Subject: Calculus

Topic: Integrals

Task 1

Goal: Use *Mathematica* to find antiderivatives (i.e. indefinite integrals).

Find the indefinite integral symbol in the Basic Math Assistant palette (Advanced
tab), and try a few examples:

$$\int \left(x^{81} + \text{Cos}[x] \right) \, dx$$

$$\int \sqrt{x+2} \, dx$$

$$\int \text{Sec}[x] \, dx$$

Task 2

Goal: Use *Mathematica* to compute definite integrals.

Find the definite integral symbol in the Basic Math Assistant palette (Advanced tab),
and try a few examples:

$$\int_{1}^{4} \left(x^2 + \text{Log}[x] \right) \, dx$$

$$\int_{-1}^{2} e^t \, dt$$

$$\int_{\frac{-\pi}{4}}^{\frac{\pi}{2}} (\text{Cos}[x] - \text{Sin}[x]) \, dx$$

We can plot and shade the signed area that represents the last example
above:

$$\text{Plot}\left[\text{Cos}[x] - \text{Sin}[x], \left\{ x, \frac{-\pi}{4}, \frac{\pi}{2} \right\}, \text{Filling} \to \text{Axis} \right]$$

Is the signed area positive or negative? Does this match with Mathemati-
ca's numerical
computation of the definite integral? Explain.

Related Exercises/Notes: