

Math 122 HW #8

8.2 #11, 18, 26

8.3 #5, 10a

8.2 #11

$$\int_0^2 \pi (e^x)^2 dx = \pi \int_0^2 e^{2x} dx$$

$$= \pi \left. \frac{e^{2x}}{2} \right|_0^2 = \pi \left(\frac{e^4}{2} - \frac{e^0}{2} \right)$$

$$= \pi \left(\frac{e^4}{2} - \frac{1}{2} \right)$$

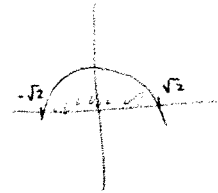
8.2 #18

~~8.2 #18~~

$$f(x) = 2 - x^2$$

$$0 = 2 - x^2 \quad x^2 = 2$$

$$\cancel{0 = 2 - x^2} \quad x = \pm\sqrt{2}$$



$$V = \int_{-\sqrt{2}}^{\sqrt{2}} \pi (2 - x^2)^2 dx = \pi \int_{-\sqrt{2}}^{\sqrt{2}} (4 - 4x^2 + x^4) dx = \pi \left(4x - \frac{4}{3}x^3 + \frac{x^5}{5} \right) \Big|_{-\sqrt{2}}^{\sqrt{2}}$$

$$= \pi \left(4\sqrt{2} - \frac{4}{3}(\sqrt{2})^3 + \frac{(\sqrt{2})^5}{5} - \left(-4\sqrt{2} - \frac{4}{3}(\sqrt{2})^3 + \frac{(\sqrt{2})^5}{5} \right) \right)$$

8.2 #26

$$\frac{1}{13-1} \int_1^{13} (2x-1)^{1/2} dx$$

$$u = 2x - 1$$

$$du = 2 dx$$

$$\frac{1}{2} du = dx$$

$$= \frac{1}{12} \int_{x=1}^{x=13} u^{1/2} \cdot \frac{1}{2} du = \frac{1}{24} \int_{x=1}^{x=13} u^{1/2} du = \frac{1}{24} \cdot \frac{2}{3} u^{3/2} \Big|_{x=1}^{x=13}$$

$$= \frac{1}{36} (2x-1)^{3/2} \Big|_1^{13} = \frac{1}{36} \left((2 \cdot 13 - 1)^{3/2} - (2 \cdot 1 - 1)^{3/2} \right)$$

8.3 #5a

$$\begin{aligned} P &= \int_0^{10} 400 e^{.03x} \cdot e^{-.08x} dx \\ &= 400 \int_0^{10} e^{-.05x} dx = 400 \left. \frac{e^{-.05x}}{-.05} \right|_0^{10} \\ &= 400 \left(\frac{e^{-.05 \cdot 10}}{-.05} - \frac{e^{-.05 \cdot 0}}{-.05} \right) = 3147.75 \end{aligned}$$

8.3 #10a

$$\begin{aligned} P &= \int_0^{10} 50x e^{-.08x} dx & u &= 50x & du &= 50 dx \\ & & dv &= e^{-.08x} dx & v &= \frac{e^{-.08x}}{-.08} \\ &= 50x \cdot \frac{e^{-.08x}}{-.08} - \int \frac{e^{-.08x}}{-.08} \cdot 50 dx \\ &= 50x \cdot \frac{e^{-.08x}}{-.08} + \frac{50}{.08} \left. \frac{e^{-.08x}}{-.08} \right|_0^{10} \\ &= 50(10) \cdot \frac{e^{-.08 \cdot 10}}{-.08} + \frac{50}{.08} \frac{e^{-.08 \cdot 10}}{-.08} \\ &\quad - \left(0 + \frac{50}{.08} \cdot \frac{e^{-.08 \cdot 0}}{-.08} \right) \end{aligned}$$