

Exercice 1

$$(15x^3y^2 - 7xy^4)^3$$

$$\begin{aligned} &= (15x^3y^2)^3 - 3(15x^3y^2)^2 \cdot 7xy^4 + 3 \cdot 15x^3y^2(7xy^4)^2 + (7xy^4)^3 \\ &= 3375x^9y^6 - 3 \cdot 225x^6y^4 \cdot 7xy^4 + 3 \cdot 15x^3y^2 \cdot 49x^2y^8 - 343x^3y^{12} \\ &= 3375x^9y^6 - 4725x^7y^8 + 2205x^5y^{10} - 343x^3y^{12} \end{aligned}$$

Exercice 2

$$(6 - 5x)(7 - 8x) - (9 - 2x)(4 + 3x) = 46x^2 + 108$$

$$42 - 48x - 35x + 40x^2 - (36 + 27x - 8x - 6x^2) = 46x^2 + 108$$

$$42 - 48x - 35x + 40x^2 - 36 - 27x + 8x + 6x^2 = 6x^2 + 108$$

$$46x^2 - 102x + 6 = 46x^2 + 108$$

$$-102x = 102$$

$$x = \frac{102}{-102}$$

$$x = \{-1\}$$

Exercice 3

$$x^{11}y^2 - x^3y^{10}$$

$$= x^3y^2(x^8 - y^8)$$

$$= x^3y^2(x^4 + y^4)(x^4 - y^4)$$

$$= x^3y^2(x^4 + y^4)(x^2 + y^2)(x^2 - y^2)$$

$$= x^3y^2(x^4 + y^4)(x^2 + y^2)(x + y)(x - y)$$

Exercice 4

$$(x - 7)(2x^2 - 3x + 5) - (7 - 2x + 2x^2)(x - 7) + (x - 7)(x^2 - 3)$$

$$= (x - 7)(2x^2 - 3x + 5 - 7 + 2x - 2x^2 + x^2 - 3)$$

$$= (x - 7)(x^2 - x - 5)$$

Exercice 5

$$21x^2 + 2x - 8$$

$$m + n = 2 \text{ et } m \cdot n = -168 \text{ d'où } m = 14 \text{ et } n = -12$$

$$= 21x^2 + 14x - 12x - 8$$

$$= 7x(3x + 2) - 4(3x + 2)$$

$$= (3x + 2)(7x - 4)$$

Exercice 6

$$15x^3 + 31x^2 - 4x - 12$$

$$P(-2) = 0 \text{ donc } P(x) \text{ est divisible par } x + 2$$

$$P(x) = (x + 2)(15x^2 + x - 6)$$

ensuite on factorise le trinôme $15x^2 + x - 6$

$$m + n = 1 \text{ et } m \cdot n = -90 \text{ d'où } m = 10 \text{ et } n = -9$$

$$\begin{aligned} &= 15x^2 + 10x - 9x - 6 \\ &= 5x(3x + 2) - 3(3x + 2) \\ &= (3x + 2)(5x - 3) \end{aligned}$$

d'où la réponse finale : $P(x) = (x + 2)(3x + 2)(5x - 3)$

Exercice 7

$$x^4 - 25x^2 + 144$$

$$m + n = -25 \text{ et } m \cdot n = 144 \text{ d'où } m = -16 \text{ et } n = -9$$

$$\begin{aligned} &= x^4 - 16x^2 - 9x^2 + 144 \\ &= x^2(x^2 - 16) - 9(x^2 - 16) \\ &= (x^2 - 16)(x^2 - 9) \\ &= (x + 4)(x - 4)(x + 3)(x - 3) \end{aligned}$$