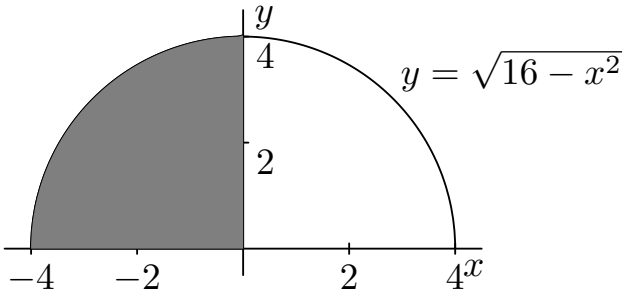
. 5

1. Graph the following integrand and use area to evaluate the integral: $\int_{-4}^{0} \sqrt{16-x^2}\, dx$. (NO credit for using other methods!)

Solution.



The area is one quarter of a circle of radius 4. As the area of the whole circle is 16π, the area of the region is 4π.

. 5

2. Using the Fundamental Theorem of Calculus, evaluate the integral: $\int_4^9 \frac{1-u^{3/2}}{\sqrt{u}}\, du$.

Solution. First, we simplify the integrand:

$$\frac{1-u^{3/2}}{\sqrt{u}} = u^{-1/2} - u.$$

One antiderivative of this is $2u^{1/2} - \frac{u^2}{2}$. Thus

$$\begin{aligned}\int_4^9 \frac{1-u^{3/2}}{\sqrt{u}}\, du &= 2u^{1/2} - \frac{u^2}{2}\Big|_4^9 \\ &= \left(2\cdot 3 - \frac{81}{2}\right) - \left(2\cdot 2 - \frac{1}{6}2\right) = -\frac{61}{2}\end{aligned}$$