

Math 1072 Homework #1

Section 4.3 #39

4.4 #10

4.5 #30

5.1 #18

4.3 #39

$$\int_1^2 \frac{s^4+1}{s^2} ds = \int_1^2 (s^4+1) s^{-2} ds = \int_1^2 s^2 + s^{-2} ds$$

$$= \left. \frac{1}{3} s^3 - \frac{1}{-1} s^{-1} \right|_1^2 = \frac{1}{3} \cdot 2^3 - 2^{-1} - \left(\frac{1}{3} \cdot 1^3 - 1^{-1} \right)$$

4.4 #10

$$\int \sqrt[4]{x^5} dx = \int x^{5/4} dx = \frac{4}{9} x^{9/4} + C$$

4.5 #30

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

$$u = 2+x \rightarrow x = u-2$$

$$du = dx$$

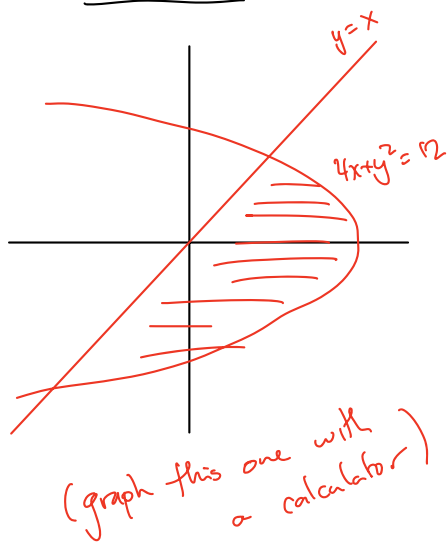
$$= \int (u-2)^2 \sqrt{u} du = \int (u^2 - 4u + 4) u^{1/2} du$$

$$= \int u^{5/2} - 4u^{3/2} + 4u^{1/2} du$$

$$= \frac{2}{7} u^{7/2} - 4 \cdot \frac{2}{5} u^{5/2} + 4 \cdot \frac{2}{3} u^{3/2} + C$$

$$= \frac{2}{7} (2+x)^{7/2} - \frac{8}{5} (2+x)^{5/2} + \frac{8}{3} (2+x)^{3/2} + C$$

5.1 #18



We need to do this as a dy , so
solve both for x :

$$x=y$$

$$x = 3 - \frac{1}{4}y^2$$

Intersections: $y = 3 - \frac{1}{4}y^2$

$$\frac{1}{4}y^2 + y - 3 = 0$$

$$y^2 + 4y - 12 = 0$$

$$(y+6)(y-2) = 0$$

$$y = -6, 2$$

$$\int_{-6}^2 \left(3 - \frac{1}{4}y^2 \right) - (y) dy = 3y - \frac{1}{4} \cdot \frac{1}{3}y^3 - \frac{1}{2}y^2 \Big|_{-6}^2$$

$$= 3 \cdot 2 - \frac{1}{12} \cdot 2^3 - \frac{1}{2} \cdot 2^2 - \left(3 \cdot (-6) - \frac{1}{12}(-6)^3 - \frac{1}{2}(-6)^2 \right)$$