Mathematica Labs | iLearnMath.net | Denis Shubleka

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:

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

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

Related Exercises/Notes: