1 Preliminaries

• Launch Maple.

• Begin by clicking on the Text button in the context bar, and enter Your names, Math 227, Lab 1.

• From a new line, click on the Math button in the context bar.

2 Using Maple to find Antiderivatives

To use maple to evaluate an indefinite integral (i.e., to find antiderivatives), you can either use the Expression Palette or you can enter the maple code: \texttt{int(f(x), x)}; If you enter maple code, be very careful of the placement of parentheses in your expressions.

Use Maple to evaluate each of the following integrals:

1. \( \int \frac{1}{x} \, dx \)

2. \( \int \frac{2x}{x^2 - 3} \, dx \)

3. \( \int e^x \, ds \)

3 Using Maple to Compute Definite Integrals

To computer definite integrals with maple, again, you can use the Expression Palette or you can enter the maple code: \texttt{int(f(x), x=a..b)}; where \( a \) and \( b \) are the limits of integration.
Use Maple to evaluate each integral below

1. \[ \int_{1}^{3} \frac{1}{x} \, dx \]

2. \[ \int_{0}^{1} \frac{2x}{x^2 - 3} \, dx \]

3. \[ \int_{-1}^{1} e^{-x^2} \, dx \]

4 Using Maple to Approximate Definite Integrals

Select Tools → Load Package → Student Calculus 1. This loads many new Maple commands that will be useful to us. One of these is ApproximateInt. Here is an example of the syntax for this command:

\[ \text{ApproximateInt} \left( \cos(x), \ x = -(1/2) \cdot \pi \ .. \ (1/2) \cdot \pi, \ \text{method} = \text{simpson}, \ \text{output} = \text{plot} \right); \]

Try this command.

There are several other options for the \text{method} in this command:

upper, lower, left, right, trapezoid

Try each of these and explain what the method is doing to approximate the above integral (i.e. \( \int_{-\pi/2}^{\pi/2} \cos(x) \, dx \))

Another option for this command is \text{partition=n} where \( n \) is the number of objects in your approximation. Try different values for \( n \). What happens to your approximation when you use larger values of \( n \)?