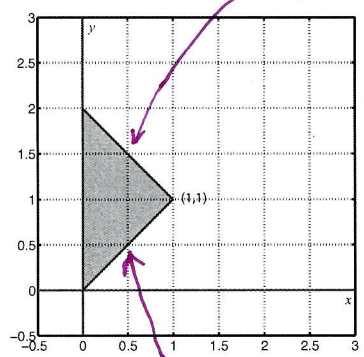
MATH 202 Name : Solutions

Quiz 7 April 2, 2012

Instructions: Point values as indicated. You get one point for taking this quiz.

1. (2 pts.) Evaluate the double integral $\iint_R x\,dA$ over the shaded triangular region R pictured:



$$\int_0^1 \int_x^{2-x} x\,dy\,dx$$

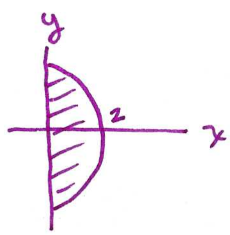
$$= \int_0^1 xy \Big|_x^{2-x} dx$$

$$= \int_0^1 x(2-x) - x(x)\ dx$$

$$= \int_0^1 2x - 2x^2 dx = x^2 - \frac{2}{3}x^3 \Big|_0^1$$

$$= (1 - \tfrac{2}{3}) - (0) = \boxed{\tfrac{1}{3}}$$

2. (2 pts.) Evaluate $\iint_R e^{\frac{-(x^2+y^2)}{2}}\, dA$ for the region R given by $x^2 + y^2 \leq 4$ and $x \geq 0$.



$-\pi/2 \leq \theta \leq \pi/2$ $\quad$ $r^2 = x^2 + y^2$ in polar coordinates

$0 \leq r \leq 2$ $\quad$ $dA = r\,dr\,d\theta$

$$\iint_R e^{-\frac{(x^2+y^2)}{2}} dA = \int_{-\pi/2}^{\pi/2} \int_0^2 e^{-\frac{r^2}{2}} r\,dr\,d\theta = \int_{-\pi/2}^{\pi/2} \int_0^2 r e^{-\frac{1}{2}r^2} dr\,d\theta$$

$$= \int_{-\pi/2}^{\pi/2} -e^{-\frac{r^2}{2}} \Big|_0^2 d\theta = \int_{-\pi/2}^{\pi/2} -e^{-\frac{2^2}{2}} - (-e^0)\, d\theta$$

$$= \int_{-\pi/2}^{\pi/2} 1 - e^{-2} d\theta = \boxed{\pi(1 - e^{-2})}$$