1. $\frac{2x^3}{3} - x^2 - 2x - \cos x - \sin x + x \ln x + e^x + C$

2. $x^2 + 3x^2z^2 - \frac{5}{3}x^3y - 3x \ln z + C$

4. $t = x+1 \quad \int t^{-1/2} = \frac{1}{\frac{1}{2}} t^{1/2} \cdot 2 \Rightarrow 2\sqrt{x+1} + C$

3. $u = x^2 \quad du = 2x\,dx \qquad u \cdot v - \int v\,du$

$dv = 3\sin 2x\,dx \quad v = -\frac{3}{2}\cos 2x$

$x^2 \cdot \left(-\frac{3}{2}\cos 2x\right) + \int \frac{3}{2}\cos 2x \cdot 2x\,dx = -\frac{3x^2\cos 2x}{2} + \int 3x\cos 2x\,dx$

$u = x \quad du = dx$

$dv = 3\cos 2x\,dx \quad v = \frac{3 \cdot \sin 2x}{2}$

$\frac{x \cdot 3 \cdot \sin 2x}{2} - \int \frac{3}{2} \cdot \sin 2x\,dx = \frac{3x \sin 2x}{2} + \frac{3\cos 2x}{4}$

$-\frac{3x^2\cos 2x}{2} + \frac{3x\sin 2x}{2} + \frac{3\cos 2x}{4}$

$-\frac{3\pi^2}{2} + \frac{3}{4} - \frac{3}{4} = -\frac{3\pi^2}{2}$