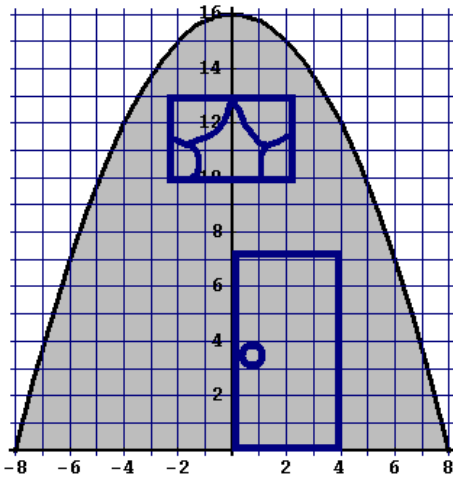


Finding the exact area under a linear, quadratic, or cubic function.

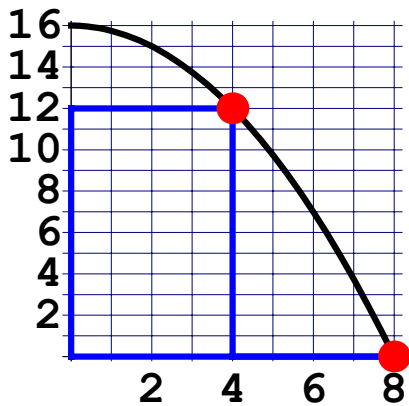
Some expansion formulas: $\sum_{k=1}^n k = \frac{n(n+1)}{2}$ $\sum_{k=1}^n k^2 = \frac{n(n+1)(2n+1)}{6}$ $\sum_{k=1}^n k^3 = \left(\frac{n(n+1)}{2}\right)^2$

For a continuous function $f(x)$ on the interval $[a, b]$, the "area underneath the curve" can be found by

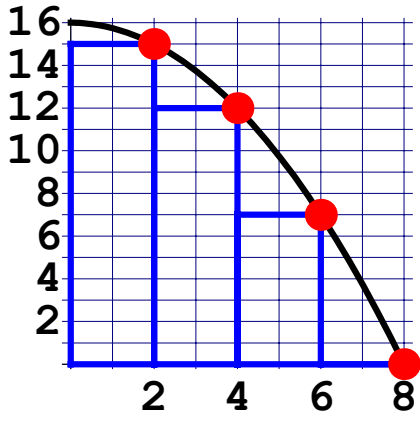
$$\text{Area} = \lim_{n \rightarrow \infty} \sum_{k=1}^n f\left(a + \frac{b-a}{n}k\right) \left(\frac{b-a}{n}\right)$$



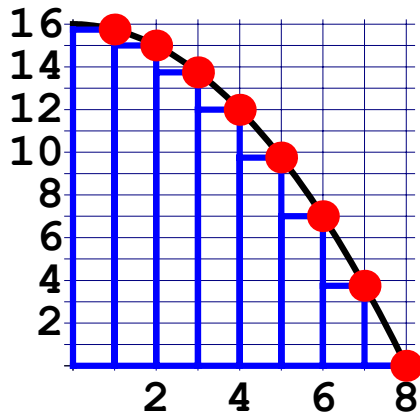
1. How much paint should we use to paint Grandma's house?



$A_{\text{approx1}} =$



$A_{\text{approx2}} =$



$A_{\text{approx3}} =$

2. Find the area under the curve $y = x^2 + 2$ on the interval $[0, 4]$

3. Find the area under the curve $y = 6 - 3x$ on the interval $[-2, 1]$

4. Find the area under the curve $y = x^3 + x$ on the interval $[1, 3]$