Math 1B
Quiz 6
Fri May 30, 2008

PINK

What day of the month is your birthday ? ___ ___
What are the last 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___

THIS IS A NO CALCULATOR QUIZ

Write, BUT DO NOT COMPUTE, integrals for the volumes of the following solids.
You may use any method you wish.

[6 POINTS] The base of the solid is the region bounded by $y = x^2$ and $y = 4$. Cross sections perpendicular to the x-axis are

[a] semicircles

$$\int_{-2}^{2} \frac{1}{8}\pi (4-x^2)^2\,dx$$

[b] equilateral triangles

$$\int_{-2}^{2} \frac{\sqrt{3}}{4}(4-x^2)^2\,dx$$

1 POINT EACH

[6 POINTS] The region bounded by $y = \sqrt{x}$, $y = 2$ and $x = 0$ is revolved about the line

[a] $y = 2$

$$\int_0^4 \pi (2-\sqrt{x})^2\,dx$$

OR

$$\int_0^2 2\pi (2-y)(y^2)\,dy$$

[b] $x = 5$

$$\int_0^2 \pi \left(25-(5-y^2)^2\right)dy$$

OR

$$\int_0^4 2\pi (5-x)(2-\sqrt{x})\,dx$$

[6 POINTS] The region bounded by $y = e^x$, $x = 2$, $y = 0$ and $x = 0$ is revolved about the line

[a] $x = 0$

$$\int_0^2 2\pi x e^x\,dx$$

OR

$$\int_0^1 4\pi\,dy + \int_1^{e^2} \pi (4-(\ln y)^2)\,dy$$

[b] $y = -4$

$$\int_0^2 \pi \left((e^x+4)^2-16\right)dx$$

OR

$$\int_0^1 2\pi (y+4)(2)\,dy + \int_1^{e^2} 2\pi (y+4)(2-\ln y)\,dy$$

3/8 POINT EACH

[2 POINTS] **MULTIPLE CHOICE (NO PARTIAL CREDIT)**

An MRI scan indicates that cross sectional areas of adjacent slices of a tumor are as given in the table below. Estimate the\ volume of the tumor.

x	0.0	0.2	0.4	0.6	0.8	1.0	1.2
$A(x)$	0.0	0.3	0.4	0.2	0.3	0.1	0.0

[A] $1.2\,(0.0+0.3+0.4+0.2+0.3+0.1+0.0)$

[B] $0.2\pi\,(0.0^2+0.3^2+0.4^2+0.2^2+0.3^2+0.1^2+0.0^2)$

[C] $\dfrac{0.2}{2}(0.0+2\times0.3+2\times0.4+2\times0.2+2\times0.3+2\times0.1+0.0)$

[D] $\dfrac{0.2}{3}(0.0+2\times0.3+4\times0.4+2\times0.2+4\times0.3+2\times0.1+0.0)$

LETTER OF CORRECT ANSWER: C

[2 BONUS POINTS] Sketch a region and an axis of revolution so the volume of the solid created is given by the integral $\int_0^1 \pi\left(4-e^x\right)dx$.