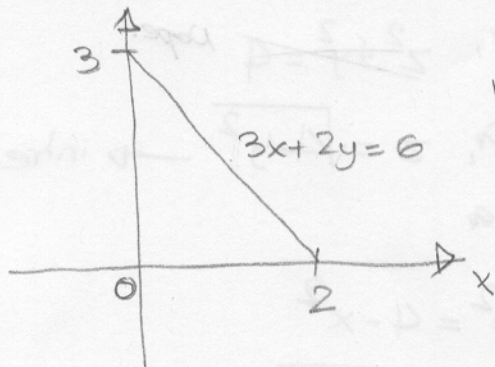Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. **Set up** a double integral for the volume of the region bounded by the coordinate planes and the plane $3x + 2y + z = 6$.

Top veiw y

$3x + 2y = 6$

when $y = 0$ when $x = 0$

$3x = 6$ $2y = 6$

$x = 2$ $y = 3$

Also,

$3x + 2y + z = 6$

or, $z = 6 - 3x - 2y$

$\underbrace{\qquad\qquad}_{\text{Intregrand}}$

$\&$ $3x + 2y = 6$

$2y = 6 - 3x$

$y = \dfrac{6 - 3x}{2}$

$y = \dfrac{6 - 3x}{2}$ r y (upper limit)

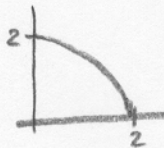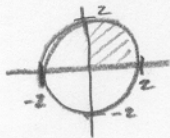∴ $V = \displaystyle\int_{0}^{2} \int_{0}^{\frac{6-3x}{2}} 6 - 3x - 2y \; dy \, dx$

Excellent!

2. Set up a double integral for the volume of the solid bounded by the cylinder $x^2 + y^2 = 4$ and the planes $x = z$, $y = 0$, and $z = 0$ in the first octant.

$4 = x^2 + y^2$ $x = 2$; $y = 0$; $z = 0$ 1st octant

top view:

$y = \pm\sqrt{4 - x^2}$

Nice

$$\int_0^2 \int_0^{\sqrt{4-x^2}} x \, dy \, dx$$