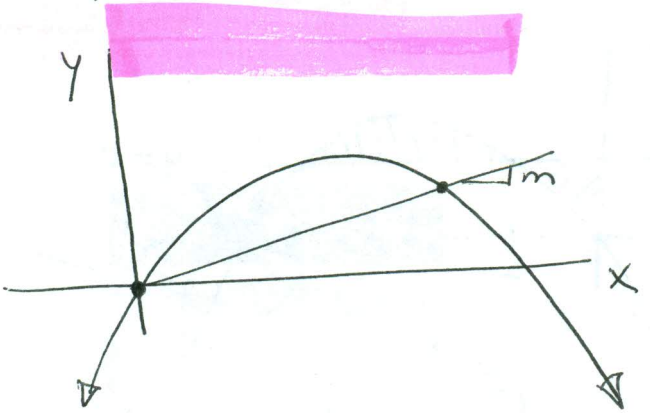
Page 380 Problem Instruction #2

NAME



$y = x(2-x)$

$$\int_0^2 2x - x^2\,dx = 4/3$$

$$\int_0^a 2x - x^2 - mx\,dx = \frac{2}{3}$$

& $2x - x^2 = mx$ @ $x = a$

$x(2-m-x) = 0$

$x = 0$ & $x = 2-m$

$a = 2-m$

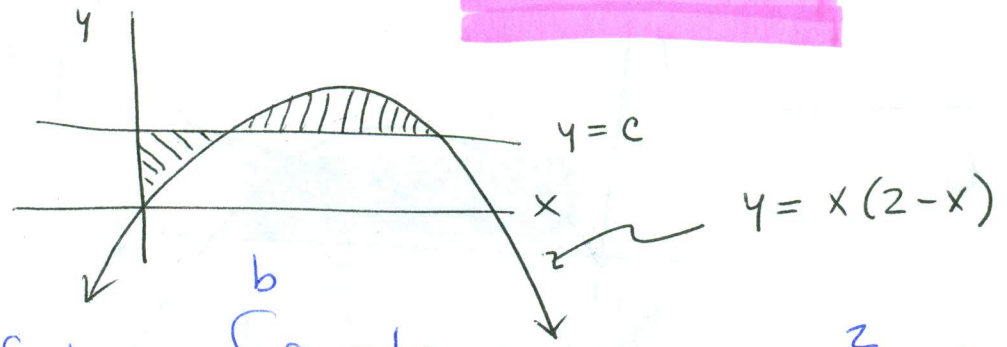
$$\left.\frac{(2-m)}{2}x^2 - \frac{x^3}{3}\right|_0^{2-m}$$

$(2-m)^3 = 4$

$m = 2 - \sqrt[3]{4}$

slope $= 2 - \sqrt[3]{4}$

Page 380 Problem Instruction 3



$$\int_0^a c - f\,dx = \int_a^b f - c\,dx$$

$$\int_0^b c\,dx = \int_0^b f\,dx$$

$$cb = b^2 - \frac{b^3}{3}$$

$$b(3c - 3b + b^2) = 0$$

$$2x - x^2 = c$$

$$2b - b^2 = c$$

Combining

$$3(2b - b^2) - 3b + b^2 = 0$$

$$b = 0 \text{ or } b = 3/2$$

Backsubstitution

$$c = 2(3/2) - (3/2)^2$$

$$c = \frac{12 - 9}{4} \Rightarrow \boxed{c = 3/4}$$