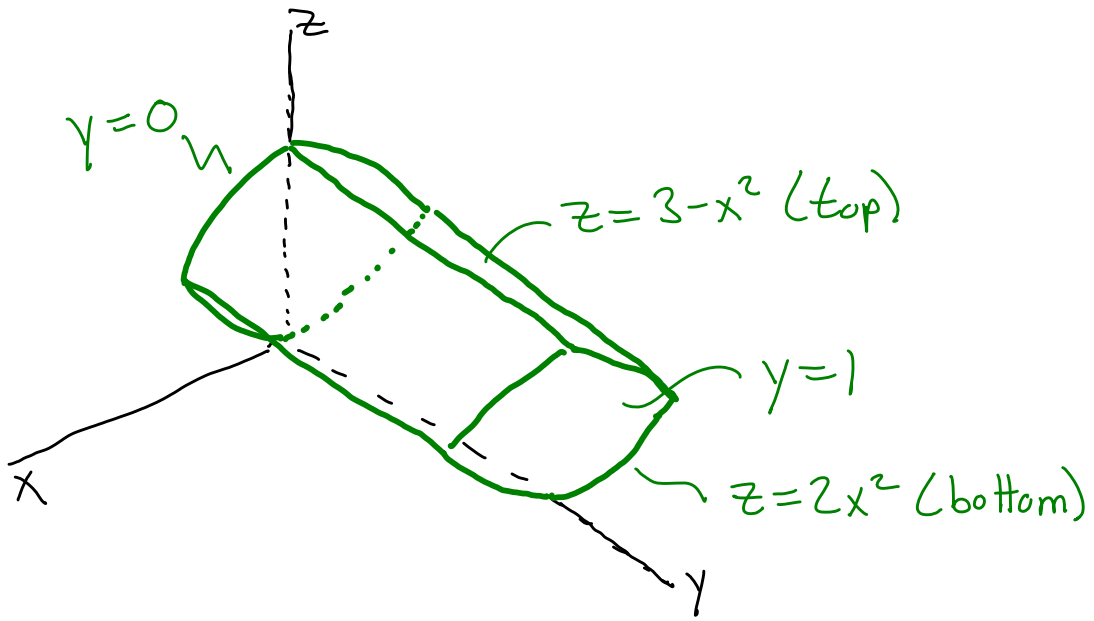
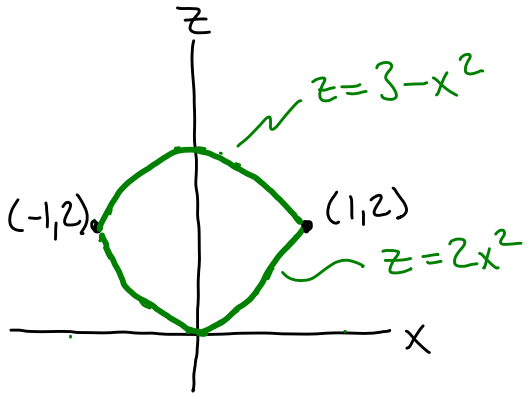
14.5, 14.6 #5

Volume is $\iiint_G 1 \, dV$ where G is the solid



Projection on xz-plane



Intersection: $3 - x^2 = 2x^2$

$3 = 3x^2$

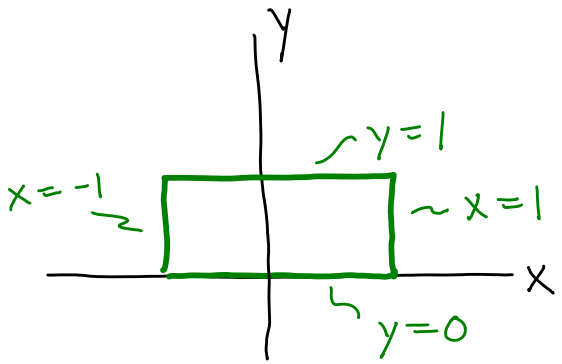
$x = -1, 1$

$$\iiint_G 1 \, dV = \int_{-1}^{1} \int_{2x^2}^{3-x^2} \int_{0}^{1} 1 \, dy \, dz \, dx$$

$$= \int_{-1}^{1} \int_{2x^2}^{3-x^2} dz \, dx = \int_{-1}^{1} (3 - 3x^2) \, dx = 3x \Big|_{-1}^{1} - x^3 \Big|_{-1}^{1} = 6 - 2 = 4$$

Some alternatives:

Projection on xy-plane is



$$\iiint_G 1 \, dV = \int_{-1}^{1} \int_{0}^{1} \int_{2x^2}^{3-x^2} 1 \, dz \, dy \, dx$$

$$= \int_{0}^{1} \int_{-1}^{1} \int_{2x^2}^{3-x^2} 1 \, dz \, dx \, dy$$