

% !TEX TS-program = sage

% The following lines are standard LaTeX preamble statements.

\documentclass[11pt, oneside]{amsart}

\usepackage{geometry}

\geometry{letterpaper}

\usepackage[parfill]{parskip}

\usepackage{graphicx}

\usepackage{amssymb}

\usepackage{epstopdf}

\title{Brief Article}

\author{The Author}

% Only one command is required to use Sage within the LaTeX source:

\usepackage{sagetex}

\begin{document}

\maketitle

\section{Introduction}

This is an example of using Sage within a \TeX\ document. We can compute extended values like

$$32^{31} = \text{\sage{32^31}}$$

We can plot functions like $x \sin x$:

\sageplot[width=4in]{plot(x * sin(30 * x), -1, 1)}

We can integrate:

$$\int \frac{x^2 + x + 1}{(x - 1)^3 (x^2 + x + 2)} dx = \text{\sage{integrate((x^2 + x + 1) / ((x - 1)^3 * (x^2 + x + 2)), x)}}$$

\newpage

We can perform matrix calculations:

$$\text{\sage{matrix([[1, 2, 3], [4, 5, 6], [7, 8, 9]])^3}}$$

$$AB = \text{\sage{Matrix([[1, 2], [3, 4]])}} \text{\sage{Matrix([[5, 6], [6, 8]])}} = \text{\sage{Matrix([[1, 2], [3, 4]]) * Matrix([[5, 6], [6, 8]])}}$$

Plots are fun; here is a second one showing $x \ln x$. The ``width" command in the source is sent to the include graphics command in LaTeX rather than to Sage.

\sageplot[width=5in]{plot(x * ln(x), 0, 2)}

Sage understands mathematical constants and writes them symbolically unless it is told to produce a numerical approximation. The term $e \pi$ below is not in the LaTeX source; instead it is the result of a Sage calculation, as is the numerical value on the other side of the equal sign.

$$\text{The product of } e \text{ and } \pi \text{ is } \text{\sage{pi * e}} = \text{\sage{N(pi * e)}}.$$

\end{document}