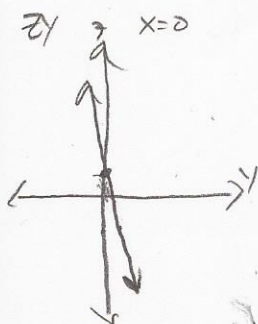
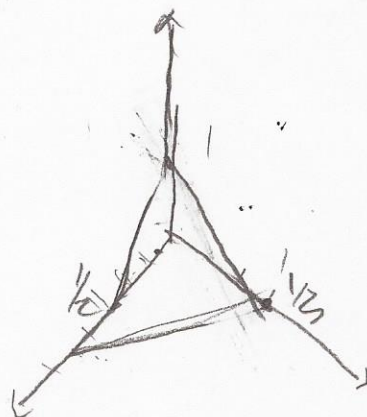
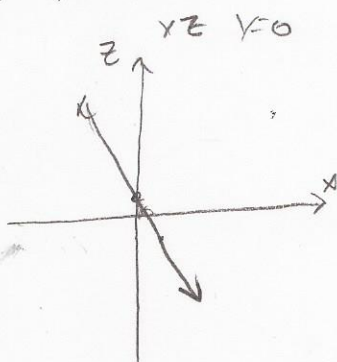
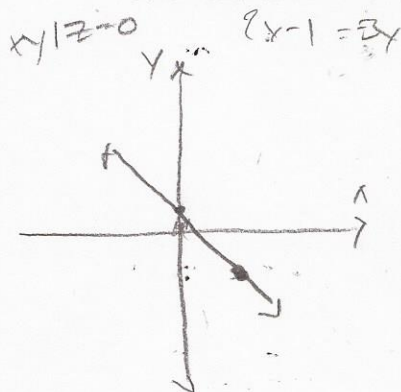


Exercise 1. Determine the volume of the tetrahedron in the first octant bounded by $z = 1 - 2x - 3y$. (So, other bounds are $z = 0$, $y = 0$, and $x = 0$.)



$$y = \frac{1}{3} - \frac{2}{3}x$$

$$-\frac{1}{2} \quad \frac{1}{3} - \frac{2}{3}x$$

$$\int_0^{\frac{1}{3} - \frac{2}{3}x} (1 - 2x - 3y) dy dx$$

$$\int_0^{\frac{1}{2}} \left(\frac{1}{3} - \frac{2}{3}x \right) - \left(\frac{2x}{3} - \frac{4x^2}{3} \right) - \frac{3}{2} \left(\frac{1}{3} - \frac{2}{3}x \right)^2 dx$$

$$\frac{1}{3} - \frac{2}{3}x$$

$$\frac{1}{3} - \frac{2}{3}x$$

$$\int_0^{\frac{1}{3} - \frac{2}{3}x} (1 - 2x - 3y) dy \quad y - 2xy - \frac{3y^2}{2} \Big|_0^{\frac{1}{3} - \frac{2}{3}x} = \left(\frac{1}{3} - \frac{2}{3}x \right) - 2x \left(\frac{1}{3} - \frac{2}{3}x \right) - \frac{3 \left(\frac{1}{3} - \frac{2}{3}x \right)^2}{2}$$