Practice with Definite Integrals

Use antidifferentiation to compute the following definite integrals. Check your work using the geometric definition of the definite integral, graphing and estimation.

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b) $\displaystyle\int_1^e \frac{1}{x}\,dx$

c) $\displaystyle\int_{-\pi/4}^0 \sin x\,dx$

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a) $\int_0^2 x^2\,dx = \frac{x^3}{3} + C \Big|_0^2$

$= \frac{8}{3} + C - (0 + C)$

$= \frac{8}{3}$

b) $\int_1^e \frac{1}{x}\,dx = \ln|x| \Big|_1^e$

$= 1 - 0$

$= 1$

c) $\int_{-\frac{\pi}{4}}^0 \sin x\,dx = -\cos x \Big|_{\frac{\pi}{4}}^0$

$= -\left(1 - \frac{\sqrt{2}}{2}\right)$

$= \frac{\sqrt{2}}{2} - 1$