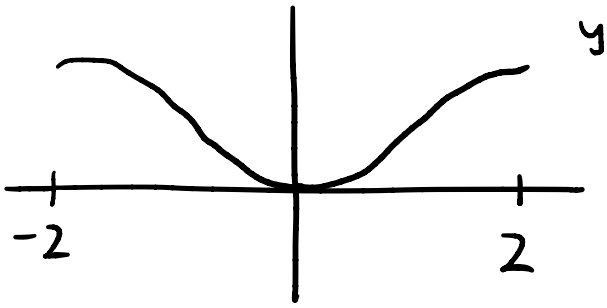
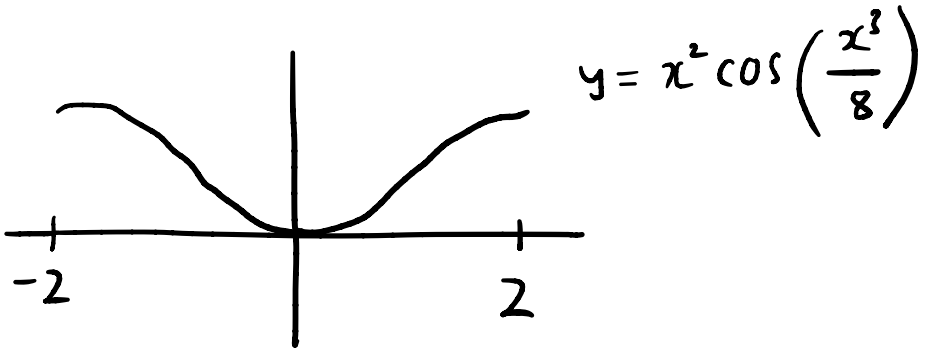
Compute $\int_{-2}^{2} x^2 \cos\left(\frac{x^3}{8}\right) dx$



$y = x^2 \cos\left(\frac{x^3}{8}\right)$

Compute $\int_{-2}^{2} x^2 \cos\left(\frac{x^3}{8}\right) dx$



Let $u = \frac{x^3}{8} \Rightarrow du = \frac{3}{8} x^2 \, dx$. $u = \frac{2^3}{8} = 1$, $u = \frac{(-2)^3}{8} = -1$

$$\int_{-2}^{2} x^2 \cos\left(\frac{x^3}{8}\right) dx$$

$$= \int_{-1}^{1} \frac{8}{3} \cos u \, du \qquad (u'(x) \geq 0)$$

$$= \frac{8}{3} \sin u \Big|_{-1}^{1}$$

$$= \frac{8}{3} (\sin 1 - \sin(-1))$$

$$= \frac{16}{3} \sin 1$$