3. $\int x \cos(5x)\,dx \qquad \int fg' = fg - \int f'g$

$= \cancel{x\cos(5x) - \int \cos(5x)\,dx} = \frac{x\sin(5x)}{5} - \int 1\cdot\frac{\sin}{5}$

$= \cancel{x\cos(5x) - \sin(5x)}$

$\frac{x\sin(5x)}{5} + \frac{\cos(5x)}{25} + C$

4. $\int y e^{.2y}\,dy$

$= 5y\cdot e^{.2y} - 5\int e^{.2y}$

$= 5y\cdot e^{.2y} - 25e^{.2y} + C$

5. $\int x e^{-3x}\,dx$

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

$= -\frac{xe^{-3x}}{3} - \frac{e^{-3x}}{9} + C$

6. $\int (x-1)\sin(\pi x)\,dx$

$= (x-1)\left(-\frac{\cos(\pi x)}{\pi}\right) - \int -\frac{\cos(\pi x)}{\pi}$

$= (x-1)\left(-\frac{\cos(\pi x)}{\pi}\right) + \frac{\sin(\pi x)}{\pi^2} + C$

7. $\int (x^2+2x)\cos x \, dx$

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

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

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

8. $\int t^2 \sin Bt \, dt$

$= (t^2)\left(\frac{-\cos Bt}{B}\right) - \int (2t)\left(-\frac{\cos Bt}{B}\right) dt$

$= (t^2)\left(\frac{-\cos Bt}{B}\right) - \left[(2t)\left(-\frac{\sin Bt}{B^2}\right) - 2\int -\frac{\sin Bt}{B^2}\right]$

$= (t^2)\left(\frac{-\cos Bt}{B}\right) - \left[(2t)\left(-\frac{\sin Bt}{B^2}\right) - 2\frac{\cos Bt}{B^3}\right)\right]$

9. $\int \ln(3\sqrt{x}) \cdot 1 \, dx$

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

or $\int \frac{1}{3} dx$

$= x \ln(3\sqrt{x}) - \frac{x}{3} + C$

10. $\int \sin^{-1}(x) \, dx$

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

$= \sin^{-1}(x) \cdot x -$

$u=1,\ v=\arctan(4t),\ u'=\frac{1}{1+(4t)^2}\cdot 4$

11. $\int \arctan(4t)\,dt$ Idk.

$= \cancel{\frac{4t}{1+(4t)^2} - \int t\cdot\frac{4}{1+(4t)^2}\,dt}$

$= \cancel{\frac{4t}{1+(4t)^2} - \left(-4t\left(1+(4t)^2\right)(8t)(4)\right)} -$

$\frac{1}{4}\int \arctan(4t)\,dt$

$= t\arctan(t) - \int \frac{t}{t^2+1}$

14. $\int s\cdot 2^s\,ds$

$= s\cdot\frac{2^s}{\ln(2)} - \int \frac{2^s}{\ln(}$

$= \frac{2^s\cdot s}{\ln(2)} - \frac{2^s}{\ln(2)^2}$

12.

$\int Fg = FG - \int fG$

$\int uv' = uv - \int u'v$

$\int p^5 \ln(p)\,dp$

$= \ln(p)\cdot\frac{1}{6}p^6 - \int \frac{1}{p}\cdot\frac{1}{6}p^6$

$= \int \frac{p^5}{6}\,dp$

$= -\frac{1}{36}p^6 + \frac{p^6}{6}\cdot\ln(p)$

13.

$\int t\sec^2(2t)\,dp$

$= t\cdot\frac{\tan(2t)}{2} - \int \frac{\tan(2t)}{2}\,dt$

$= t\cdot\frac{\tan(2t)}{2} - \frac{1}{4}\int \tan(t) = \frac{1}{4}\int\frac{\sin t}{\cos t} =$

$u=\cos t$

$\frac{du}{dt} = -\sin$

$du = -\frac{1}{\sin}$

oh wait it's definite: $\frac{1}{2x} - \frac{1}{\pi^2}$

23

$\int uv' = uv - \int u'v$

$$\int_0^{\frac{1}{2}} x \cos(\pi x)\, dx$$

$$= x \cdot \frac{\sin(\pi x)}{\pi} - \int_0^{\frac{1}{2}} \frac{\sin(\pi x)}{\pi}\, dx$$

$$= x \cdot \frac{\sin(\pi x)}{\pi} + \frac{\cos(\pi x)}{\pi^2}$$

24.

$$\int_0^1 (x^2+1)(e^{-x})\, dx$$

$$= (x^2+1)(-e^{-x}) - \int_0^1 2x \cdot -e^{-x}\, dx$$

$$= '' - \left(2x \cdot e^{-x} - 2\int_0^1 e^{-x}\, dx\right)$$

$$= (x^2+1)(-e^{-x}) - (2x)(e^{-x}) - e^{-x}$$

$$\left[(2)(-e^{-1}) - (2)(e^{-1}) - e^{-1}\right] - \left[(1)(1) - (0) - (1)\right]$$

27.

$$\int_1^3 r^3 \ln r\, dr$$

$27 \cdot \ln(3) - 1 \cdot 0$?

28.

$$\int_0^{2\pi} t^2 \sin 2t = (2\pi)^2 - 0 + 0$$

$$= t^2 - \frac{\cos(2t)}{2} - t \cdot \frac{\sin(2t)}{2} + \frac{\cos(2t)}{2}$$

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

$$= '' - \left(t \cdot \frac{-\sin(2t)}{2} - \int -\sin(2t)\, dt\right.$$