**Exercice 1.**

Effectuer et réduire au maximum les expressions suivantes.

a) $(6x^2 - y^3)^2$

b) $(2a + 5)^3$

c) $(3x - 4)^2 - (3x + 4)^2 - 5(3x + 4)(3x - 4)$

a) $(6x^2-y^3)^2 = 36x^4 - 12x^2y^3 + y^6$

b) $(2a+5)^3 = 8a^3 + 3\cdot 4a^2\cdot 5 + 3\cdot 2a\cdot 25 + 125$
$= 8a^3 + 60a^2 + 150a + 125$

c) $(3x-4)^2 - (3x+4)^2 - 5(3x+4)(3x-4)$
$= 9x^2 - 24x + 16 - (9x^2 + 24x + 16) - 5(9x^2 - 16)$
$= 9x^2 - 24x + 16 - 9x^2 - 24x - 16 - 45x^2 + 80$
$= -45x^2 - 48x + 80$

**Exercice 2.**

Factoriser au maximum les expressions suivantes.

a) $25x^2 - 30x + 9$

b) $x(x-1) - 5(x-1)^2$

c) $27x^3 - 1$

d) $12x^2 - 8x - 15$

a) $25x^2 - 30x + 9 \overset{PR}{=} (5x-3)^2$

b) $x(x-1) - 5(x-1)^2 \overset{MEE}{=} (x-1)[x - 5(x-1)] = (x-1)(x - 5x + 5)$
$= (x-1)(-4x+5)$

c) $27x^3 - 1 \overset{PR}{=} (3x-1)(9x^2 + 3x + 1)$

d) $\Delta = 64 - 4\cdot 12\cdot(-15) = 784$

$x_{1,2} = \frac{8 \pm 28}{24} = \begin{cases} \frac{36}{24} = \frac{3}{2} \\ \frac{-20}{24} = -\frac{5}{6} \end{cases}$

$12x^2 - 8x - 15$
$= 12\left(x - \frac{3}{2}\right)\left(x + \frac{5}{6}\right)$
$= (2x-3)(6x+5)$

e) $3x^3 - 36x^2 + 96x$

f) $x^3 - x^2 - x + 1$

g) $16x^3y - 24x^2y + 12xy - 2y$

h) $9x^2 - (2y+1)^2$

e) $3x^3 - 36x^2 + 96x \overset{\text{MEE}}{=} 3x(x^2 - 12x + 32) \overset{\text{SP}}{=} 3x(x-4)(x-8)$

f) $x^3 - x^2 - x + 1 \overset{\text{GR}}{=} x^2(x-1) - 1(x-1) = (x-1)(x^2-1) \overset{\text{PR}}{=} (x-1)(x+1)(x-1)$
$= (x-1)^2(x+1)$

g) $16x^3y - 24x^2y + 12xy - 2y \overset{\text{MEE}}{=} 2y(8x^3 - 12x^2 + 6x - 1)$
$\overset{\text{PR}}{=} 2y(2x-1)^3$

h) $9x^2 - (2y+1)^2 \overset{\text{PR}}{=} [3x + (2y+1)][3x - (2y+1)]$
$= (3x + 2y + 1)(3x - 2y - 1)$

i) $x^3y^2 + 64y^2$

j) $(2x-5)(2x+3) - (5-2x)(3x+2)$

i) $x^3y^2 + 64y^2 = y^2(x^3 + 64) \overset{\text{PR}}{=} y^2(x+4)(x^2 - 4x + 16)$

j) $(2x-5)(2x+3) - (5-2x)(3x+2) = (2x-5)(2x+3) + \underbrace{(-5+2x)}_{(2x-5)}(3x+2)$
$\overset{\text{MEE}}{=} (2x-5)[(2x+3) + (3x+2)]$
$= (2x-5)(5x+5)$
$\overset{\text{MEE}}{=} 5(2x-5)(x+1)$