"QUIZ" for Lecture 15

NAME: (print!) _____ **Section:** _____

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: qXFirstLast.pdf) ASAP BUT NO LATER THAN Oct. 29, 8:00pm

1. Use polar coordinates to compute the double integral

$$\int\int_D xy\,dA \quad ,$$

where

$$D = \{(x,y)\,|\,x^2+y^2 \le 1\,,\; x \ge 0\,,\; y \ge 0\} \quad .$$

$\iint_D r\cos\theta\, r\sin\theta\, dA$

$r^2 \le 1$

$r\cos\theta \ge 0$

$r\sin\theta \ge 0$

$\int_0^1 r\cos\theta r\sin\theta\, dr = r\cos(\theta) r\sin(\theta) =$

$\int_0^1 \cos(\theta)\sin(\theta)$ $= .4546$

2. Evaluate the iterated integral by converting it to polar coordinates

$$\int_0^1 \int_0^{\sqrt{1-y^2}} e^{x^2+y^2}\,dx\,dy \quad .$$

Note: The previous version had a typo ($dy\,dx$ instead of $dx\,dy$, that made it nonsense). I thank Yidi "Wendy" Weng for pointing it out (and see won a dolllar).

$f(r,\theta) = e^{(r\cos\theta)^2 + (r\sin\theta)^2}$ $= r\cos^2\theta + r\sin^2\theta = r$

$\Rightarrow e^{r^2}$

$= e^{r^2\cos^2\theta + r^2\sin^2\theta}$

$= e^{r(r\cos^2\theta + r\sin^2\theta)}$

$\int_0^1 \int_0^{\sqrt{1-y^2}} e^{r^2}\,dx\,dr$

$= \int_0^1 e^{r^2}\cdot\sqrt{1-r^2\sin^2\theta}\,dr = \cos\theta$