Corrigé – ex. suppl. – primitives

a) $\int (2x^2 - 3x + 2)\,dx = \frac{2}{3}x^3 - \frac{3}{2}x^2 + 2x + C$

b) $\int \frac{1}{3x^4}\,dx = \int \frac{1}{3}x^{-4}\,dx = \frac{1}{3}\cdot\frac{1}{-3}x^{-3} + C = -\frac{1}{9x^3} + C$

c) $\int \frac{6x^2+8}{x^3+4x}\,dx = 2\int \frac{3x^2+4}{x^3+4x}\,dx$ $\quad 2\cdot u'(x)$

$u(x) = x^3 + 4x$

$u'(x) = 3x^2 + 4$

$= 2\ln\left(|x^3+4x|\right) + C$

d) $\int \left(\frac{3x^4}{2} + \frac{x}{5}\right)dx = \frac{3}{10}x^5 + \frac{1}{10}x^2 + C$

e) $\int \frac{x^4 - 3x^2}{x^4}\,dx = \int \left(1 - \frac{3}{x^2}\right)dx = \int (1 - 3x^{-2})\,dx$

$\deg(N) = \deg(D)$ $\Rightarrow$ division

$= x - \frac{3}{-1}x^{-1} + C = x + \frac{3}{x} + C$

f) $\int (3x^2+x)^3 \cdot (6x+1)\,dx = \frac{1}{4}(3x^2+x)^4 + C$

dérivée interne

g) $\int \frac{2x+3}{2x^2+6x+5}\,dx = \frac{1}{2}\int \frac{2(2x+3)}{2x^2+6x+5}\,dx$

$u(x) = 2x^2 + 6x + 5$

$u'(x) = 4x + 6$

$= \frac{1}{2}\ln\left(|2x^2+6x+5|\right) + C$

h) $\int \frac{1}{(3-2x)^2}\,dx = \int (3-2x)^{-2}\,dx$

$u(x) = 3 - 2x$

$u'(x) = -2$

$= -\frac{1}{2}\int (3-2x)^{-2}\cdot(-2)\,dx$

$= -\frac{1}{2}\cdot\frac{1}{-1}(3-2x)^{-1} + C = \frac{1}{2(3-2x)} + C$

i) $\int \sqrt{x^2+2x-1}\cdot(x+1)\,dx = \frac{1}{2}\int (x^2+2x-1)^{1/2}\cdot 2(x+1)\,dx$

$u(x) = x^2 + 2x - 1$

$u'(x) = 2x + 2$

$= \frac{1}{2}\cdot\frac{1}{3/2}(x^2+2x-1)^{3/2} + C$

$= \frac{1}{3}\sqrt{(x^2+2x-1)^3} + C$

j) $\int (7x-2)^5\,dx = \frac{1}{7}\int (7x-2)^5 \cdot 7\,dx = \frac{1}{7}\cdot\frac{1}{6}(7x-2)^6 + C = \frac{1}{42}(7x-2)^6 + C$

k) $\int e^{-2x+5}\,dx = -\frac{1}{2}\int e^{-2x+5}\cdot(-2)\,dx = -\frac{1}{2}e^{-2x+5} + C$

l) $\int \frac{x}{(x^2+1)^3}\,dx = \frac{1}{2}\int (x^2+1)^{-3}\cdot 2x\,dx$

$u(x) = x^2+1$

$u'(x) = 2x$

$= \frac{1}{2}\cdot\frac{1}{-2}(x^2+1)^{-2} + C$

$= \frac{1}{-4(x^2+1)^2} + C$

m) $\int x\cdot\cos(x^2)\,dx = \frac{1}{2}\int 2x\cdot\cos(x^2)\,dx = \frac{1}{2}\sin(x^2) + C$

$u(x) = x^2$

$u'(x) = 2x$

n) $\int (\cos(x) - \sin^2(x)\cos(x))\,dx = \int \cos(x)\,dx - \int \sin^2(x)\cos(x)\,dx$

$= \sin(x) - \frac{1}{3}\sin^3(x) + C$

$u(x) = \sin(x)$

$u'(x) = \cos(x)$