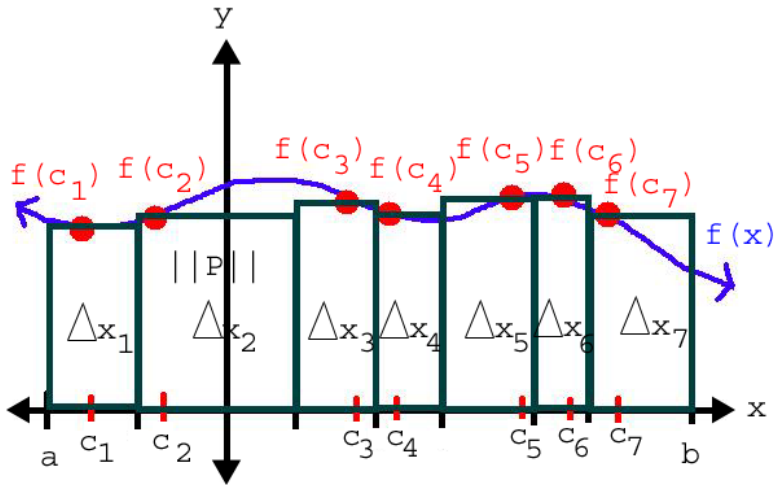


5.2 Definite Integrals

Definitions of the Definite Integral

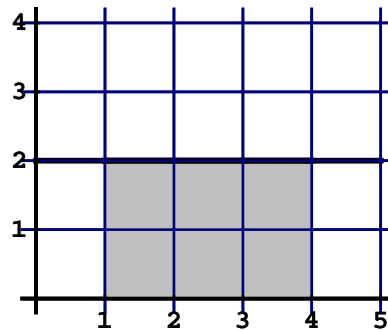
$$\int_a^b f(x) dx = \lim_{\|P\| \rightarrow 0} \sum_{k=1}^n f(c_k) \Delta x_k \quad \text{or} \quad \int_a^b f(x) dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n f\left(a + \frac{b-a}{n}k\right) \left(\frac{b-a}{n}\right)$$



Think of the formulas above as the "area under the curve" formulas.

First Shortcut

$$\int_a^b c dx = c(b-a)$$



$$\int_1^4 2 dx =$$

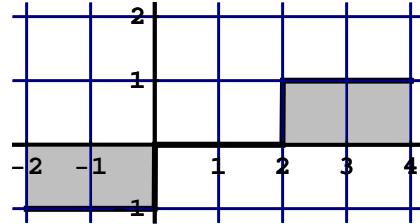
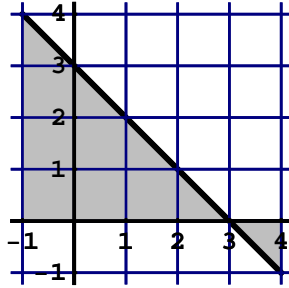
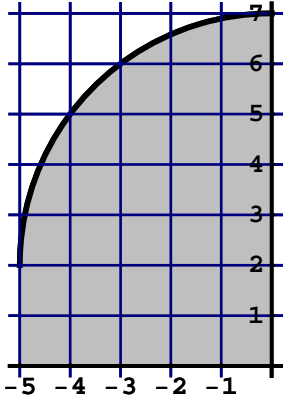
1. $\int_1^6 4 dx$

2. $\int_{-2}^3 (-5) dx$

3. $\int_{\frac{7}{2}}^5 \left(\frac{-x}{2}\right) dx$

4. $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n (c_k^2 - 4c_k + 2) \Delta x_k$, where P is any partition of $[-3, 2]$

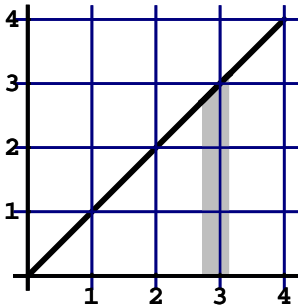
5. $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n \log_6(5c_k - 3) \Delta x_k$, where P is any partition of [2, 4]



6. $\int_{-5}^0 (2 + \sqrt{25 - x^2}) dx$

7. $\int_{-1}^4 (-x + 3) dx$

8. $\int_{-2}^4 \left\lfloor \frac{1}{2}x \right\rfloor dx$

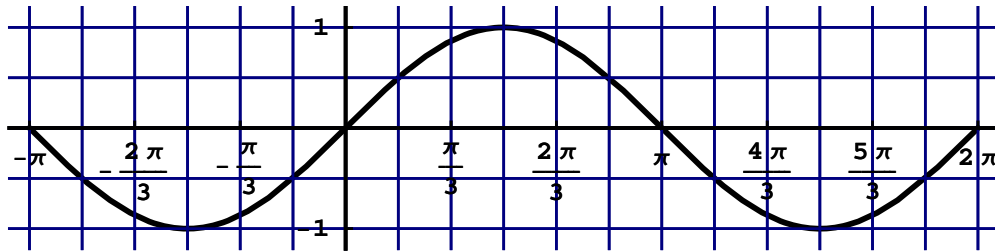


9. $\int_e^\pi s ds$

10. $\int_a^b -3y dy$ where $0 < a < b$

11. $\int_b^{2b} \sqrt{3} r dr$ where $0 < b$

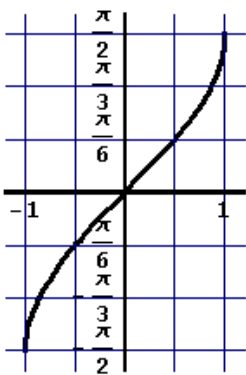
Assuming that $\int_0^{\frac{\pi}{2}} \sin x \, dx = 1$, evaluate the following integrals



12. $\int_0^{\frac{3\pi}{2}} \sin x \, dx$

13. $\int_{\frac{\pi}{6}}^{\frac{7\pi}{6}} \sin \left(x - \frac{\pi}{6} \right) \, dx$

14. $\int_0^{\frac{\pi}{2}} (1 - \sin x) \, dx$



15. $\int_0^1 \sin^{-1} x \, dx$