Exercice 1 : décomposer (=factoriser)

1. $16a^3b^2x^3y^4 + 20a^2b^3x^3y^2 - 36a^3b^3c^3y^3$ $= 4a^2b^2y^2(4ax^3y^2+5bx^3-9abc^3y)$
2. $x^{19}y^2 - x^3y^{18}$ $= x^3y^2(x^{16}-y^{16}) = x^3y^2(x^8+y^8)(x^4+y^4)(x^2+y^2)(x+y)(x-y)$
3. $243x^{12} - 1875y^8$ $= 3[(9x^6)^2-(25y^4)^2] = 3(9x^6+25y^4)(3x^3+5y^2)(3x^3-5y^2)$
4. $81x^4 - 625y^4$ $= (9x^2+25y^2)(3x+5y)(3x-5y)$
5. $6x^6 + 17x^3 - 14$ $= (2x^3+7)(3x^3-2)$
6. $30x^2 + 7x - 15$ $= (5x-3)(6x+5)$
7. $4x^4 + 21x^3 - 18x^2 - 128x + 96$ $= (x-2)(x+4)^2(4x-3)$
8. $15x^3 + 31x^2 - 4x - 12$ $= (x+2)(3x+2)(5x-3)$
9. $243x^{10} - 1024y^{15}$ $= (3x^2)^5 - (4y^3)^5 = (3x^2-4y^3)(81x^8+108x^6y^3+144x^4y^6+192x^2y^9+256y^{12})$
10. $54x^6 + 128y^3$ $= 2[(3x^2)^3+(4y)^3] = 2(3x^2+4y)(9x^4-12x^2y+16y^2)$
11. $16x^8 - 24x^4y^2 + 9y^4$ $= (4x^4-3y^2)^2$
12. $27x^3 - 54x^2y + 36xy^2 - 8y^3$ $= (3x-2y)^3$

Exercice 2 : résoudre les équations :

1. $4(3x-2)^2 - (2x+3)(3x-2) = (10x-2)(3x+6)$

$4(9x^2-12x+4)-(6x^2+5x-6)$
$= 30x^2+54x-12$

$36x^2-48x+16-6x^2-5x+6 = 30x^2+54x-12$
$30x^2-53x+22 = 30x^2+54x-12$
$-107x = -34$
$x = \{34/107\}$

2. $(5x-4)(3x-2) - (2x+3)(4x-1) - (7x^2-373) = 0$ $x = \{12\}$
3. $2x^2 - 2(x-3)^2 + 102 = 0$ $x = \{-7\}$
4. $(8x-3)(3x+5) - (4x+1)(2x-6) = (4x-2)^2 - (5x-16)$ $x = \{29/74\}$
5. $18 - (5-x)(3-x) = x - x^2 + 66$ $x = \{9\}$