

$$4. \int_{y=0}^{y=3x} (ye^{-3xy}) dy$$

$$\left[ -\frac{y}{3x} e^{-3xy} - \frac{1}{9x^2} e^{-3xy} \right]_{y=0}^{y=3x}$$

$$\left[ e^{-3xy} \left( -\frac{y}{3x} - \frac{1}{9x^2} \right) \right]_{y=0}^{y=3x}$$

$$e^{-3x(3x)} \left( \frac{-3x}{3x} - \frac{1}{9x^2} \right) - e^{-3x(0)} \left( \frac{-0}{3x} - \frac{1}{9x^2} \right)$$

$$e^{-9x^2} \left( -1 - \frac{1}{9x^2} \right) - e^0 \left( 0 - \frac{1}{9x^2} \right)$$

$$e^{-9x^2} \left( -1 - \frac{1}{9x^2} \right) + \frac{1}{9x^2}$$

<u>S</u>	<u>D</u>	<u>I</u>
+	→ y	e <sup>-3xy</sup>
-	→ 1	- $\frac{1}{3x} e^{-3xy}$
+	0	- $\frac{1}{3x} \left( -\frac{1}{3x} e^{-3xy} \right)$ $\frac{1}{9x^2} e^{-3xy}$

$$\int e^{-3xy} dy$$

$$u = -3xy \quad du = -3x dy$$

$$\frac{1}{-3x} \int -3x e^{-3xy} dy$$

$$-\frac{1}{3x} \int e^u du$$

$$-\frac{1}{3x} e^u$$

$$-\frac{1}{3x} e^{-3xy}$$