1.

$$F_1(x) = \int_0^x te^t dt$$

2.

$$F_2(x) = \int_0^x t^2 e^t dt$$

3.

$$F_3(x) = \int_0^x t^3 e^t dt$$

4.

$$F_4(x) = \int_1^x t \ln(t)\, dt$$

5.

$$F_5(x) = \int_1^x t^2 \ln(t)\, dt$$

6.

$$F_6(x) = \int_1^x t^3 \ln(t)\, dt$$

7.

$$F_7(x) = \int_0^x t \sin(t)\, dt$$

8.

$$F_8(x) = \int_0^x t^2 \sin(t)\, dt$$

9.

$$F_9(x) = \int_0^x t^3 \sin(t)\, dt$$

10.

$$F_{10}(x) = \int_0^x t \cos(t)\, dt$$

11.

$$F_{11}(x) = \int_0^x t^2 \cos(t)\, dt$$

12.

$$F_{12}(x) = \int_0^x t^3 \cos(t)\, dt$$

13.

$$F_{13}(x) = \int_0^x \arcsin(t)\, dt$$

14.

$$F_{14}(x) = \int_0^x t \arcsin(t) dt$$

15.

$$F_{15}(x) = \int_0^x \arctan(t)\, dt$$

1.

$F_1(x) = \int_0^x te^t dt$	
$u'(t) = e^t$	$u(t) = e^t$
$v(t) = t$	$v'(t) = 1$

Calculs de primitives

$$F_1(x) = \int_0^x te^t dt = [te^t]_0^x - \quad \int_0^x 1 \times e^t dt$$

$$F_1(x) = \int_0^x te^t dt = [te^t]_0^x - \int_0^x e^t dt = xe^x - [e^t]_0^x = xe^x - e^x + 1$$

$F_2(x) = \int_0^x t^2 e^t dt$	
$u'(t) = e^t$	$u(t) = e^t$
$v(t) = t^2$	$v'(t) = 2t$
$F_2(x) = \int_0^x t^2 e^t dt = [t^2 e^t]_0^x -$	$\int_0^x 2te^t dt$

$$F_2(x) = \int_0^x t^2 e^t dt = [t^2 e^t]_0^x - 2\int_0^x te^t dt = x^2 e^x - 2F_1(x) = x^2 e^x - 2(x-1)e^x - 2$$
$$= (x^2 - 2x + 2)e^x - 2$$

3.

$F_3(x) = \int_0^x t^3 e^t dt$	
$u'(t) = e^t$	$u(t) = e^t$
$v(t) = t^3$	$v'(t) = 3t^2$
$F_3(x) = \int_0^x t^3 e^t dt = [t^3 e^t]_0^x -$	$\int_0^x 3t^2 e^t dt$

$$F_3(x) = \int_0^x t^3 e^t dt = [t^3 e^t]_0^x - 3F_2(t) = x^3 e^x - 3(x^2 - 2x + 2)e^x + 6$$

$$= (x^3 - 3x^2 + 6x - 6)e^x + 6$$

4.

$F_4(x) = \int_1^x t\ln(t)\,dt$	
$u'(t) = t$	$u(t) = \frac{t^2}{2}$
$v(t) = \ln(t)$	$v'(t) = \frac{1}{t}$
$F_4(x) = \int_1^x t\ln(t)\,dt = \left[\frac{t^2}{2}\ln(t)\right]_1^x -$	$\int_1^x \frac{t^2}{2} \times \frac{1}{t}dt$

$$F_4(x) = \int_1^x t\ln(t)\,dt = \left[\frac{t^2}{2}\ln(t)\right]_1^x - \frac{1}{2}\int_1^x tdt = \frac{x^2}{2}\ln(x) - \frac{1}{2}\left[\frac{t^2}{2}\right]_1^x = \frac{x^2}{2}\ln(x) - \frac{1}{4}(x^2 - 1)$$

5.

$F_5(x)=\int_1^x t^2\ln(t)\,dt$	
$u'(t)=t^2$	$u(t)=\frac{t^3}{3}$
$v(t)=\ln(t)$	$v'(t)=\frac{1}{t}$

$F_7(x)=\int_0^x t\sin(t)\,dt$	
$u'(t)=\sin(t)$	$u(t)=-\cos(t)$
$v(t)=t$	$v'(t)=1$
$F_7(x)=\int_0^x t\sin(t)\,dt=[t(-\cos(t)]_0^x-$	$\int_0^x 1\times(-\cos(t))dt$

$F_5(x)=\int_1^x t^2\ln(t)\,dt=\left[\frac{t^3}{3}\ln(t)\right]_1^x-\quad\int\frac{t^3}{3}\times\frac{1}{t}dt$

$$F_5(x)=\int_1^x t^2\ln(t)\,dt=\left[\frac{t^3}{3}\ln(t)\right]_1^x-\frac{1}{3}\int_1^x t^2dt=\frac{x^3}{3}\ln(x)-\frac{1}{3}\left[\frac{t^3}{3}\right]_1^x=\frac{x^3}{3}\ln(x)-\frac{1}{9}(x^3-1)$$

6.

$F_6(x) = \int_1^x t^3 \ln(t)\, dt$	
$u'(t) = t^3$	$u(t) = \frac{t^4}{4}$
$v(t) = \ln(t)$	$v'(t) = \frac{1}{t}$
$F_6(x) = \int_1^x t^3 \ln(t)\, dt = \left[\frac{t^4}{4}\ln(t)\right]_1^x -$	$\int_1^x \frac{t^4}{4} \times \frac{1}{t} dt$

$$F_6(x) = \int_1^x t^3 \ln(t)\, dt = \left[\frac{t^4}{4}\ln(t)\right]_1^x - \frac{1}{4}\int_1^x t^3 dt = \frac{x^4}{4}\ln(x) - \frac{1}{4}\left[\frac{t^4}{4}\right]_1^x = \frac{x^4}{4}\ln(x) - \frac{1}{16}(x^4 - 1)$$

7.

$$F_7(x) = \int_0^x t\sin(t)\,dt = [t(-\cos(t)]_0^x + \int_0^x \cos(t)\,dt = -x\cos(x) + [\sin(t)]_0^x$$

$$= -x\cos(x) + \sin(x)$$

8.

$F_8(x) = \int_0^x t^2 \sin(t)\,dt$	
$u'(t) = \sin(t)$	$u(t) = -\cos(t)$
$v(t) = t^2$	$v'(t) = 2t$
$F_8(x) = \int_0^x t^2 \sin(t)\,dt = [t^2(-\cos(t))]_0^x - \int_0^x 2t(-\cos(t))dt$	

$$F_8(x) = \int_0^x t^2 \sin(t)\,dt = [t^2(-\cos(t))]_0^x + 2\int_0^x t\cos(t)\,dt$$

Il faut faire une seconde intégration par parties.

$\int_0^x t\cos(t)\,dt$	
$u'(t) = \cos(t)$	$u(t) = \sin(t)$
$v(t) = t$	$v'(t) = 1$
$\int_0^x t\cos(t)\,dt = [t\sin(t)]_0^x -$	$\int_0^x 1 \times \sin(t)\,dt$

$$\int_0^x t\cos(t)\,dt = [t\sin(t)]_0^x - \int_0^x \sin(t)\,dt = x\sin(x) - [-\cos(t)]_0^x = x\sin(x) + \cos(x) - 1$$

Ce que l'on remplace dans

$$F_8(x) = \int_0^x t^2 \sin(t)\,dt = [t^2(-\cos(t)]_0^x + 2\int_0^x t\cos(t)\,dt$$
$$= -x^2\cos(x) + 2(x\sin(x) + \cos(x) - 1) = (-x^2 + 2)\cos(x) + 2x\sin(x) - 2$$

9.

$F_9(x) = \int_0^x t^3 \sin(t)\, dt$	
$u'(t) = \sin(t)$	$u(t) = -\cos(t)$
$v(t) = t^3$	$v'(t) = 3t^2$
$F_9(x) = \int_0^x t^3 \sin(t)\, dt = [t^3(-\cos(t))]_0^x -$	$\int_0^x 3t^2(-\cos(t))dt$

$$F_9(x) = \int_0^x t^3 \sin(t)\, dt = [t^3(-\cos(t))]_0^x + 3\int_0^x t^2 \cos(t)\, dt$$

Il faut faire une seconde intégration par parties.

$\int_0^x t^2 \cos(t)\, dt$	
$u'(t) = \cos(t)$	$u(t) = \sin(t)$
$v(t) = t^2$	$v'(t) = 2t$
$\int_0^x t^2 \cos(t)\, dt = [t^2 \sin(t)]_0^x -$	$\int_0^x 2t \sin(t)\, dt$

$$\int_0^x t^2 \cos(t)\, dt = [t^2 \sin(t)]_0^x - 2\int_0^x t \sin(t)\, dt = x^2 \sin(x) - 2F_7(x)$$

$$= x^2 \sin(x) - 2(-x\cos(x) + \sin(x)) = (x^2 - 2)\sin(x) + 2x\cos(x)$$

Ce que l'on remplace dans

$$F_9(x) = -x^3 \cos(x) + 3\int_0^x t^2 \cos(t)\, dt = -x^3\cos(x) + 3\big((x^2-2)\sin(x) + 2x\cos(x)\big)$$

$$= (-x^3 + 6x)\cos(x) + (3x^2 - 6)\sin(x)$$