

126 HW 3

6.5 #8

5.5 #2, 29, 38

6.1 #12

6.5 #8

$$\frac{1}{6-1} \int_1^6 \frac{3}{(1+r)^2} dr = \frac{1}{5} \int_1^6 \frac{3}{(1+r)^2} dr \quad \begin{array}{l} u = 1+r \\ du = +dr \end{array}$$

$$= \frac{+1}{5} \int_{r=1}^6 \frac{3}{u^2} du = \frac{+3}{5} \int_{r=1}^6 u^{-2} du$$

$$= -\frac{3}{5} u^{-1} \Big|_{r=1}^6 = -\frac{3}{5} (1+r)^{-1} \Big|_1^6$$

$$= -\frac{3}{5} \left(\frac{1}{7} - \frac{1}{2} \right) = \frac{3}{14} = .214$$

5.5 #2

$$\int x^3 (2+x^4)^5 dx \quad \begin{array}{l} u = 2+x^4 \\ du = 4x^3 dx \end{array}$$

$$= \frac{1}{4} \int u^5 du = \frac{1}{4} \cdot \frac{1}{6} u^6 + C$$

$$= \frac{1}{24} (2+x^4)^6 + C.$$

5.5 # 29

$$\int \frac{x}{\sqrt{x+2}} dx$$

$$u = x+2 \quad x = u-2 \\ du = dx$$

$$= \int \frac{u-2}{\sqrt[4]{u}} du = \int \frac{u-2}{u^{1/4}} du$$

$$= \int \frac{u}{u^{1/4}} - \frac{2}{u^{1/4}} du = \int u^{3/4} - 2u^{-1/4} du$$

$$= \frac{4}{7} u^{7/4} - 2 \cdot \frac{4}{3} u^{3/4} + C$$

$$= \frac{4}{7} (x+2)^{7/4} - \frac{8}{3} (x+2)^{3/4} + C$$

5.5 # 38

$$\int_0^{\sqrt{\pi}} x \cos(x^2) dx$$

$$u = x^2 \\ du = 2x dx$$

$$\frac{1}{2} \int_0^{\sqrt{\pi}} \cos u du = \frac{1}{2} \sin u \Big|_{x=0}^{\sqrt{\pi}}$$

$$= \frac{1}{2} \sin(x^2) \Big|_0^{\sqrt{\pi}} = \frac{1}{2} (\sin \pi - \sin 0)$$

$$= \frac{1}{2} \cdot (0 - 0) = 0$$

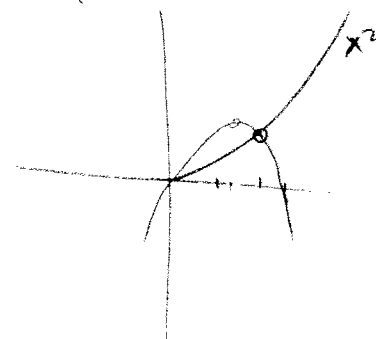
6.1 # 12

area between $y = x^2$, $y = 4x - x^2$

$$\text{intersect at: } x^2 = 4x - x^2$$

$$2x^2 - 4x = 0$$

$$x = 0, x = 2$$



$$\text{area is } \int_0^2 (4x - x^2 - x^2) dx = \int_0^2 (4x - 2x^2) dx = 2x^2 - \frac{2}{3}x^3 \Big|_0^2$$

$$= 2 \cdot 4 - \frac{2}{3} \cdot 8 = 8 - \frac{16}{3} = \frac{8}{3} = 2.66$$