

122 HW #7

Section 8.1 # 3, 12, 17

Section 8.2 # 3, 8

8.1 #3

$$\int (4x-12)e^{-8x} dx$$

$$u = 4x-12$$

$$du = 4 dx$$

$$dv = e^{-8x} dx$$

$$v = \int e^{-8x} dx = -\frac{1}{8}e^{-8x}$$

$$\int uv - \int v du = (4x-12) \cdot -\frac{1}{8}e^{-8x} - \int -\frac{1}{8}e^{-8x} \cdot 4 dx$$

$$= (4x-12) \cdot -\frac{1}{8}e^{-8x} + \frac{1}{2} \int e^{-8x} dx$$

$$= (4x-12) \cdot -\frac{1}{8}e^{-8x} + \frac{1}{2} \cdot -\frac{1}{8}e^{-8x} + C$$

$$= \left(-\frac{x}{2} + \frac{23}{16}\right) e^{-8x} + C$$

8.1 #12

$$\int_0^1 xe^x dx$$

$$u = x$$

$$du = dx$$

$$dv = e^x dx$$

$$v = e^x$$

$$= uv - \int v du = xe^x - \int e^x dx = xe^x - e^x \Big|_0^1$$

$$= 1e^1 - e^1 - (0e^0 - e^0) = e - e - (0 - 1) = 1.$$

8.1 #17

$$\int (8x+10) \ln(5x) dx$$

$$u = \ln(5x)$$

$$du = \frac{1}{5x} \cdot 5 dx = \frac{1}{x} dx$$

$$dv = 8x+10$$

$$v = \int 8x+10 = 4x^2+10x$$

$$= uv - \int v du = \ln 5x \cdot (4x^2+10x) - \int (4x^2+10x) \cdot \frac{1}{x} dx$$

$$= \ln 5x \cdot (4x^2+10x) - \int 4x+10 dx$$

$$= \ln 5x \cdot (4x^2+10x) - (2x^2+10x) + C$$

8.2 #3 $2x+1$ revolved between $x=0$, $x=4$

$$V = \int_0^4 \pi (2x+1)^2 dx = \pi \int_0^4 4x^2 + 4x + 1 dx$$

$$= \pi \cdot \left(\frac{4}{3} x^3 + 2x^2 + x \right) \Big|_0^4$$

$$= \pi \left(\frac{4}{3} \cdot 4^3 + 2 \cdot 4^2 + 4 \right) - \pi \cdot (0 + 0 + 0) = \frac{364}{3} \pi$$

8.2 #8

$$V = \int_1^3 \pi (\sqrt{x+5})^2 dx = \pi \int_1^3 x+5 dx = \pi \left(\frac{x^2}{2} + 5x \right) \Big|_1^3$$

$$= \pi \left(\frac{3^2}{2} + 5 \cdot 3 \right) - \pi \left(\frac{1^2}{2} + 5 \cdot 1 \right) = 14\pi$$