Name: SOLUTIONS

Quiz #6 - October 28, 2008

1. Calculate

$$\int_0^1 \int_0^3 xy^2 dx dy.$$

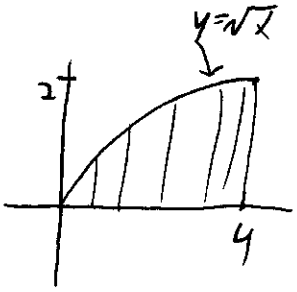
$$\int_0^1 \frac{x^2}{2} y^2 \Big|_{x=0}^{x=3} dy$$

$$= \int_0^1 \frac{9}{2} y^2 dy$$

$$= \frac{3}{2} y^3 \Big|_0^1 = \boxed{3/2}$$

2. Sketch the region of integration. Then rewrite the integral with the order of integration reversed

$$\int_0^4 \int_0^{\sqrt{x}} f(x,y) dy dx.$$



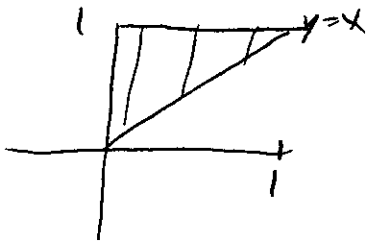
$$\int_0^2 \int_{y^2}^4 f(x,y)\, dx\, dy$$

Name: SOLUTIONS

Quiz #7 - October 30, 2008

1. Evaluate the integral by first reversing the order of integration:

$$\int_0^1 \int_x^1 e^{\frac{x}{y}}\, dy dx.$$



$$\int_0^1 \int_0^y e^{\frac{x}{y}}\, dx\, dy$$

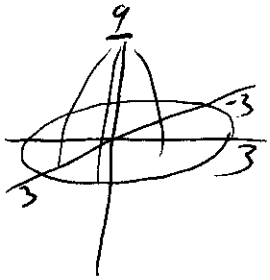
$$= \int_0^1 y e^{\frac{x}{y}} \Big|_{x=0}^{x=y} dy$$

$$= \int_0^1 y e - y\, dy$$

$$= \frac{y^2}{2} e - \frac{y^2}{2} \Big|_0^1$$

$$= \frac{e}{2} - \frac{1}{2} = \boxed{\frac{e-1}{2}}$$

2. Use polar coordinates to find the volume below the paraboloid $z = 9 - x^2 - y^2$ and above the xy-plane.



$$\int_0^{2\pi} \int_0^3 (9 - r^2)\, r\, dr\, d\theta$$

$$= \int_0^{2\pi} \frac{9}{2} r^2 - \frac{r^4}{4} \Big|_{r=0}^{3} d\theta$$

$$= \int_0^{2\pi} \frac{81}{2} - \frac{81}{4}\, d\theta = \int_0^{2\pi} \frac{81}{4}\, d\theta$$

$$= \boxed{\frac{81\pi}{2}}$$