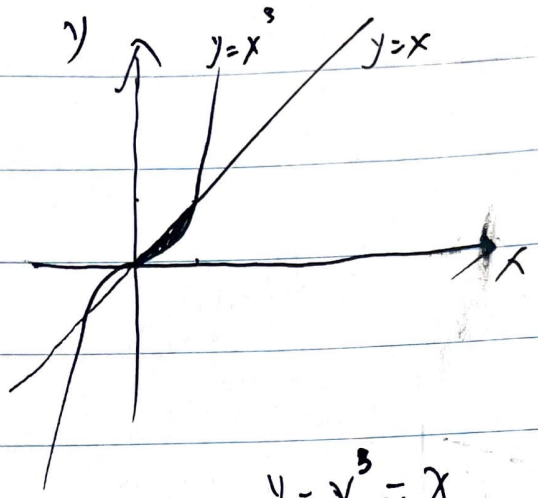
15.2 : 18



$y=x^3=x$, $x=-1$, or $x=1$, or $x=0$

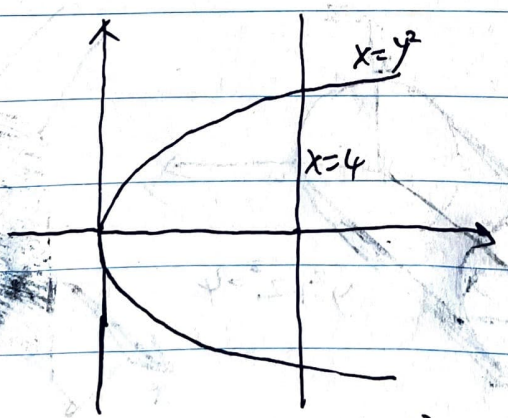
$$\int_0^1 \int_{x^3}^{x} (x^2+2y)\,dA = \int_0^1 \int_{x^3}^{x} (x^2+2y)\,dy\,dx =$$

$$\int_0^1 x^2y+y^2 \Big|_{y=x^3}^{y=x} dx = \int_0^1 x^3+x^2-x^5-x^6\,dx =$$

$$\left(\frac{1}{4}x^4+\frac{1}{3}x^3-\frac{1}{6}x^6-\frac{1}{7}x^7\right)\Big|_0^1 =$$

$$\frac{1}{4}+\frac{1}{3}-\frac{1}{6}-\frac{1}{7} = \frac{21+28-14-12}{84} = \frac{23}{84}$$

15.2: 24



$$\int_{-2}^{2}\int_{y^2}^{4} 1+x^2y^2\,dx\,dy =$$

$$\int_{-2}^{2} x+\frac{1}{3}y^2x^3 \Big|_{y^2}^{4} dy =$$

$$\int_{-2}^{2} 4+\frac{1}{3}y^2\cdot 64-y^2-\frac{1}{3}y^8\,dy =$$

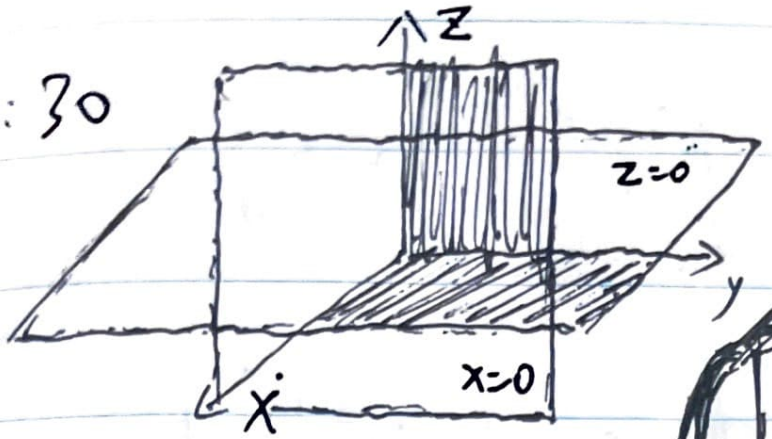
$$4y+\frac{61}{9}y^3-\frac{1}{27}y^9\Big|_{-2}^{2} = 8+\frac{61\cdot 8}{9}-\frac{512}{27}-$$

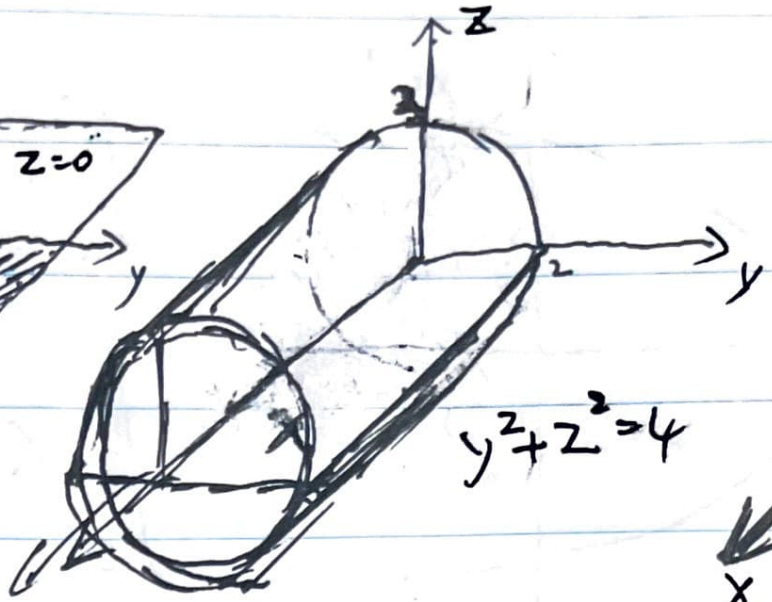
$$\left(-8-\frac{61\cdot 8}{9}+\frac{512}{27}\right) =$$

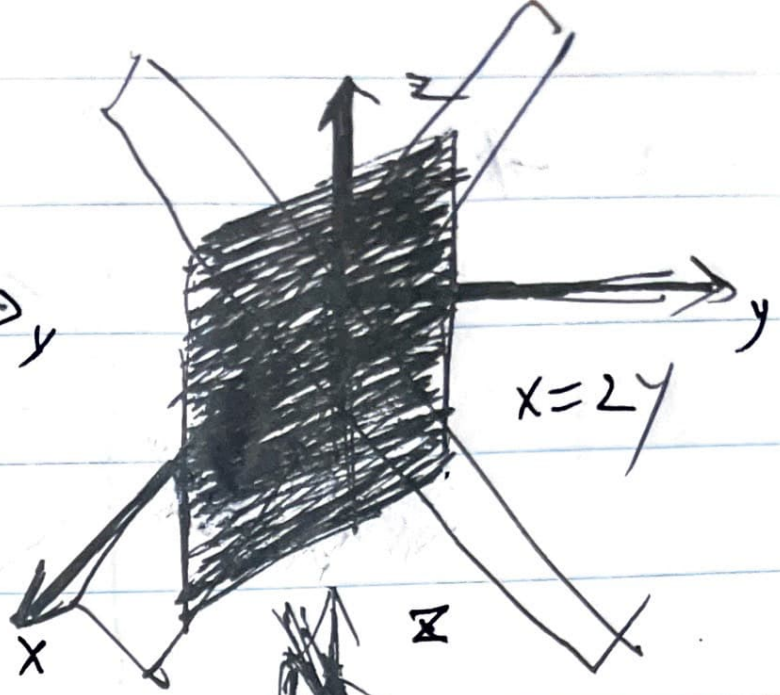
$$16+\frac{16\cdot 61}{9}-\frac{1024}{27} = \frac{16\cdot 27}{27}+\frac{3\cdot 16\cdot 61}{27}-\frac{16\cdot 2^6}{27} =$$

$$\frac{16\cdot(27+183-64)}{27} = \frac{146\cdot 16}{27} = \frac{2336}{27}$$

15.2:30



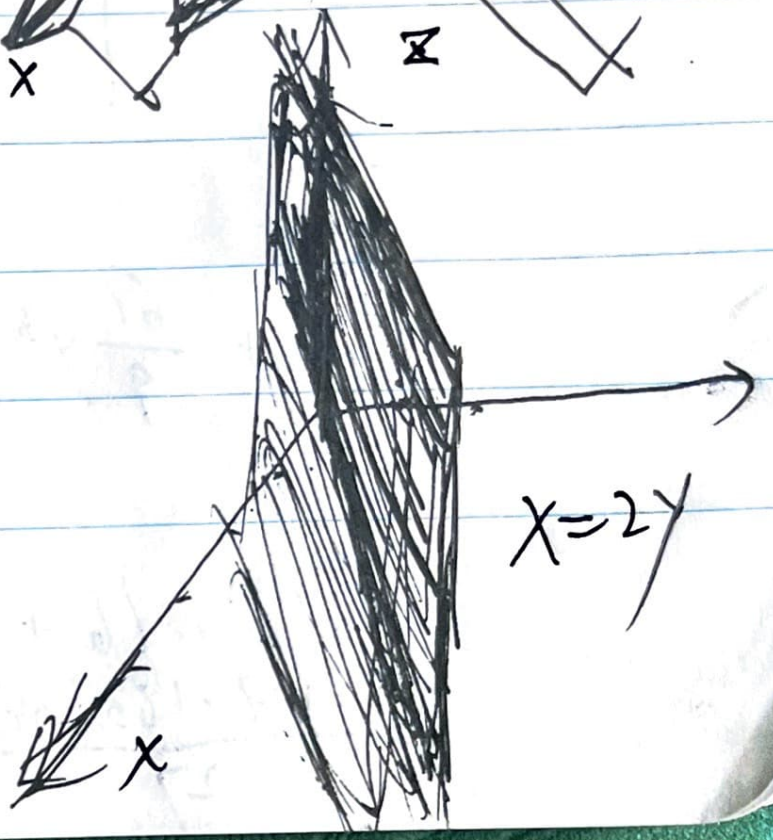




$$\int_0^2 \int_0^{2y} \int_0^{\sqrt{4-y^2}} 1 \, dz \, dx \, dy =$$

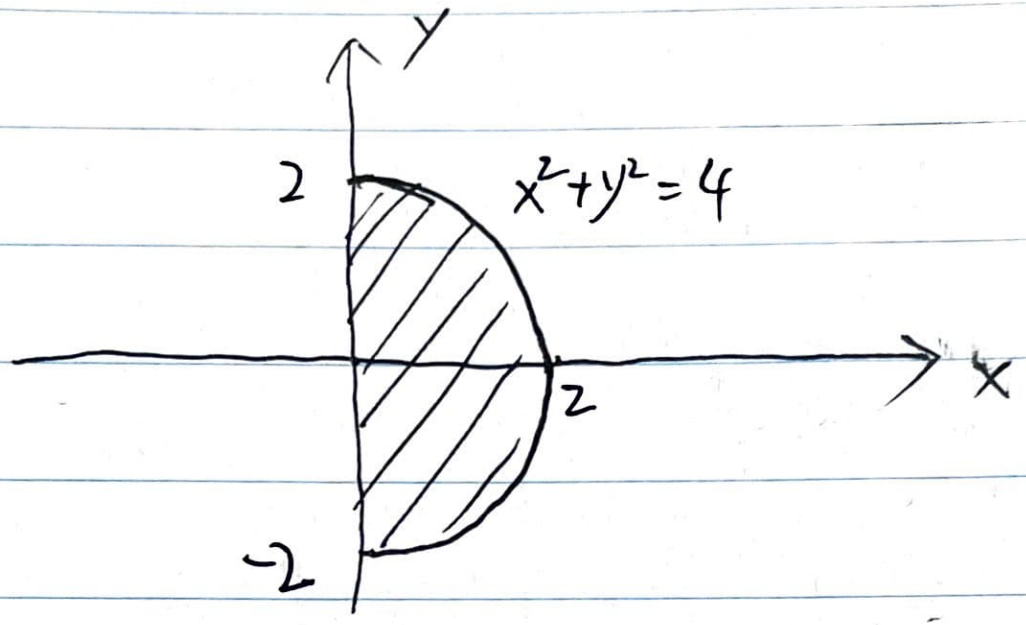
$$\int_0^2 \int_0^{2y} \sqrt{4-y^2} \, dx \, dy =$$

$$\int_0^2 2y\sqrt{4-y^2} \, dy = \left(-\frac{2}{3}(4-y^2)^{\frac{3}{2}}\right)\Big|_0^2 = \frac{16}{3}$$



15.2 : 48.

$$\int_{-2}^{2}\int_{0}^{\sqrt{4-y^2}} f(x,y)\,dx\,dy$$



$$\int_{0}^{2}\int_{-\sqrt{4-x^2}}^{0} f(x,y)\,dy\,dx + \int_{0}^{2}\int_{0}^{\sqrt{4-x^2}} f(x,y)\,dy\,dx$$