Quiz 2 Calc IV (Math2443-003) 6/22/2001

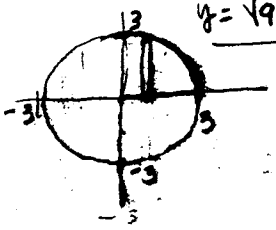
Each problem is worth 5 points. For full credit indicate clearly how you reached your answer.

1. *Set up* a double integral for the volume of the solid lying under the elliptic paraboloid $x^2/4 + y^2/9 + z = 1$ and above the square $R = [-1,1] \times [-2,2]$.

$\frac{x^2}{4} + \frac{y^2}{9} + z = 1, \quad z = 1 - \frac{x^2}{4} - \frac{y^2}{9}$

$$\int_{-2}^{2}\int_{-1}^{1}\left(1 - \frac{x^2}{4} - \frac{y^2}{9}\right) dx\,dy$$

2. *Set up* a double integral for the volume of the solid lying under the paraboloid $z = 9 - x^2 - y^2$ and above the xy-plane.



$y = \sqrt{9-x^2}$

Very Nice

$y\Big|_0^{\sqrt{9-x^2}}$

$$4\int_0^3\int_0^{\sqrt{9-x^2}}(9 - x^2 - y^2)\,dy\,dx$$

$x^2 + y^2 = 9$

$x^2 + y^2 + z = 9$

if $z = 0$ $x^2 + y^2 = 9$

$r = 3$

$y^2 = 9 - x^2$

$y = \sqrt{9-x^2}$

3. Compute the value of $\int_0^2\int_0^x (4 - x^2)\,dy\,dx$ [Hint: The TI-89 says it's 4].

5

$$\int_0^2\int_0^x (4-x^2)\,dy\,dx = \int_0^2 y(4-x^2)\Big|_0^x dx$$ Nice

$$= \int_0^2 x(4-x^2)\,dx = \int_0^2 (4x - x^3)\,dx$$

$$= \left(2x^2 - \frac{x^4}{4}\right)\Big|_0^2 = 8 - 4 + (0-0)$$

$$= 4$$