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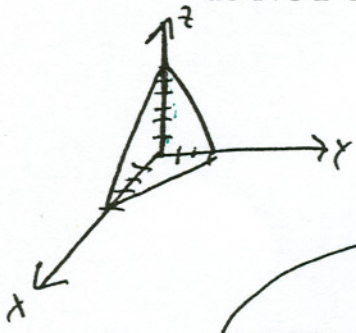
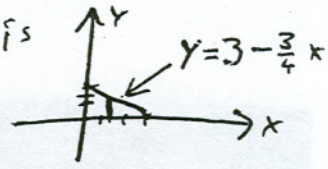
12. (7 points) Consider the solid which is bounded by $3x + 4y + 2z = 12$ and the three coordinate planes. Find the volume of the solid. Set up the integral, **but do NOT compute the integral.**



the top is $z = 6 - 2y - \frac{3}{2}x$

the base is



$$\text{Vol} = \int_0^4 \int_0^{3-\frac{3}{4}x} 6 - 2y - \frac{3}{2}x \, dy \, dx$$

13. (7 points) Find the volume of the region between $z = 9 - x^2 - y^2$ and the xy plane.

the top is $z = 9 - r^2$

the base is

$$\text{Vol} = \int_0^{2\pi} \int_0^3 r(9 - r^2) \, dr \, d\theta$$

$$= 2\pi \int_0^3 9r - r^3 \, dr$$

$$= 2\pi \left(\frac{9r^2}{2} - \frac{r^4}{4} \right) \Big]_0^3$$

$$= 2\pi \left(\frac{81}{2} - \frac{81}{4} \right) = 2\pi \left(\frac{81}{4} \right) = \frac{81\pi}{2}$$