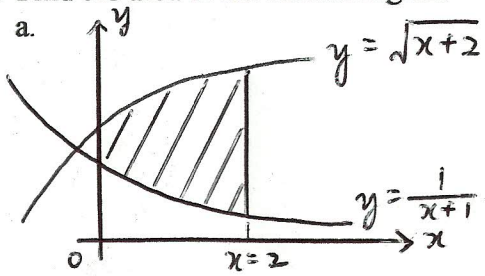
AAMS 3123 CALCULUS II

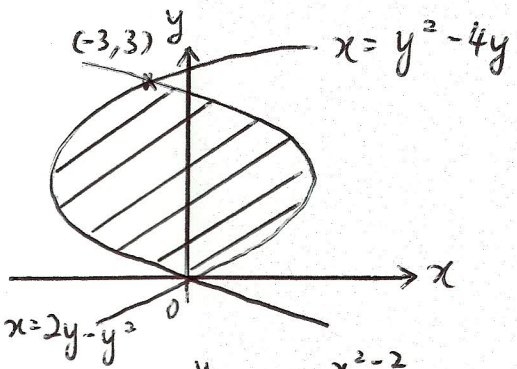
Tutorial 1

1) Find the area of the shaded region.

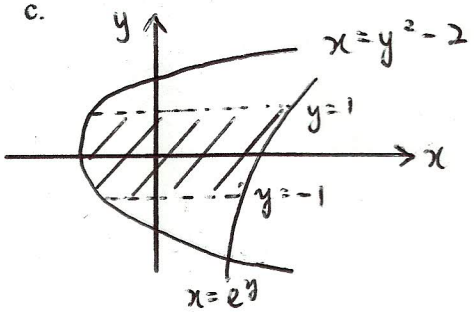
a.



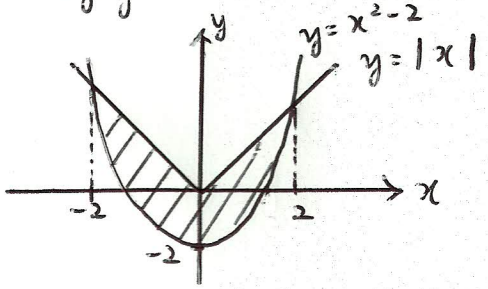
b.



c.



d.



2) Sketch the region enclosed by the given curves. Find the area of the enclosed region.
   a. $y = 4x^2, y = x^2 + 3$
   b. $x + y^2 = 2, x + y = 0$
   c. $x = 1 - y^2, x = y^2 - 1$

3) Find the volume of the solid generated by rotating the region bounded by the given curves, about the specified axis. Sketch the region, the solid, and a typical disk or "washer".
   a. $y = e^x, y = 0, x = 0, x = 0$; about x-axis (x = 1)
   b. $y = x^2, y^2 = x$, about x-axis
   c. $y^2 = x, x = 2y$; about x-axis
   d. $y = 1/x, y = 0, x = 1, x = 3$; about y = -1
   e. $y = x, y = \sqrt{x}$; about x = 2

4) The region enclosed by the curver $x = 4y$ and $y = \sqrt[3]{x}$ in the first quadrant is rotated about the line x = 8. Find the volume generated.

5) Sketch the region bounded by the curves $y^2 = x$, $y^2 = \frac{1}{x^2}$, and the line $x = 3$.
   Find the volume generated when the region is rotated about the x-axis.

ANSWERS:

1a) 2.349
b) 9
c) $e - e^{-1} + \frac{10}{3}$
d) $\frac{20}{3}$

2a) 4
b) $\frac{9}{2}$
c) $\frac{8}{3}$

3a) $\frac{\pi}{2}(e^2 - 1)$
b) $\frac{3\pi}{10}$
c) $\frac{64\pi}{15}$ 8/3 pi
d) $2\pi\left(ln3 + \frac{1}{3}\right)$
e) $\frac{8\pi}{15}$

4) $\frac{832\pi}{21}$

5) $\pi\left(\frac{1}{2} + ln3\right)$