1. $\int x^2 \operatorname{sen} x \, dx$

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

$= x^2(-\cos(x)) - 1(-2) \int \cos(x)\, x \, dx$

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

$= x^2(-\cos(x)) + 2 (x \operatorname{sen}(x) - \int \operatorname{sen}(x) \, dx$

$= x^2(\cos(x)) + 2 (x \operatorname{sen}(x) - (-\cos(x)))$

$= -x^2 \cos x + 2x \operatorname{sen} x + 2 \cos x$

$= -x^2 \cos x + 2x \operatorname{sen} x + 2 \cos x + C$

2. $\int x^3 e^{2x} dx$

$$= x^3 \frac{e^{2x}}{2} - \int \frac{e^{2x}}{2} 3x^2 dx$$

$$= x^3 \frac{e^{2x}}{2} - \frac{1}{2} 3 \int e^{2x} x^2 dx$$

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

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

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

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

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

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

$$= \frac{x^3 e^{2x}}{2} - \frac{3x^2 e^{2x} - 3xe^{2x} - \frac{3e^{2x}}{8}}{4}$$

$$= \frac{x^3 e^{2x}}{2} - \frac{3x^2 e^{2x} - 3xe^{2x}}{4} - \frac{3e^{2x}}{8} + C$$

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$$3 \int x^2 \sqrt{(1-x)}\,dx$$

$$= \int -t^2\sqrt{t} + 2t\sqrt{t} - \sqrt{t}\,dt$$

$$= \int -t^2 \left(t^{\frac{1}{2}}\right) + 2t \left(t^{\frac{1}{2}}\right) - t^{\frac{1}{2}}\,dt$$

$$= \int -t^2 \left(t^{\frac{1}{2}}\right) + 2t \left(t^{\frac{1}{2}}\right) - t^{\frac{1}{2}}\,dt$$

$$= \int -t^{\frac{5}{5}} + 2t^{\frac{3}{2}} - t^{\frac{1}{2}}\,dt$$

$$= -\int t^{\frac{5}{2}}\,dt + \int 2t^{\frac{3}{2}}\,dt - \int t^{\frac{1}{2}}\,dt$$

$$= -\frac{2t^3\sqrt{t}}{7} + \frac{4t^2\sqrt{t}}{5} - \frac{2t\sqrt{t}}{3}$$

$$= -\frac{2(1-x)^3(\sqrt{1-x})}{7} + \frac{4(1-x)^2(\sqrt{1-x})}{5} - \frac{2(1-x)(\sqrt{1-x})}{3}$$

$$= \frac{-2\sqrt{1-x}\,(1-3x+3x^2-x^3)}{7} + \frac{4\sqrt{1-x}\,(1-2x+x^2}{5} - \frac{2(1-x)(\sqrt{1-x})}{3}$$

$$= -\frac{2\sqrt{1-x}(1-3x+3x^2-x^3)}{7} + \frac{4\sqrt{1-x}(1-2x+x^2}{5} - \frac{2(1-x)(\sqrt{1-x})}{3} + C$$

6. $\int \text{sen } 3x \cos 2x \, dx$

$= \int \frac{1}{2} (\text{sen } 5x + \text{sen}) \, dx$

$= \frac{1}{2} \int \text{sen } 5x + \text{sen } x \, dx$

$= \frac{1}{2} \int \text{sen } 5x \, dx + \int \text{sen } x \, dx$

$= \frac{1}{2} \left(- \frac{\cos 5x}{5} - \cos x \right)$

$= - \frac{\cos 5x}{10} - \frac{\cos x}{2}$

$= \frac{\cos 5x}{10} - \frac{\cos x}{2} + c$

7.- $\int \text{sen}(\ln x) \, dx$

$= \text{sen}(t) e^t - \int e^t \cos(t) \, dt$

$= \text{sen}(t) e^t - \int \cos(t) \, dt$

$= \text{sen}(t) e^t - (\cos(t) e^t - \int e^t (-\text{sen}(t) \, dt)$

$= \text{sen}(t) e^t - (\cos(t) e^t + \int e^t (-\text{sen}(t) \, dt)$

$= \int e^t \text{sen}(t) \, dt = \text{sen}(t) e^t - (\cos(t) e^t + \int e^t \text{sen}(t) \, dt)$

$= \int e^t \text{sen}(t) \, dt = \text{sen}(t) e^t - \cos t \, e^t - \int e^t \text{sen}(t) \, dt$

$= \int e^t \text{sen}(t) \, dt + \int e^t \text{sen}(t) \, dt = \text{sen}(t) e^t - \cos(t) e^t$

$= 2 \int e^t \text{sen}(t) \, dt = \text{sen}(t) \, dt \cancel{\text{sen}(t) e^t} - \cos(t) e^t$

$= \int e^t \text{sen}(t) \, dt = \frac{\text{sen}(t) e^t}{2} - \frac{\cos(t) e^t}{2}$

$= \int$

$= \frac{\text{sen}(\ln(x)) e^{\ln(x)}}{2} - \frac{\cos(\ln(x)) e^{\ln(x)}}{2}$

$= \frac{\text{sen}(\ln(x)) x}{2} - \frac{\cos(\ln(x)) e^{\ln(x)}}{2}$

$= \frac{\text{sen}(\ln(x)) x - \cos(\ln(x)) x}{2}$

$= \frac{\text{sen}(\ln(x)) x - \cos(\ln(x)) x}{2} + c$