Math 1B (7:30am – 8:20am)
Quiz 4 Version C
Fri May 6, 2011

What month is your birthday ? ___ ___
What are the first 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___
What are the last 2 digits of your DeAnza ID number ? ___ ___

SCORE: ___ / 30 POINTS

NO CALCULATORS ALLOWED

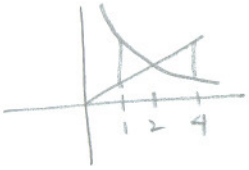
SHOW PROPER ALGEBRAIC WORK
USE PROPER NOTATION & SIMPLIFY ALL ANSWERS WHERE REASONABLE

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER $\int_0^1 \pi(1-y^2)^2\,dy$ **SCORE: ___ / 3 POINTS**

If you revolve the region in Q_1 bounded by $y=\sqrt{x}$, $x=1$ and $y=0$ around the line $x=1$, the volume of the resulting solid is

[a] $\frac{3\pi}{5}$ [b] $\frac{7\pi}{15}$ [c] $\frac{2\pi}{3}$ [d] $\frac{8\pi}{15}$ [e] $\frac{2\pi}{5}$

Find the area between the curves $y=\frac{2}{x^2}$ and $y=\frac{x}{4}$ on the interval $1\le x\le 4$. **SCORE: ___ / 6 POINTS**



$\frac{2}{x^2}=\frac{x}{4}$
$8=x^3$
$x=2$

$\int_1^2\left(\frac{2}{x^2}-\frac{x}{4}\right)dx+\int_2^4\left(\frac{x}{4}-\frac{2}{x^2}\right)dx$

$=\left(-2x^{-1}-\frac{x^2}{8}\right)\Big|_1^2+\left(\frac{x^2}{8}+2x^{-1}\right)\Big|_2^4$

$=\left(-\frac{2}{2}-\frac{4}{8}\right)-\left(-\frac{2}{1}-\frac{1}{8}\right)+\left(\frac{16}{8}+\frac{2}{4}\right)-\left(\frac{4}{8}+\frac{2}{2}\right)$

$=\frac{13}{8}$

The base of a solid is the region bounded by $y=x^2+3x$ and $y=2x+12$. Cross sections perpendicular to the $x-$axis are semicircles. Write, **BUT DO NOT EVALUATE**, an integral (or sum of integrals) for the volume of the solid. **SCORE: ___ / 6 POINTS**

$x^2+3x=2x+12$
$x^2+x-12=0$
$(x+4)(x-3)=0$
$x=-4,3$

$\int_{-4}^{3}\frac{\pi}{8}\left(2x+12-(x^2+3x)\right)^2dx$

OR

$\int_{-4}^{3}\frac{\pi}{8}\left(12-x-x^2\right)^2dx$

The region bounded by $x = y^2$ and $y = \dfrac{3-x}{2}$ is revolved around the line $x = 11$. **SCORE: ___ / 6 POINTS**

Write, **BUT DO NOT EVALUATE**, an integral (or sum of integrals) for the volume of the solid.

$$\int_{-3}^{1} \pi \left[(11-y^2)^2 - (11-(3-2y))^2 \right] dy$$

OR

$$\int_{-3}^{1} \pi \left[(11-y^2)^2 - (8+2y)^2 \right] dy$$

$y = \frac{3-x}{2} \Rightarrow x = 3-2y$

$y^2 = 3-2y$

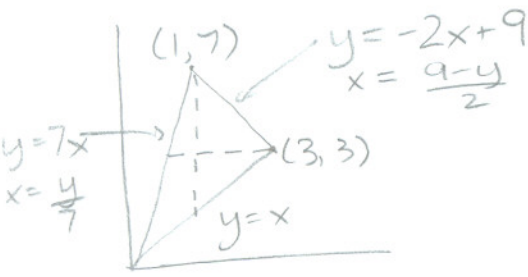
$y^2+2y-3=0$

$(y+3)(y-1)=0$

$y=-3, 1$

Consider the triangle with vertices $(0, 0)$, $(1, 7)$ and $(3, 3)$. **SCORE: ___ / 9 POINTS**

[a] Write, **BUT DO NOT EVALUATE**, a dx integral (or sum of integrals) for the area of the triangle.
Your integrand must NOT use absolute values.



$$\int_{0}^{1} (7x-x)\,dx + \int_{1}^{3} (-2x+9-x)\,dx$$

OR

$$\int_{0}^{1} 6x\,dx + \int_{1}^{3} (9-3x)\,dx$$

[b] Write, **BUT DO NOT EVALUATE**, a dy integral (or sum of integrals) for the area of the triangle.
Your integrand must NOT use absolute values.

$$\int_{0}^{3} \left(y - \frac{y}{7}\right) dy + \int_{3}^{7} \left(\frac{9-y}{2} - \frac{y}{7}\right) dy$$

OR

$$\int_{0}^{3} \frac{6y}{7}\,dy + \int_{3}^{7} \frac{63-9y}{14}\,dy$$