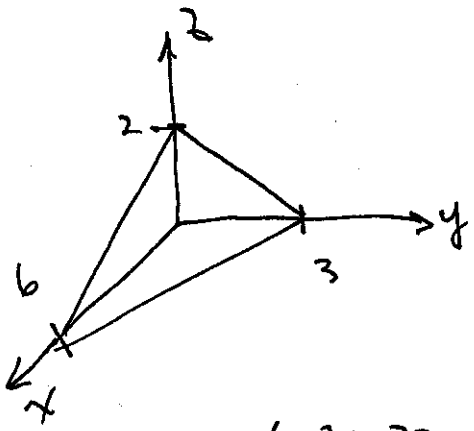
Math 2471 – Calc 3

Find limits of integration for

$$\iiint_V f(x,y,z)\,dV$$

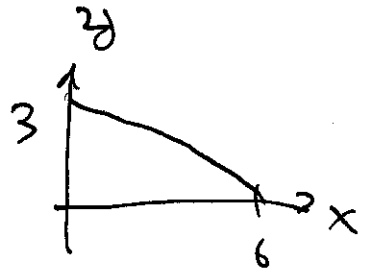
where V is the solid bound by $x=0,\ y=0,\ z=0$ and $x+2y+3z=6$



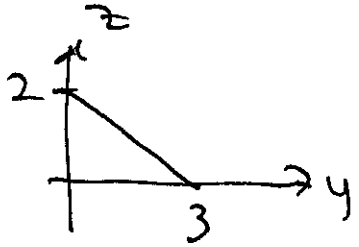
$$\iint_{R_{xy}} \int_0^{\frac{6-x-2y}{3}} f\,dz\,dA_{xy}$$

$$\iiint_{R_{yz}} \int_{x=0}^{6-2y-3z} f\,dx\,dA_{yz}$$

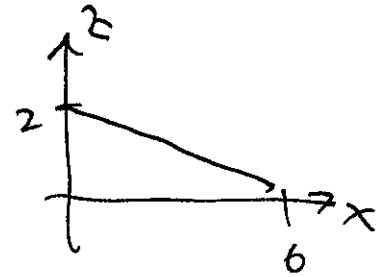
$$\iiint_{R_{xz}} \int_{y=0}^{\frac{6-x-3z}{2}} f\,dy\,dA_{xz}$$



$z=0$ $\quad x+2y=6$



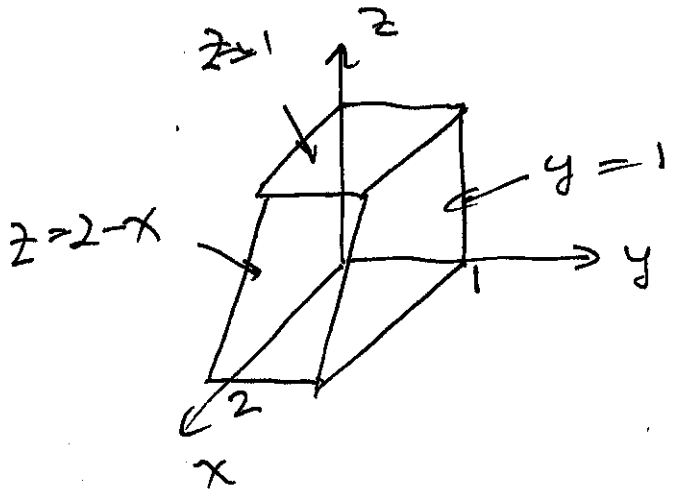
$x=0$ $\quad 2y+3z=6$



$y=0$ $\quad x+3z=6$

Ex 1 The volume is bound by

$z=0,\ z=1,\ z=2-x,\ y=0,\ y=1$



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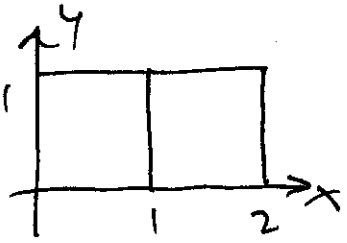
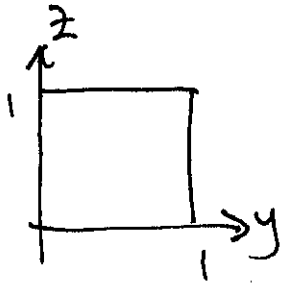


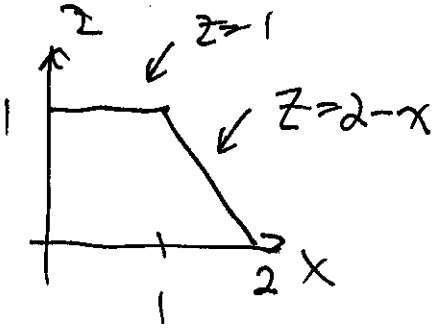
← the surface split

front



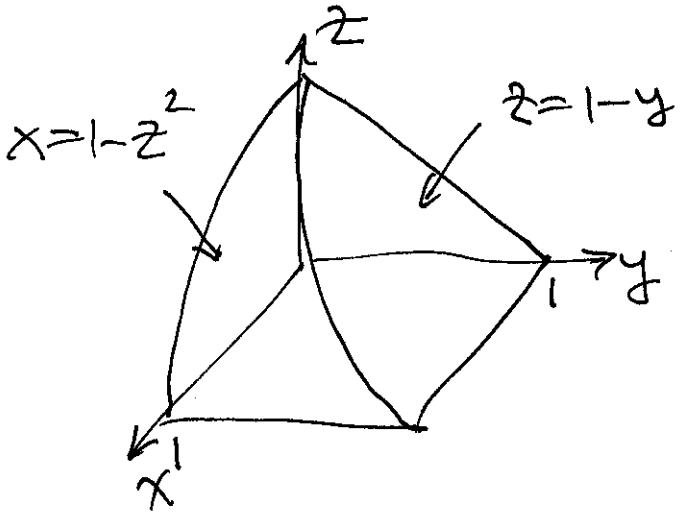
probably the easiest to set up

Side



← would want curve → curve in x direction

#35 $x=0$, $x=1-z^2$ $y=0$, $z=0$ $z=1-y$



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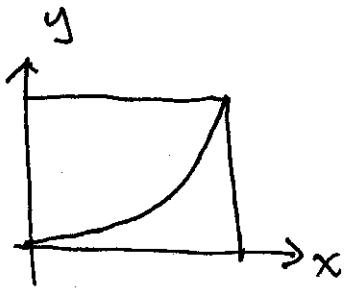
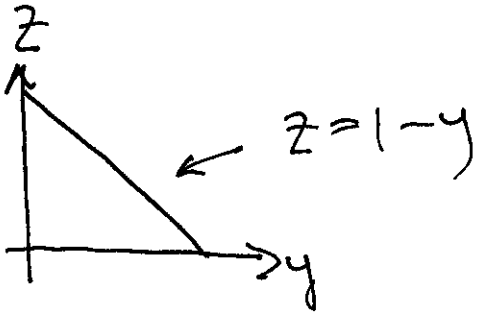


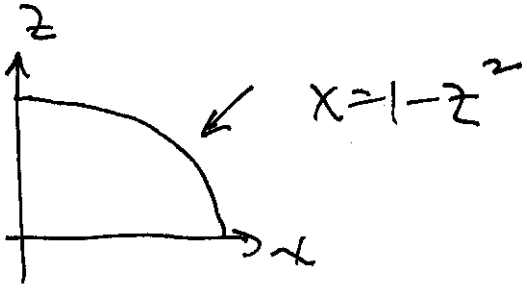
intersection of surfaces

$$x = 1-(1-y)^2$$
$$= 1-1+2y-y^2$$
$$= 2y-y^2$$

front



Side



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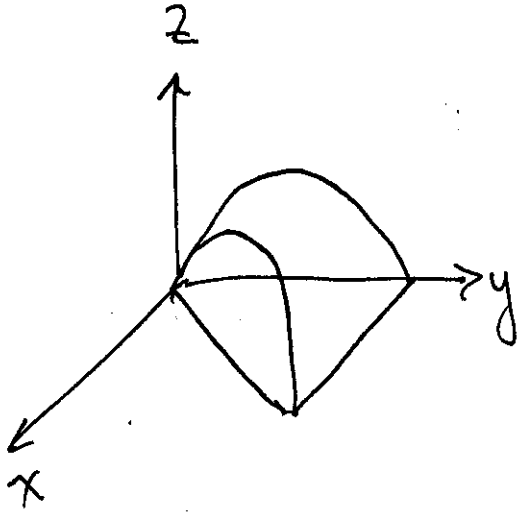
Solid bound by $z = \sin y$ $y = x$, $x = 0$

$0 \le y \le \pi$



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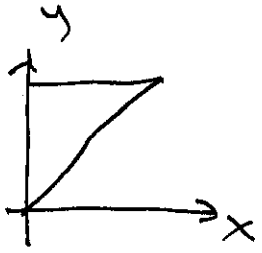
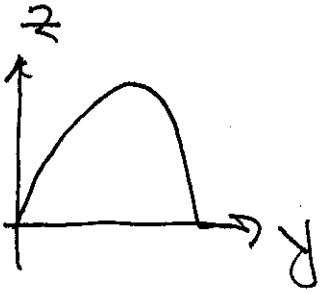
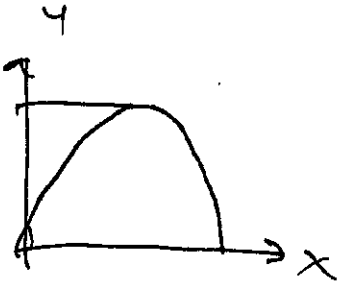


} these are better

front



side



surface splits on this view