1. Evaluate the indefinite integral \[ \int x\sqrt{1+x} \, dx. \]

Substitute \( u = 1 + x, \ du = dx: \)

\[
\int x\sqrt{1+x} \, dx = \int (u - 1)\sqrt{u} \, du
= \int u^{3/2} - u^{1/2} \, du
= \frac{2}{5}u^{5/2} - \frac{2}{3}u^{3/2} + C
= \frac{2}{5}(1 + x)^{5/2} - \frac{2}{3}(1 + x)^{3/2} + C.
\]

2. Sketch the region enclosed by the curves \( y = x^2, \ y = 8 - x^2, \) and find its area. Find the endpoints by solving \( x^2 = 8 - x^2 \) \( \Rightarrow \ 2x^2 = 8 \ \Rightarrow \ x^2 = 4 \ \Rightarrow \ x = \pm 2. \)

The area is given by the definite integral
\[
\int_{-2}^{2} 8 - 2x^2 \, dx = 8x - \frac{2}{3}x^3 \bigg|_{-2}^{2} = (16 - 16/3) - (-16 + 16/3) = 64/3.
\]