1) $\int (2-3x)^4 dx$ let $u = 2-3x$, $du = -3dx$

$-\frac{1}{3}\int (2-3x)^4(-3dx)$

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

2) $\int \frac{\cos(\ln x)}{x}\, dx$

let $u = \ln x$

$du = \frac{dx}{x}$

$= \int \cos(\ln x)\, \frac{dx}{x}$

$= \sin(\ln x) + C$

3) $\int x e^{3x} dx$ let $u = x$ $du = dx$

$dv = e^{3x} dx$ $v = \frac{1}{3} e^{3x}$

$$\int u\,dv = \frac{x e^{3x}}{3} - \frac{1}{3}\int e^{3x} dx$$

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

4) $\int 3x \ln(3x)\,dx$

$u = \ln(3x)$ $\quad du = \frac{1}{3x}\cdot 3\,dx$

$du = \frac{dx}{x}$

$dV = 3x\,dx$ $\quad V = \frac{3}{2}x^2$

$$\int u\,dv = \frac{3}{2}x^2\ln(3x) - \int \frac{3}{2}x^2\frac{dx}{x}$$

$$-\frac{3}{2}\int x\,dx$$

$$\frac{3}{2}x^2\ln(3x) - \frac{3}{4}x^2$$