Name: SOLUTIONS

Quiz #1 - January 20, 2009

1. Evaluate

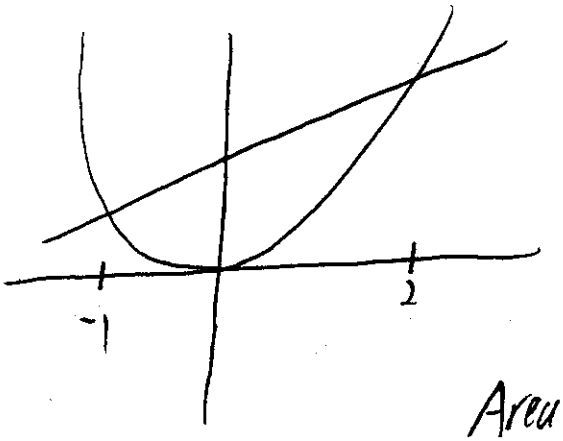
$$\int_1^3 \frac{e^t + 2t}{e^t + t^2} dt.$$

$u = e^t + t^2 \quad du = (e^t + 2t)\,dt$

$\int \frac{1}{u}\,du = \ln|u| \quad$ so $\quad \ln|e^t + t^2|_1^3$

$= \ln(e^3 + 9) - \ln(e + 1)$

2. Find the area of the region between the curves $y = x + 2$ and $y = x^2$.



$x + 2 = x^2$

$(x - 2)(x + 1) = 0 \quad x = 2, -1$

$$\text{Area} = \int_{-1}^{2} x + 2 - x^2\,dx = \frac{x^2}{2} + 2x - \frac{x^3}{3}\Big|_{-1}^{2}$$

$= (2 + 4 - 8/3) - (1/2 - 2 + 1/3)$

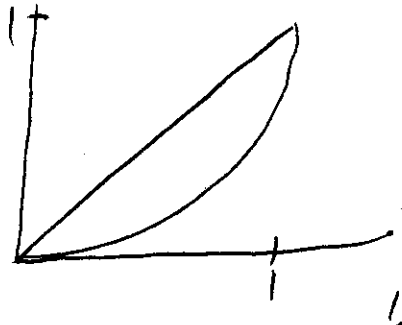
$= 20/6 - (-7/6) = 27/6$

$= 9/2$

Name: SOLUTIONS

Quiz #1 - January 22, 2009

1. The region enclosed by the curves $y = x$ and $y = x^2$ is rotated about the x axis. Find the volume of the resulting solid.



Integrate $0 \le x \le 1$

use washers

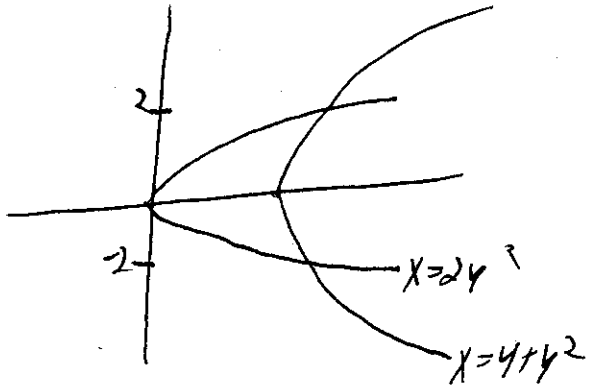
inner radius $= x^2$

outer radius $= x$

$$\int_0^1 \pi x^2 - \pi x^4 \, dx = \pi/3 \, x^3 - \pi/5 \, x^5 \Big|_0^1$$

$$= \pi/3 - \pi/5$$

2. Find the area of the region between the curves $x = 2y^2$ and $x = 4 + y^2$.



$2y^2 = 4 + y^2$

$y = \pm 2$

$$\text{Area} = \int_{-2}^{2} 4 + y^2 - 2y^2 \, dy = 4y - y^3/3 \Big|_{-2}^{2}$$

$$= (8 - 8/3) - (-8 + 8/3)$$

$$= 32/3$$