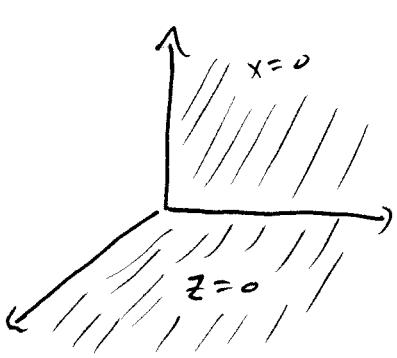
Math 272A
Spring 2010
Instructor: Shawn Rafalski

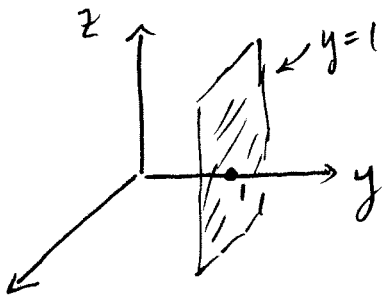
Multivariable Calculus II
Quiz 3
Write your name on this quiz

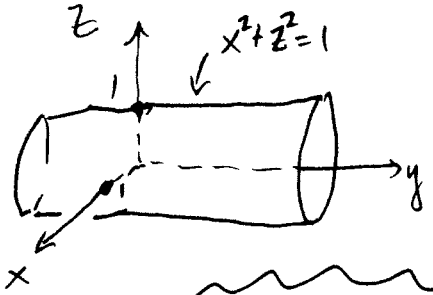
Evaluate the triple integral

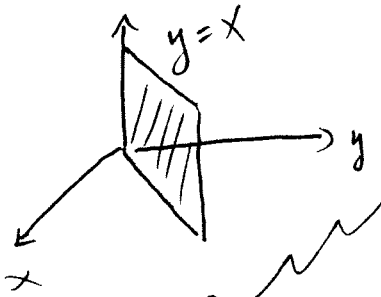
$$\iiint_E 2z\,dV,$$

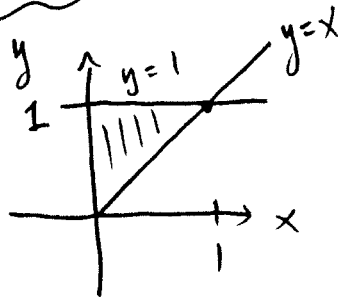
where E is the solid region in the first octant bounded the planes $z = 0$, $x = 0$, $y = 1$ and $y = x$ and the cylinder $x^2 + z^2 = 1$. Use the shadow that E casts on the xy–plane (hint: this shadow is a triangle). **Bonus:** Also write down the triple iterated integral you obtain when you consider E as a solid over a region in the xz–plane.











Shadow in xy-plane

$0 \le x \le 1$

$x \le y \le 1$

(or $0 \le y \le 1$, $0 \le x \le y$)

$0 \le z \le \sqrt{1-x^2}$

$$\iiint_E 2z\,dV = \int_0^1 \int_x^1 \int_0^{\sqrt{1-x^2}} 2z\,dz\,dy\,dx = \int_0^1 \int_x^1 z^2 \Big|_0^{\sqrt{1-x^2}} dy\,dx = \cdots$$