

Date: _____

$$\begin{aligned} 1. \int (2x^2 - 2x - 1 + \sin x - \cos x + \ln x + e^x) dx &= \\ &= \frac{2x^3}{3} - x^2 - 2x - \cos(x) - \sin(x) + x \ln x + e^x + \\ &+ C \end{aligned}$$

$$\begin{aligned} 2. \int (2x + 6xz^2 - 5x^2y - 3\ln z) dx &= \\ &= -3\ln(z)x - \frac{5x^3y}{3} + (6z^2 + 2) \cdot \frac{x^2}{2} + C = \\ &= -\frac{5x^3y}{3} + 3x^2z^2 + x^2 - 3x\ln(z) + C \end{aligned}$$

$$\begin{aligned} 4. \int \frac{1}{\sqrt{x+1}} dx &= \int \frac{1}{\sqrt{y}} dy \quad y = x+1 \\ &= 2\sqrt{y} + C \Rightarrow 2\sqrt{x+1} + C \end{aligned}$$

$$3. \int_0^{\pi} 3x^2 \sin(2x) dx =$$

$$\left(-\frac{3}{2} x^2 \cos(2x) \right) \Big|_0^{\pi} + 3 \int_0^{\pi} x \cos(2x) dx =$$

$$= -\frac{3\pi^2}{2} + \frac{3}{2} x \sin(2x) \Big|_0^{\pi} - \frac{3}{2} \int_0^{\pi} \sin(2x) dx =$$

$$= -\frac{3\pi^2}{2} + \frac{3}{4} \int_0^{2\pi} \sin(y) dy$$

$y = 2x$
 $\rightarrow 0$

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