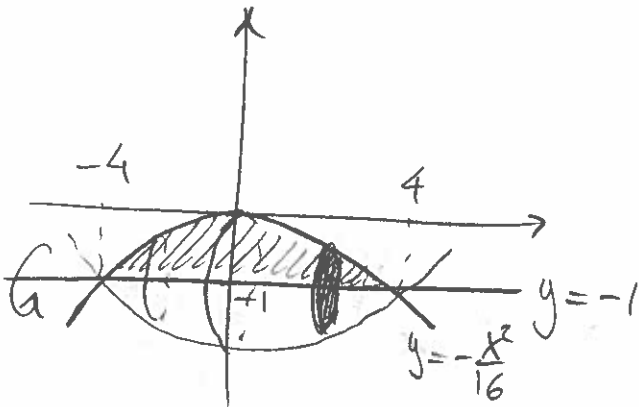


↓ a) $y = -1$

Bounds of integration:

$$-\frac{x^2}{16} = -1 \Rightarrow x^2 = 16$$

$$\Rightarrow x = -4 \text{ and } x = 4$$



Disk Method:

$$\text{Radius} = \overbrace{-\frac{x^2}{16}}^{\text{top}} - \underbrace{(-1)}_{\text{bottom}} = 1 - \frac{x^2}{16}$$

$$V = \pi \int_{-4}^4 \left(1 - \frac{x^2}{16}\right)^2 dx$$

b) $y = -2$

Washer Method

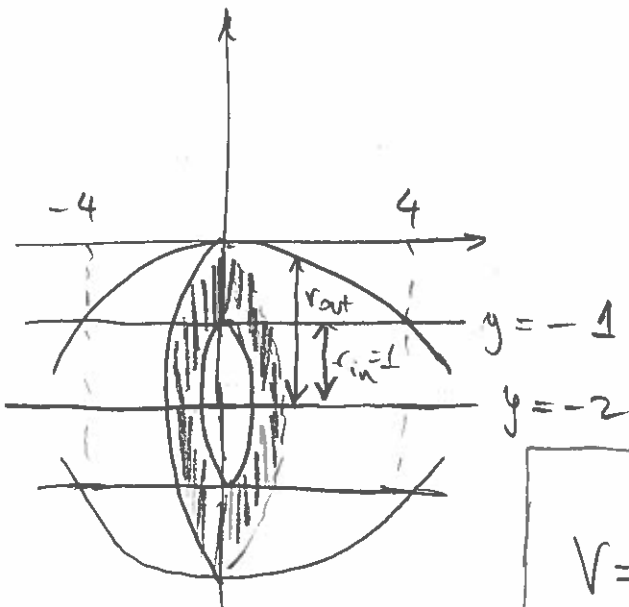
Inner Radius

$$r_{in} = 1$$

Outer Radius

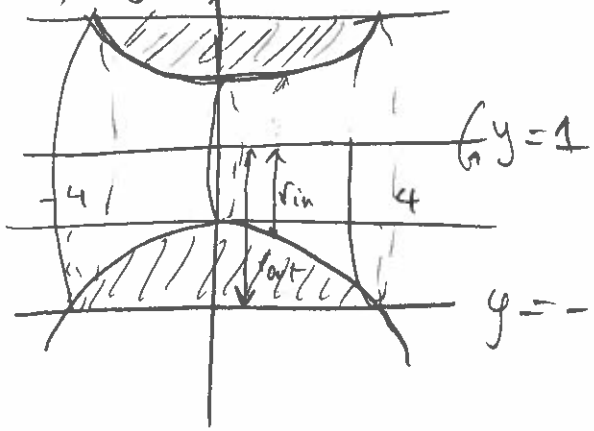
$$r_{out} = \underbrace{-\frac{x^2}{16}}_{\text{top}} - \underbrace{(-2)}_{\text{bottom}}$$

$$r_{out} = 2 - \frac{x^2}{16}$$



$$V = \pi \int_{-4}^4 \left(2 - \frac{x^2}{16}\right)^2 - 1^2 dx$$

c) $y = 1$



Washer Method

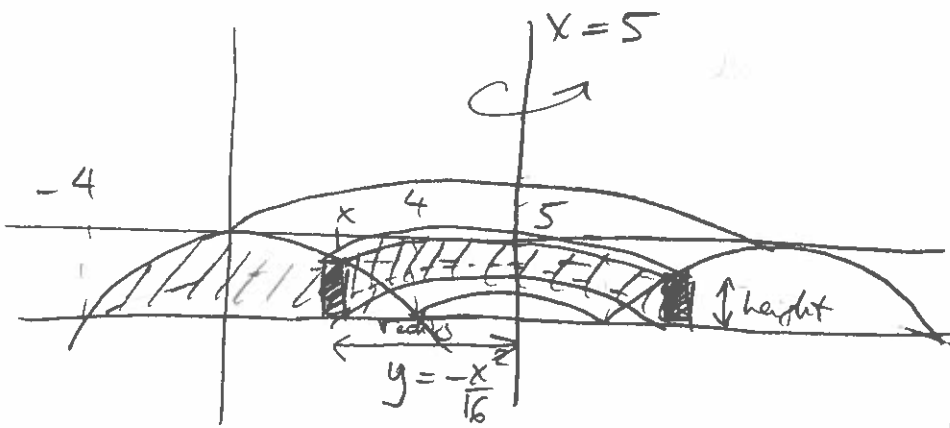
Inner Radius

$$r_{in} = 1 - \left(-\frac{x^2}{16}\right) = 1 + \frac{x^2}{16}$$

Outer Radius $r_{out} = 1 - (-1) = 2$

$$V = \pi \int_{-4}^4 2^2 - \left(1 + \frac{x^2}{16}\right)^2 dx$$

d) $x = 5$



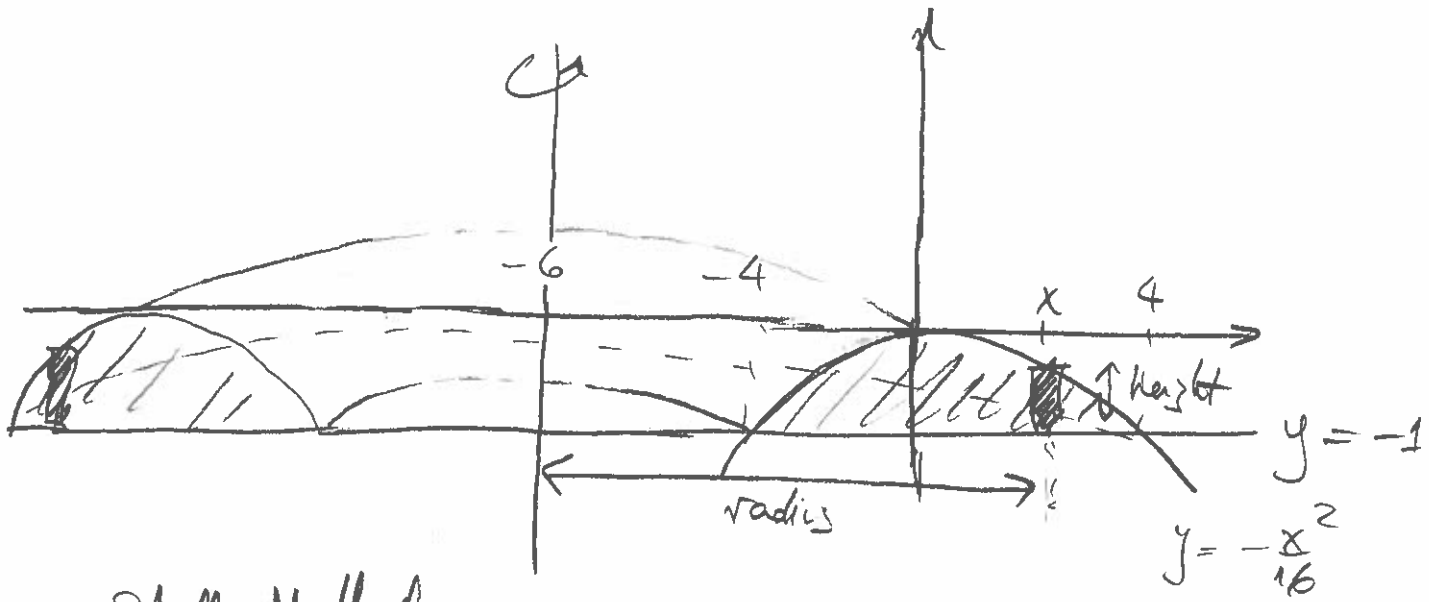
Shell Method

$$\begin{aligned} (\text{Shell height}) &= -\frac{x^2}{16} - (-1) \\ &= 1 - \frac{x^2}{16} \end{aligned}$$

$$(\text{Shell radius}) = 5 - x$$

$$V = 2\pi \int_{-4}^4 (\text{shell height}) (\text{shell radius}) dx = 2\pi \int_{-4}^4 \left(1 - \frac{x^2}{16}\right) (5 - x) dx$$

e) $x = -6$



Shell Method

$$\left(\begin{array}{l} \text{Shell} \\ \text{height} \end{array} \right) = 1 - \frac{x^2}{16} \quad (\text{as in the previous exercise})$$

$$\left(\begin{array}{l} \text{Shell} \\ \text{radius} \end{array} \right) = x - (-6) = x + 6$$

$$V = 2\pi \int_{-4}^4 \left(1 - \frac{x^2}{16} \right) (x + 6) dx$$