times a} + \frac{1 \times b^2}{a^3 b^3 \times b^2} = \frac{a}{a^3 b^5} + \frac{b^2}{a^3 b^5} = \frac{a + b^2}{a^3 b^5}$$

$$E = \frac{2a}{b^3 c^2} + \frac{3b}{a^2 c^3} = \frac{2a \times a^2 c}{b^3 c^2 \times a^2 c} + \frac{3b \times b^3}{a^2 c^3 \times b^3} = \frac{2a^3 c}{a^2 b^3 c^3} + \frac{3b^4}{a^2 b^3 c^3} = \frac{2a^3 c + 3b^4}{a^2 b^3 c^3}$$

$$F = \frac{a}{b^2 c^5} + \frac{b^2}{a^4 b} + \frac{c^3}{b^5 a^2} = \frac{a \times a^4 b^3}{b^2 c^5 \times a^4 b^3} + \frac{b^2 \times b^4 c^5}{a^4 b \times b^4 c^5} + \frac{c^3 \times a^2 c^5}{b^5 a^2 \times a^2 c^5} = \frac{a^5 b^3}{a^4 b^5 c^5} + \frac{b^6 c^5}{a^4 b^5 c^5} + \frac{a^2 c^8}{a^4 b^5 c^5} = \frac{a^5 b^3 + b^6 c^5 + a^2 c^8}{a^4 b^5 c^5}$$

**EXERCICE 3A.6** Factoriser à l'aide d'un facteur commun :

$$A = 3a^2 + 6a = 3a(a + 2)$$

$$B = 4ab - 6a^2 = 2a(2b - 3a)$$

$$C = a^3b^2 + a^4b + a^2b^3 = a^2b(ab + a^2 + b^2)$$

$$D = 6a^5b^3 - 2a^4 + 14a^2b = 2a^2(3a^3b^3 - a^2 + 7b)$$

$$E = a^2b^6c + a^3bc^4 + a^1b^3c^2 = abc(ab^5 + a^2c^3 + b^2c)$$

$$F = 15a^5b^3c^5 - 35a^2b^6c^4 + 10a^5b^4c^2 = 5a^2b^3c^2(3a^3c^3 - 7b^3c^2 + 2a^3b)$$