

TUES 3-28-06

7.2 INTEGRATING W.R.T. y

Ex.1) FIND THE AREA OF THE REGION ENCLOSED BY: $y = \sqrt{x}$; $y = x - 2$; x-AXIS.

SOLN: w.r.t. y

SOLVE EACH EQ FOR X

IN TERMS OF y:

$$y = \sqrt{x}$$

$$\underline{y^2 = x}$$

$$y = x - 2$$

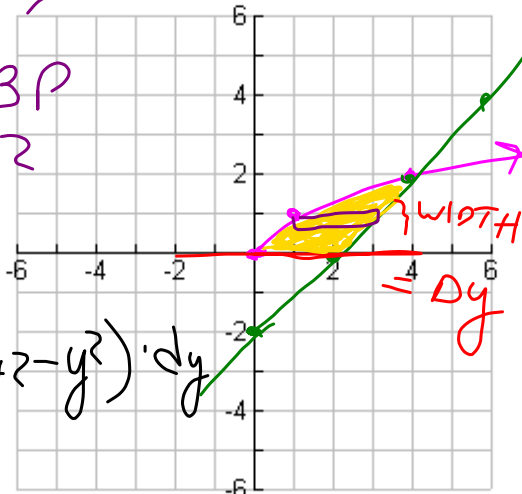
$$\underline{y + 2 = x}$$

HEIGHT = ?

GSG - PBP

$$= y + 2 - y^2$$

$$A = \int_{y=0}^{y=2} (y + 2 - y^2) \cdot dy$$



NEXT PAGE...

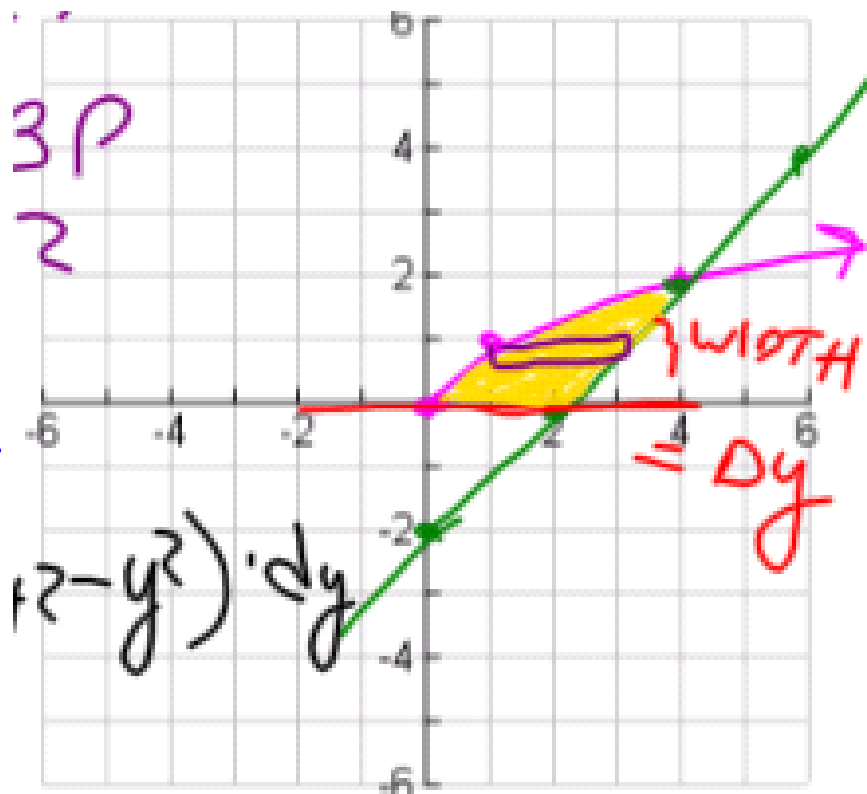
$$A = \int_{y=0}^{y=2} (y+2-y^2) \cdot dy$$

$$= \left[-\frac{1}{3}y^3 + \frac{1}{2}y^2 + 2y \right]_{y=0}^{y=2}$$

$$= -\frac{1}{3} \cdot 2^3 + \frac{1}{2} \cdot 2^2 + 2 \cdot 2 - \left\{ 0 \right\}$$

$$= -\frac{8}{3} + \frac{6}{3} + \frac{12}{3}$$

$$= \frac{10}{3} \text{ SQ. UNITS}$$



NOT PART ...

Ex. 2) P. 381 (19) $y^2 - 4x = 4$ & $4x - y = 16$

SOLVE FOR X:

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

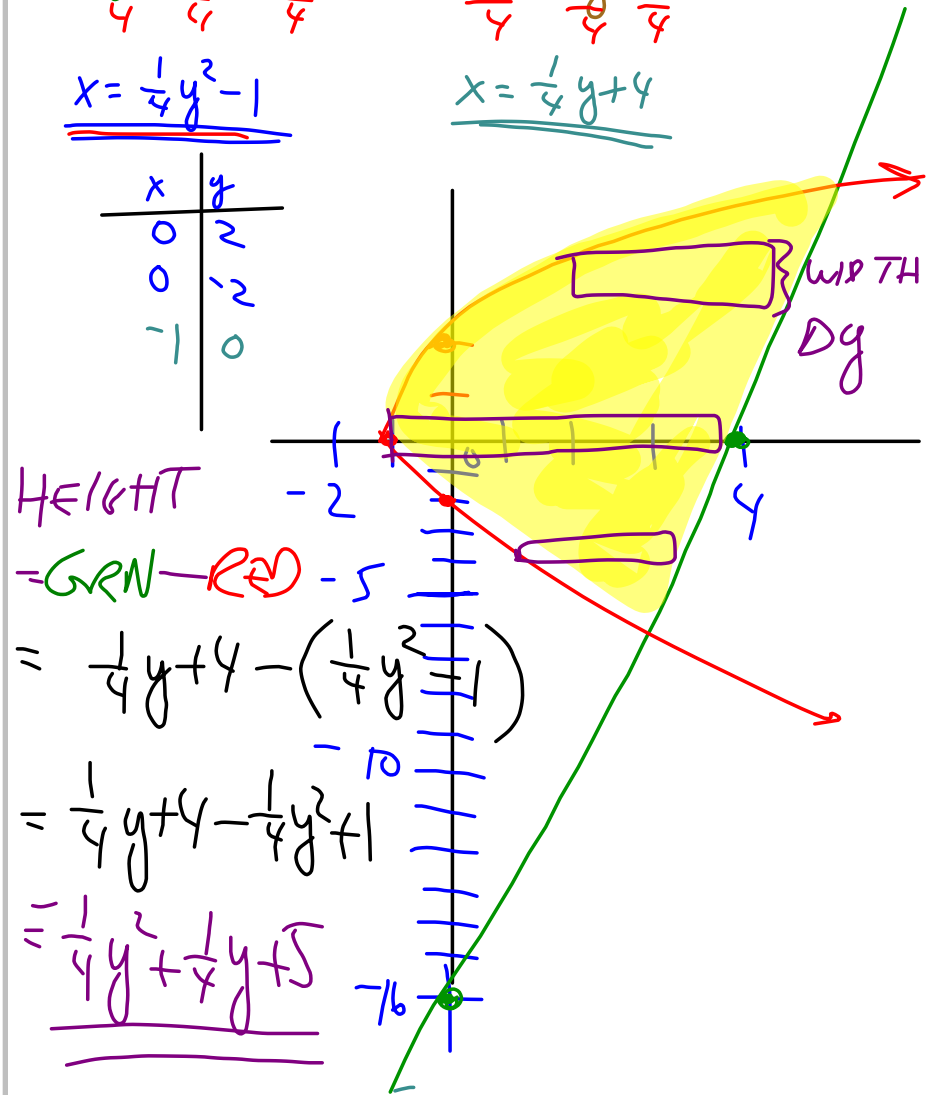
$$\underline{x = \frac{1}{4}y^2 - 1}$$

x	y
0	2
0	-2
-1	0

$$4x - y = 16 \quad 4x - 16 = y$$

$$\frac{4x}{4} = \frac{y+16}{4}$$

$$\underline{x = \frac{1}{4}y + 4}$$



HEIGHT

$$= \text{GREEN} - \text{RED} - 5$$

$$= \frac{1}{4}y + 4 - \left(\frac{1}{4}y^2 - 1\right)$$

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

$$\underline{\underline{= \frac{1}{4}y^2 + \frac{1}{4}y + 5}}$$

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

$$x = \frac{1}{4}y + 4$$

$$4 \left[\frac{1}{4}y^2 - 1 = \frac{1}{4}y + 4 \right]$$

$$y^2 - 4 = y + 16$$

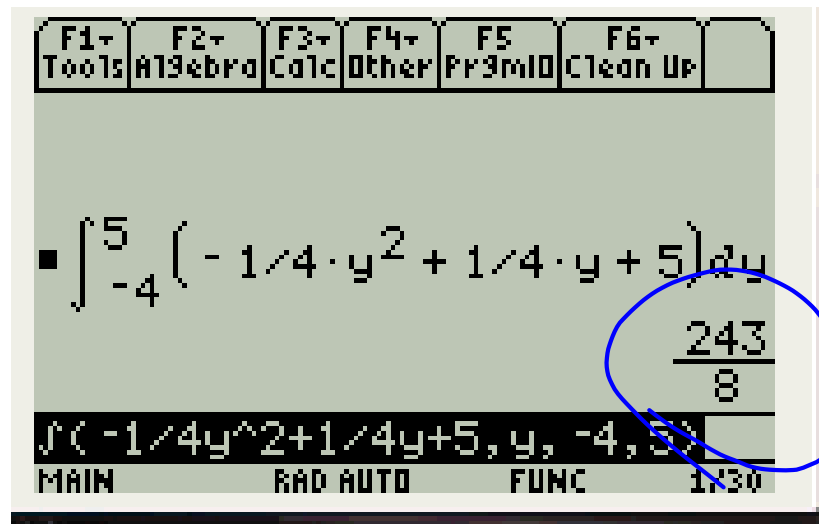
$$y^2 - y - 20 = 0$$

$$(y-5)(y+4) = 0$$

$$y = 5 \text{ or } y = -4$$

$$= \frac{1}{4}y^2 + \frac{1}{4}y + 5$$

$$A = \int_{y=-4}^{y=5} \left(-\frac{1}{4}y^2 + \frac{1}{4}y + 5 \right) dy$$

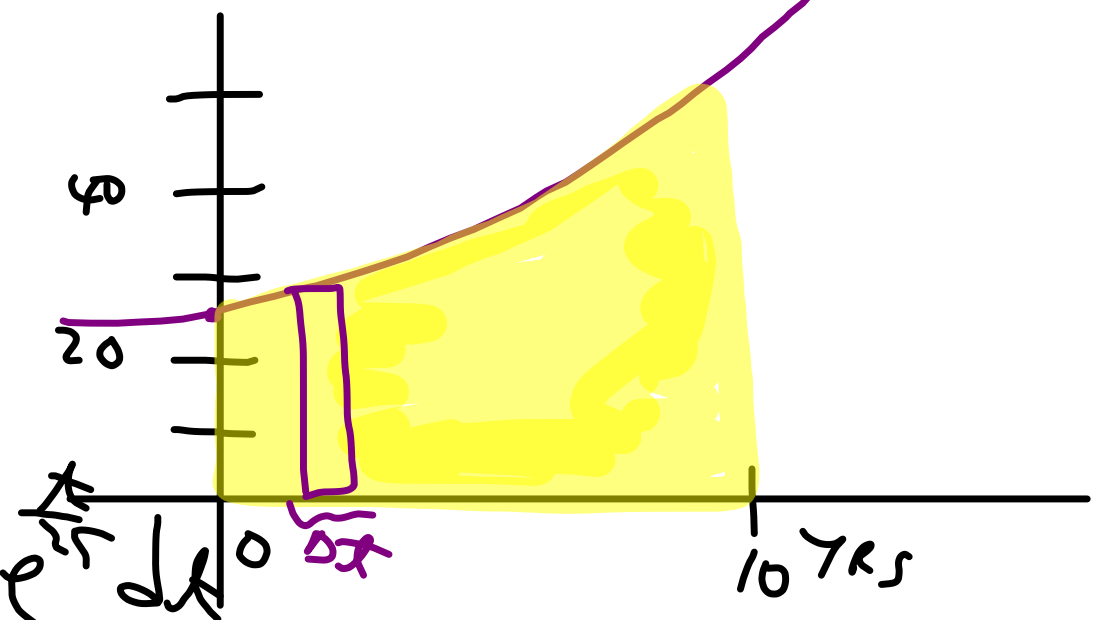


P. 372 21. The rate of consumption of oil in the United States during the 1980's (in billions of barrels per year) is modeled by the function:

$$C(t) = 27.08 e^{\frac{t}{25}}$$

where t is the number of years after January 1, 1980. Find the total consumption of oil in the U.S. from January 1, 1980 to January 1, 1990.

HT = $C(t) - 0$
 width = Δt



$$\text{TOTAL} = \int_0^{10} 27.08 e^{\frac{t}{25}} dt$$

*THE INTEGRAL AS AN ACCUMULATOR!

ANSWERS p. 380-1

② $\frac{4\pi}{3}$ ⑥ $\frac{22}{15}$ ⑧ $\frac{5}{6}$ ⑫ $\frac{32}{3}$ ⑭ 8

AP BUFF

⑩ C

⑰ A

⑱ A

O.T.L.

• GET CAUGHT UP

• P. 380-1 w.r.t y ONLY!

3, 4, 8, 18, 23

• AP BUFF 19, 20