MATH2850 - Elementary Multivariable Calculus, Spring 2014

Quiz7

March 18, 2014

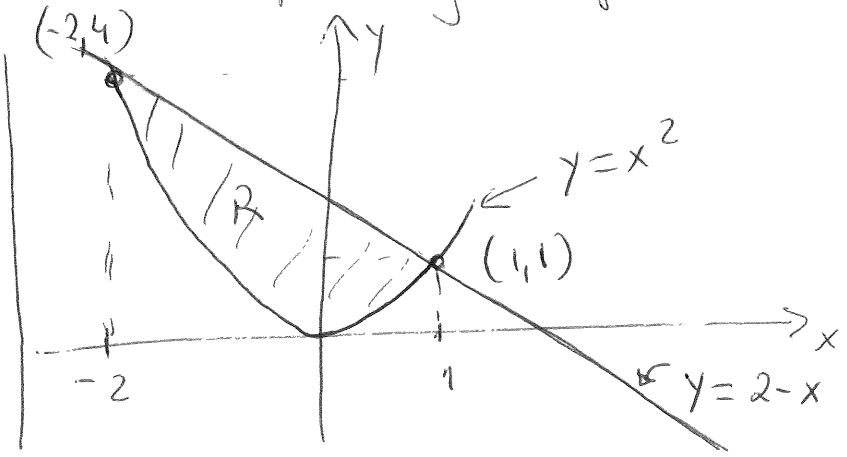
Printed NAME:

- You have 15 min to complete your quiz.
- Please show all your work neatly and indicate your final answers clearly. If you simply write down the final answer without appropriate intermediate steps, you may not get full credit for that problem.
- The quiz is closed book and notes. **Calculators are not allowed**.

GOOD LUCK :)

1. Reverse the order of integration of $\int_{-2}^{1}\int_{x^2}^{2-x} dydx$ (**DO NOT evaluate the integral**).

Region is bounded by $\begin{cases} x=1, & x=-2 \\ y=x^2 & y=2-x \end{cases}$ which have the following representation



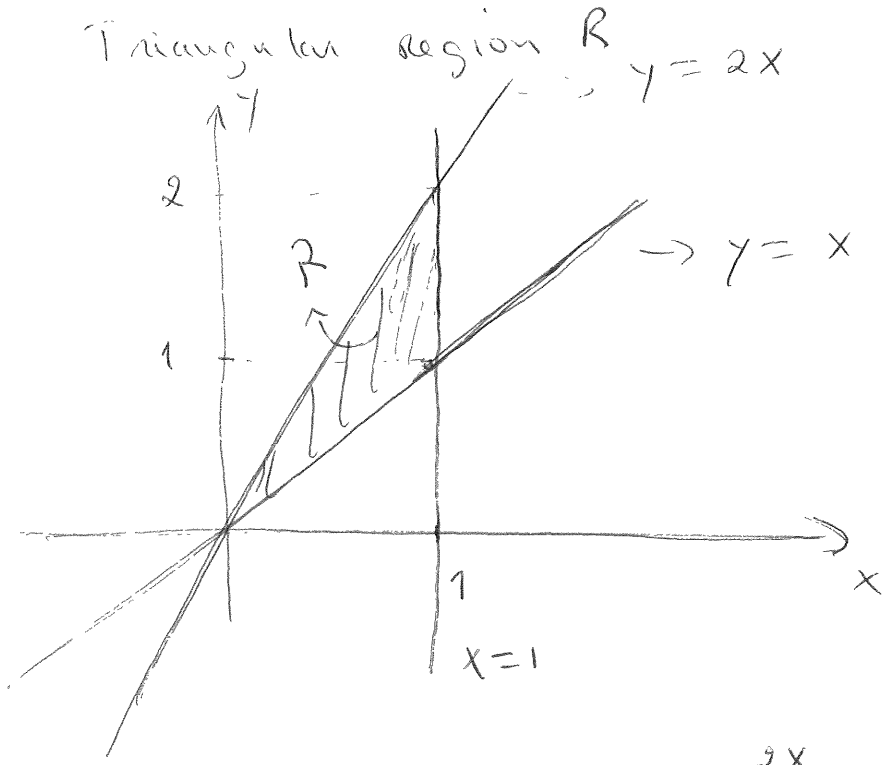
$y=x^2 \Rightarrow x=\pm\sqrt{y}$

$y=2-x \Rightarrow x=2-y$

Reversing the order of integration

$$\int_{-2}^{1}\int_{x^2}^{2-x} dy\,dx = \int_{0}^{1}\int_{-\sqrt{y}}^{\sqrt{y}} dx\,dy + \int_{1}^{4}\int_{-\sqrt{y}}^{2-y} dx\,dy$$

2. Compute the double integral of e^{x^2} over the triangular region bounded by $y = x, y = 2x$, and $x = 1$.



$$\iint e^{x^2} \, dA = \int_{x=0}^{x=1} \int_{x}^{2x} e^{x^2} \, dy \, dx$$

$$= \int_0^1 e^{x^2} \, y \Big|_x^{2x} \, dx = \int_0^1 (2x - x) e^{x^2} \, dx$$

$$= \int_0^1 x e^{x^2} \, dx = \frac{1}{2} e^{x^2} \Big|_0^1 = \frac{1}{2}(e - 1)$$