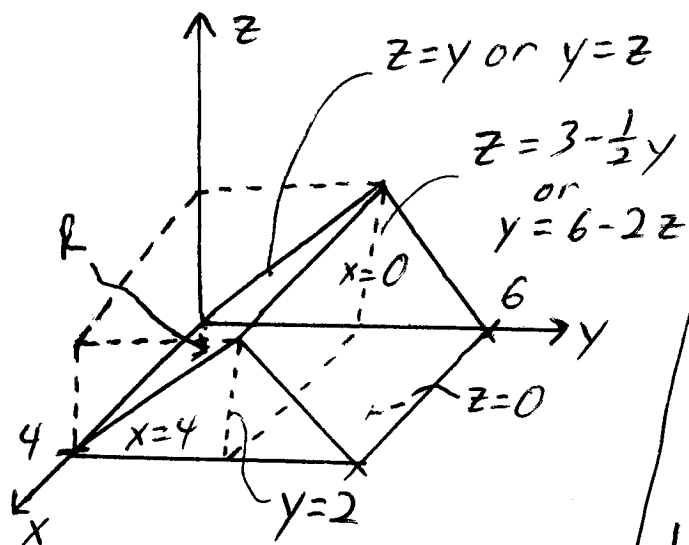


Math 21D
Vogler

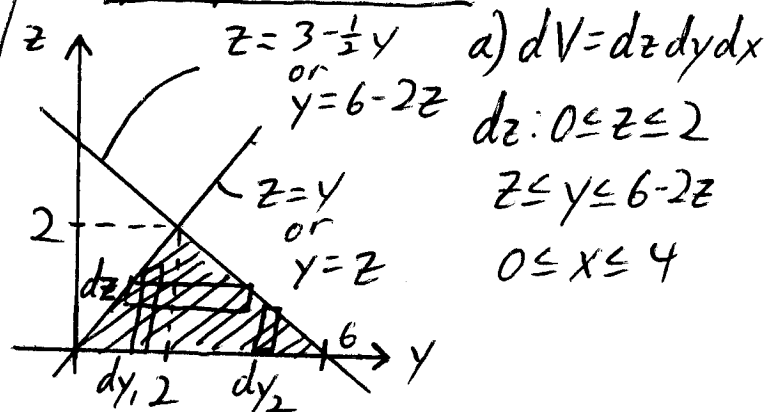
Constructing Bounds for $\iiint_R f(x,y,z) dV$

Example

Consider the solid R bounded by the planes: $x=0$, $x=4$, $z=0$, $z=y$, & $z=3-\frac{1}{2}y$. Describe R using rectangular coordinates for all 6 combinations of dV (i.e. $dx dy dz, \dots$).



yz -plane ($x=0$)

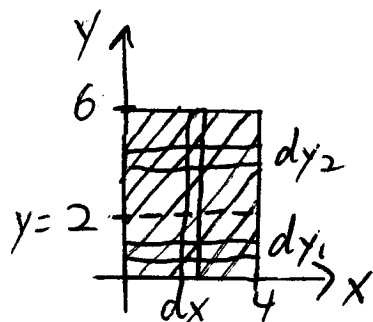


a) $dV = dz dy dx$
 $dz: 0 \leq z \leq 2$
 $z \leq y \leq 6-2z$
 $0 \leq x \leq 4$

b) $dV = dy dz dx$

$dy_1: 0 \leq y \leq 2$ $dy_2: 2 \leq y \leq 6$
 $0 \leq z \leq y$ $0 \leq z \leq 3-\frac{1}{2}y$
 $0 \leq x \leq 4$ $0 \leq x \leq 4$

xy -plane ($z=0$)



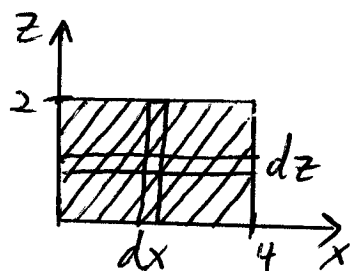
c) $dV = dy dx dz$

$dy_1: 0 \leq y \leq 2$ $dy_2: 2 \leq y \leq 6$
 $0 \leq x \leq 4$ $0 \leq x \leq 4$
 $0 \leq z \leq y$ $0 \leq z \leq 3-\frac{1}{2}y$

d) $dV = dx dy dz$

$dx: 0 \leq x \leq 4$ $dx: 0 \leq x \leq 4$
 $dy_1: 0 \leq y \leq 2$ $dy_2: 2 \leq y \leq 6$
 $0 \leq z \leq y$ $0 \leq z \leq 3-\frac{1}{2}y$

xz -plane ($y=0$)



e) $dV = dx dz dy$
 $dx: 0 \leq x \leq 4$
 $0 \leq z \leq 2$
 $z \leq y \leq 6-2z$

f) $dV = dz dx dy$

$dz: 0 \leq z \leq 2$
 $0 \leq x \leq 4$
 $z \leq y \leq 6-2z$