Creating Maple T.A. Questions Using LaTeX

Contents

Introduction

In this document, you will learn how to write questions in LaTeX that you will later convert into a Maple T.A. question bank. You will be introduced to the LaTeX structure and learn about the different question types available in Maple T.A. Each question comes with unique characteristics to allow the Maple T.A converter to identify the question type intended. These characteristics are explained in each question description and example. Every question type available in Maple T.A. can be written in LaTeX. Refer to the *Maple T.A. Help System* for further information and details regarding the different question types.

Writing Questions in LaTeX

Requirements

To use LaTeX to author Maple T.A. question banks, you need:

- ed.sty—the LaTeX style file for Maple T.A. question bank authoring. Download this file from http://www.maplesoft.com/products/mapleta/latex2ta/index.aspx and place it in the same location as your other LaTeX style files.
- A text editor
- LaTeX installed on your system
- Internet access

The Authoring Process

1. Write your question bank in LaTeX using a text editor.
2. Run LaTeX on your question bank file and preview the output to ensure it is correct.
   You may perform multiple iterations of steps 1 and 2.
3. Use the Web-based conversion service at http://latex2ta.mapleserver.com/ to convert your LaTeX-format question bank file to Maple T.A. .qu format.
4. Save the .qu file when the conversion is complete.
5. Import and save the question bank in your Maple T.A. class.

LaTeX Document Structure

The structure of the LaTeX file must be as follows. Mandatory items are bolded.

Code	Description
`\documentclass[12pt]{article}`	Beginning of document
`\usepackage{ed}`	The **ed** package is required

`\setImageBase{ }`	Location of the folder on your class where the graphics will reside
`\begin{document}`	Beginning of document
`\begin{topic}{topic name}`	Beginning of topic
`\begin{question}{question type}`	Beginning of first question
…	
`\end{question}`	End of first question

`\begin{question}{question type}`
…
`\end{question}`
`\begin{question}{question type}`
…
`\end{question}`
	Your document may contain as many questions as you like

`\end{topic}`	End of topic
`\end{document}`	End of document

The region between the **`\begin{question}`** and **`\end{question}`** macros is where you include the question details.

Question Structure

Each question in a topic has the following basic structure. Mandatory items are bolded.

Code	Description
`\begin{question}{question type}`	Beginning of question
`\name{question name}`	A name given to the question in the Maple T.A. question bank

`\property{name1}{value1}`
`\property{name2}{value2}`
…
	Information fields, useful when sorting questions in the assignment editor

`\hint{first hint}`
`\hint{second hint}`
…
	Hints available to students when taking an assignment

`\comment{feedback text}`	Feedback to students on the question
`\qutext{question text}`	Text of the question body
`[additional, question-type-specific macros]`	Each question type has its own required macros
`\end{question}`	End of question

In addition to what is listed in the table, each question type has its own set of LaTeX macros. For example, many math question types have a required `\answer{ }` macro for specifying the correct answer. See the Sample Question Bank below.

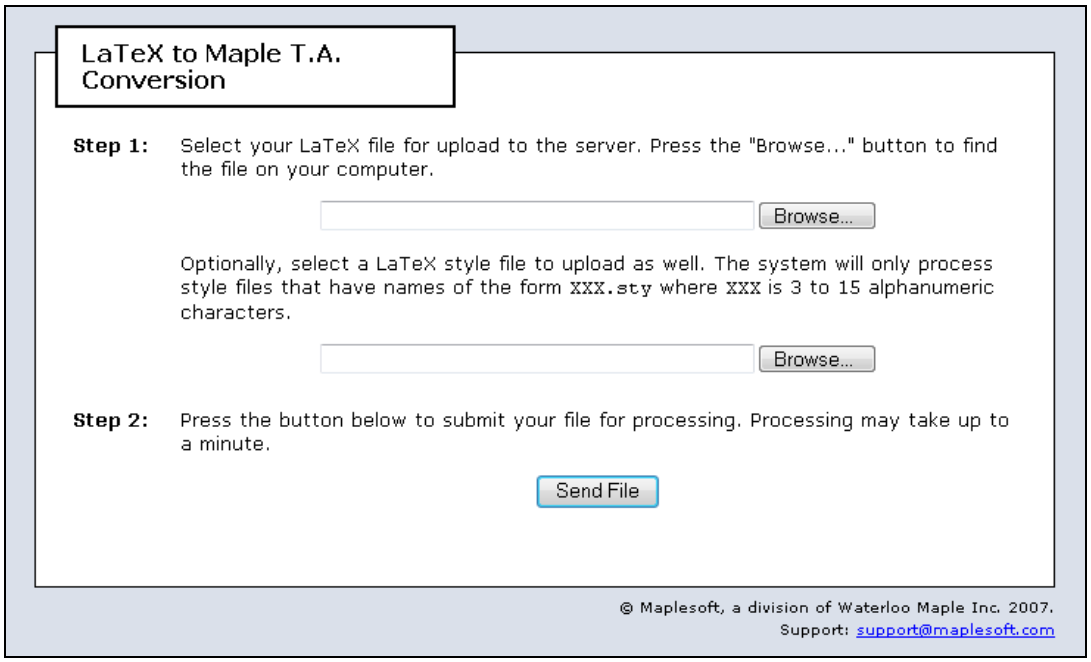
Sample Question Bank

You can copy the text of the sample question bank below and save it into a LaTeX file on your local computer. Then go to the Maplesoft web site, run the file through the LaTeX conversion feature, and import the resulting question bank into Maple T.A. (See below for detailed instructions.)

```
\documentclass[12pt]{article}

\usepackage{ed}

\setImageBase{web/myclass/Public_Html/Images}

\begin{document}

\begin{topic}{Arithmetic}

%% Question 1

\begin{question}{Numeric}
\name{Addition}
\code{$a = range(1,10);
      $b = range(1,10);}
\qutext{What is $\var{a}+\var{b}$?}
\answer{\var{\var{a}+\var{b}}}
\end{question}


%% Question 2

\begin{question}{Formula}
\name{Multiplication}
\code{$a = range(1,10);
      $b = range(1,10);}
\qutext{What is $\var{a}\times\var{b}$?}
\answer{\var{\var{a}*\var{b}}}
\end{question}

\end{topic}

\end{document}
```

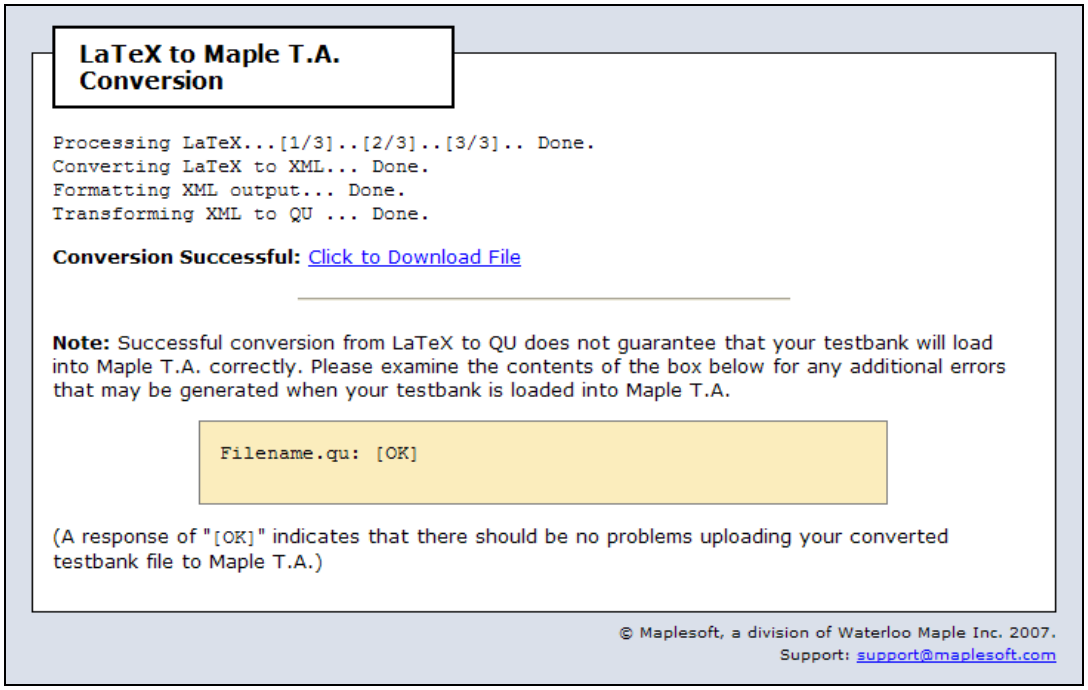
Converting into a Maple T.A. Script

Once you have written your question bank, you can process it with LaTeX to preview your questions. Once you are satisfied with the content, use the LaTeX-to-Maple T.A. conversion service to convert your LaTeX file into a Maple T.A. .qu question bank file. The converter is located at http://latex2ta.mapleserver.com/.



In the first entry cell, you may either enter the absolute path to your LaTeX file, or click the first "Browse" button to choose the file by browsing your computer. If you have a separate style file that you have used in your question bank, enter its path in the second entry cell or use the second “Browse” button. You do not need to upload ed.sty. The converter always has the current release of the ed.sty macros.

Click "Send File" to upload your file(s) for processing. A successful conversion will result in a screen similar to the following.



Click the "Click to Download File" link to download the Maple T.A. .qu file to your computer. Then, from Maple T.A., you can import the question bank to your class site.

If there is an error during conversion, you will be shown the conversion log to help you identify the problem.

Sample .qu File

The file created by the conversion process is a Maple T.A. .qu question bank file. The text of the .qu file created from the sample LaTeX file above is shown here. Some authors prefer to create or edit .qu files directly using a text editor.

```
qu.1.topic=Arithmetic@

qu.1.1.mode=Numeric@
qu.1.1.name=Addition@
qu.1.1.algorithm=$a = range(1,10);
$b = range(1,10);@
qu.1.1.question=
<p class="noindent">What is <math
xmlns="http://www.w3.org/1998/Math/MathML"
display="inline">
  <mn>${a}</mn> <mo>+</mo> <mn>${b}</mn>
 </math>?</p>@
qu.1.1.answer.num=${$a+$b}@
qu.1.1.answer.units=@
qu.1.1.showUnits=false@
qu.1.1.info=@
qu.1.1.grading=exact_value@

qu.1.2.mode=Formula@
qu.1.2.name=Multiplication@
qu.1.2.algorithm=$a = range(1,10);
$b = range(1,10);
@
qu.1.2.question=
<p class="noindent">What is <math
xmlns="http://www.w3.org/1998/Math/MathML"
display="inline">
  <mn>${a}</mn> <mo>&times;</mo>
  <mn>${b}</mn>
 </math>?</p>@
qu.1.2.answer=${$a*$b}@
qu.1.2.info=@
```

Working with Algorithmic Variables

One of Maple T.A.'s key features is its support for algorithmic question generation. Authors can write questions that use randomly-generated values in different assignment attempts.

Refer to the *Maple T.A. Help System* for detailed information about Maple T.A.'s algorithmic capabilities. Below we describe the LaTeX macros for algorithmic questions.

Defining the Algorithm

Use the **\code{}** macro to define the algorithmic variables used in the question. Separate each variable with a semi-colon, exactly as if you were defining the variables in the Question Bank Editor.

Referencing Algorithmic Variables

To include a defined variable in the question text, hint, or answer region, use the **\var{}** macro.

\var{} can also be used to create an inline variable expression: a computed expression within a variable reference, constructed from nested **\var{}** macros. Use inline variable expressions when one variable is derived from another, for example **a** and **2a**, or **a**, **b** and $\mathbf{a^2+b^2}$. In this case, there is no need to make a separate variable definition for each algorithmically-generated quantity. Inline variable expressions allow for a minimum of variables. Not only does this benefit the author, but it reduces the load on the servers when students are taking assignments.

Examples

Sample algorithmic question in LaTeX

```
\begin{question}{Formula}
\qutext{Find the solution of the linear equation
$\var{a}x+\var{b}=\var{c}$.}
\answer{(\var{c}-\var{b})/\var{a}}
\code{
$a=rint(12)+2;
$b=rint(12)+1;
$c=rint(12)+1;}
\end{question}
```

Note that $ … $ denotes math mode in LaTeX, whereas \var{} is used to include a defined variable.

Additional notes

```
\code{variable1=code1; variable2=code2; …}
\var{variable name}
```

Code used to define variables

Calling sequence used to refer to variables

Question displayed in Maple T.A.

Find the solution of the linear equation $3x+12=2$.

This question accepts numbers or formulas.
Help | Change Entry Style | Preview

Sample algorithmic question in LaTeX

```
\begin{question}{Formula}
\qutext{What is the derivative of $x^{\var{n}}$ with respect to
$x$?}
\answer{\var{n}x^\var{\var{n}-1}}
\code{$n = range(3,10);}
\end{question}
```

Note that only one variable, n, is defined in the \code macro. The value n-1 is assigned inline.

Additional notes

```
\code{ variable1=code1;}
\var{variable name}
```

Question displayed in Maple T.A.

What is the derivative of x^7 with respect to x?

This question accepts numbers or formulas.
Help | Change Math Entry Mode | Preview

Question Types

Maple T.A. supports many different question types, including Multiple Choice, True or False, Matching, Essay, Key Words, Formula, Maple Syntax, Clickable Image, Graph

Sketching, and many more. This section describes every question type available in Maple T.A. and includes any options associated with each type.

Multiple Choice Types

True or False

The True or False question type creates a question and a list of two choices, true and false. To indicate the correct answer for a True or False question, add the **\true** or **\false** macro to the question accordingly.

Sample true or false question in LaTeX

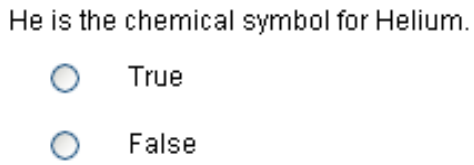
```
\begin{question}{True False}
\qutext{He is the chemical symbol for Helium.}
\true
\end{question}
```

Additional notes

\true or **\false**

In the question above, the answer was set to "True".

Question displayed in Maple T.A.



Multiple Choice and Multiple Selection

The Multiple Choice question type creates a question and a list of choices. You can have as many choices as you want using the **\choice{}** macro. To indicate the correct choice, include an asterisk beside the correct answer, **\choice*{}**. For a multiple *selection* question, place an asterisk beside each correct answer. The order for multiple choice and multiple selection questions is permuted for the student. To force the choices to appear in the order you specify, use the Nonpermuting Multiple Choice or Nonpermuting Multiple Selection question types.

Sample multiple choice question in LaTeX

```
\begin{question}{Multiple Choice}
```

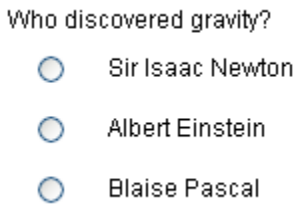
```
\qutext{Who discovered gravity?}
\choice{Blaise Pascal}
\choice{Albert Einstein}
\choice*{Sir Isaac Newton}
\end{question}
```

The asterisk (*) indicates that this is the correct answer.

Additional notes

\choice{choice} and **\choice*{correct answer}**

Question displayed in Maple T.A.



Sample multiple selection question in LaTeX

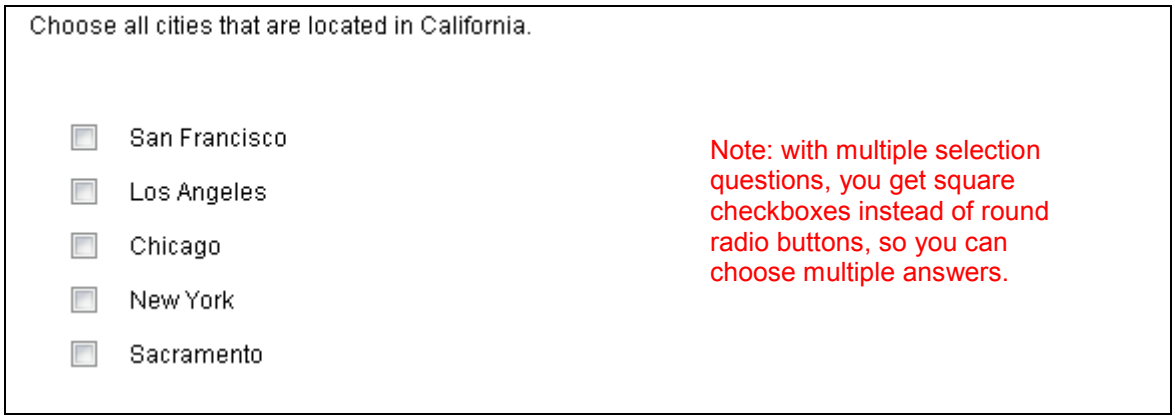
```
\begin{question}{Non Permuting Multiple Selection}
\qutext{Choose all cities that are located in California.
\choice*{San Francisco}
\choice*{Los Angeles}
\choice{Chicago}
\choice{New York}
\choice*{Sacramento}
\end{question}
```

"Non Permuting" indicates that the order of the answers will be preserved.

Additional notes

\choice{choice} and **\choice*{correct answer}**

Question displayed in Maple T.A.



Matching

The Matching question type presents two lists. The student must match each entry in the first list with one entry from the second list. To specify pairs of matching elements, use the **\match{}** macro for elements in the first list and the **\with{}** macro for elements in the second list. You can present additional entries on the second list that do not match any items on the first list by using the **\decoy{}** macro. The default behaviour is to display the first list in a single row across the screen, with a drop-down list of all choices from the second list. You can instead specify the number of columns using the **\cols{}** macro.

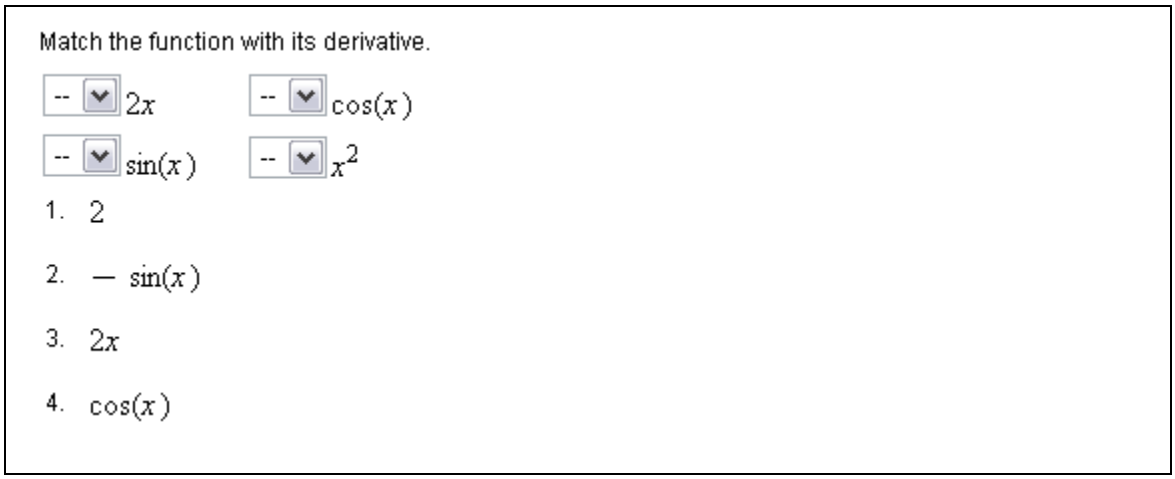
Sample matching question in LaTeX

```
\begin{question}{Matching}
\qutext{Match the function with its derivative.}
\match{$\sin(x)$}
\with{$\cos(x)$}
\match{$\cos(x)$}
\with{$-\sin(x)$}
\match{$x^2$}
\with{$2x$}
\match{$2x$}
\with{$2$}
\end{question}
```

Additional notes

```
\match{1st_list_item}
\with{2nd_list_item}
```

Question displayed in Maple T.A.



Clickable Image

The Clickable Image question type displays a question and clickable image. As the student moves the mouse over the image, various hot spots are selected. The goal for the student is to click the correct hot spot.

First choose a location on your Maple T.A. class web site where the image file will reside. Then insert the **`\setImageBase`** macro in the preamble section near the top of your LaTeX file to provide the path to this location. For details on the `\setImageBase` macro, see the "Images, Plots and Links" section of this document.

To include your image in the question, use the format,

`\begin{clickableimage}{filename}{width}{height}`

Finally, to define the hotspots use the **`\region{}`** macro. The argument to the **`\region{}`** macro is a comma-delimited list of points x, y, specifying the vertices of the clickable region. The x and y-coordinates are measured from the upper left corner (position 0, 0) of the graphic. More than one **`\region`** macro can be used. Mark the correct region with an asterisk.

Notes:

- **`\begin{clickableimage}`**…**`\end{clickableimage}`** must appear outside the argument to `\qutext{}`**.**
- If your image file resides outside the directory specified in `\setImageBase`, then include the complete path instead of just the filename, and enclose the whole within the `\ignoreImageBase` macro. See the *Maple T.A. Help System* for further details.

Sample clickable image question in LaTeX

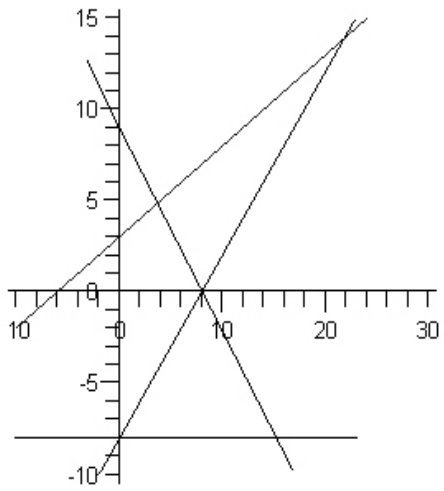
```
\begin{question}{Clickable Image}
\qutext{Which line represents the graph of $-y+x-8 = 0$?}
\begin{clickableimage}{Inequality.jpg}{284}{306}
  \region*{67,274, 64,272, 224,7, 226,9}
  \region{58,38, 61,36, 185,268, 182,270}
  \region{19,188, 16,186, 226,12, 229,15}
  \region{16,254, 17,250, 223,250, 223,254}
\end{clickableimage}
\end{question}
```

Additional notes

\begin{clickableimage}{name}{width}{height}
\region{ } and **\region*{ }**
\end{clickableimage}

Question displayed in Maple T.A.

Which line represents the graph of $-y + x - 8 = 0$?



Math Types

Numeric

The Numeric question type accepts either a number in decimal or scientific notation, or a number with units. To create a question including a number with units, the number must be enclosed in braces **{}** and the units enclosed in brackets **[]**, i.e. **\answer[unit]{correct answer}**. By specifying units in the correct answer, two text regions will display for the student, one for the numerical value and another for

the units. You must use recognized units. Refer to the *Maple T.A Help System* for a list of supported units. If you do not specify units, a single text region will display.

The Numeric question type has five distinct types of grading. Descriptions are given below.

1. **Exact value** – the student response must match the value given in the **`\answer{}`** macro. There is no error tolerance.
2. **Exact significant digits** – the student response must agree with the value given in the **`\answer{}`** macro to a specified number of significant digits, and must contain the proper number of significant digits. Specify the number of significant digits using the **`\digits{n}`** macro, where **`n`** is the number of significant digits.
3. **Absolute tolerance** – the student response must agree with the value given in the **`\answer`** macro to within a specified tolerance. Specify the absolute tolerance using the **`\err{error}`** macro.
4. **Significant digits with tolerance** – the student response must agree with the value given in the **`\answer{}`** macro to within a specified tolerance in the nth significant digit. Specify the tolerance using the **`\err{k}`** and **`\digits{n}`** macro, where k is the tolerance in the nth significant digit.
5. **Relative tolerance** – the student response must agree with the value given in the **`\answer{}`** macro to within a specified percent error. Specify the percent tolerance using the **`\perc{p}`** macro, where p is the percent.

Sample numeric question in LaTeX

```
\begin{question}{Numeric}
\qutext{A man is on the top of a tower that is 800 feet above
ground. How far can he see?
\newline\newline
Use 3960 miles for the radius of the earth.\newline Express your
answer to an accuracy of at least 6 significant digits.}
\answer[mi]{34.64134750325308}
\err{0.0001}
\end{question}
```

Additional notes

```
\answer[unit]{correct answer}
\err{error tolerance}
\digits{n}
\perc{error}
```

Absolute error

Number of significant digits

Percent error

Question displayed in Maple T.A.

A man is on the top of a tower that is 800 feet above ground. How far can he see?

Use 3960 miles for the radius of the earth.
Express your answer to an accuracy of at least 6 significant digits.

Note: both 34.6413 miles and 182906 feet will be accepted as correct answers.

Formula

The Formula question type accepts answers that are any type of formula. Answers can be any kind of formula. Enter the answer in the **\answer{}** macro as you expect the student to enter it (although equivalent answers are graded correct). The answer must be in calculator syntax, not in TeX.

If the answer is a number, it is recommended that you specify in the question text whether an exact response or an approximation is required. In the case of an approximation, either specify a certain fixed number of digits or specify a certain minimum accuracy and use the ? operator to grade answers that are within that accuracy, e.g., **\answer{3.14 ? 0.01}**.

Sample formula question in LaTeX

```
\begin{question}{Formula}
\qutext{What is the derivative of $x^3+3\cos(x)-1$?}
\answer{3x^2-3*sin(x)}
\end{question}
```

Additional notes

```
\answer{correct formula}
\answer{correct formula ? margin of error}
```

Question displayed in Maple T.A.

What is the derivative of $x^3+3\cos(x)-1$?

This question accepts numbers or formulas.
Help | Change Entry Style | Preview

Formula Mod C

The Formula Mod C question type is similar to the Formula question type. Answers can be any kind of formula, entered in calculator syntax, but responses are graded as correct if they differ from the given answer by a constant value. Answers can include variables and standard functions. This question type is designed for indefinite integral questions. The **\answer{}** macro must be in calculator syntax, not in TeX.

Sample formula mod C question in LaTeX

```
\begin{question}{Formula Mod C}
\qutext{Calculate $\int 6x^2\,dx$.}
\answer{2x^3}
\end{question}
```

Additional notes

\answer{correct answer} ← Note: the correct answer provided should exclude the constant of integration.

Question displayed in Maple T.A.

Calculate $\int 6x^2\,dx$.

This question accepts numbers or formulas.
Do not include a constant of integration in your answer.
Help | Change Entry Style | Preview

Restricted Formula

The Restricted Formula question type is similar to the Formula type, but answers can use only the standard arithmetic operations (+, -, *, /, and ^) and the sqrt( ) function. The **\answer** macro must be in calculator syntax, not in TeX. If the answer is a number, it is recommended that you specify in the question text whether an exact response or an approximation is required. In the case of an approximation, you can set a margin of error in your correct answer with the ? operator. In the following example, a response is graded correct if it is within 0.00001 of the correct answer.

Sample restricted formula question in LaTeX

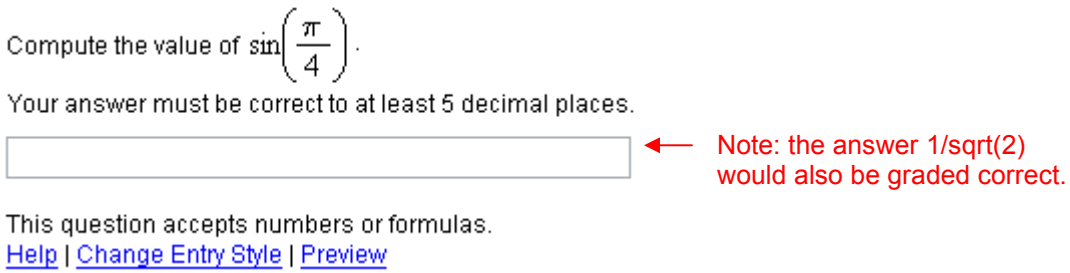
```
\begin{question}{Restricted Formula}
\qutext{Compute the value of $\sin(\frac{\pi}{4})$. Your answer
must be correct to at least 5 decimal places.}
```

```
\answer{0.707107 ? 0.00001}
\end{question}
```

Additional notes

```
\answer{correct answer ? decimal places}
```

Question displayed in Maple T.A.



Formula List

The Formula List question type accepts an ordered list of numbers or formulas separated by commas. The entries in the student response (numbers or formulas) must appear in the same order as the correct answer.

Note: This type is graded exactly the same as the Ntuple type. The only difference is in the instructions given to students.

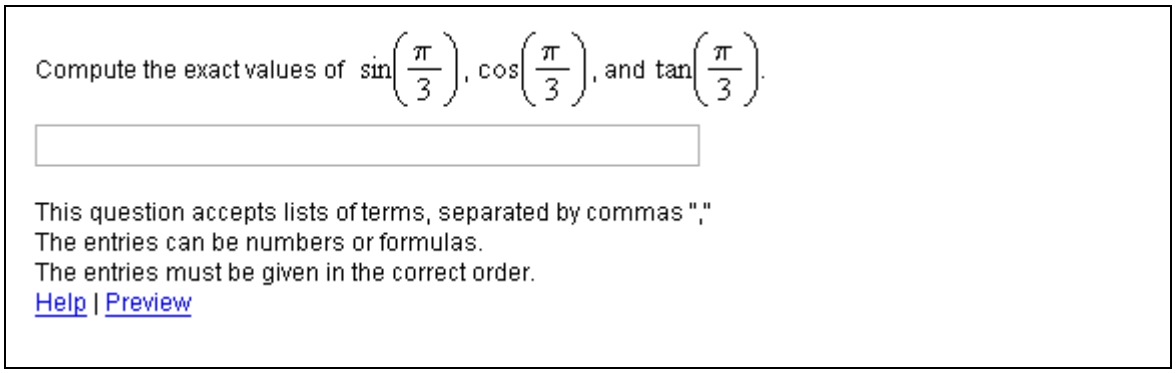
Sample formula list question in LaTeX

```
\begin{question}{Formula List}
\qutext{Compute the exact values of $\sin(\frac{\pi}{3})$,
$\cos(\frac{\pi}{3})$, and
$\tan(\frac{\pi}{3})$.}
\answer{sqrt(3)/2, 1/2, sqrt(3)}
\end{question}
```

Additional notes

```
\answer{answer1, answer2, answer3, …}
```

Question displayed in Maple T.A.



Ntuple

The Ntuple question type accepts an **ordered list** of numbers or formulas separated by commas. The student's response must appear in the same order as the correct answer. The correct answer should have parentheses, for example, (3, 5) or (2, 1, -3), since this is indicated in the instructions given under the answer box. However, a response will be graded correct with or without the parentheses.

Note: The Ntuple question type is graded exactly the same as the Formula List type. The only difference is in the instructions given to students.

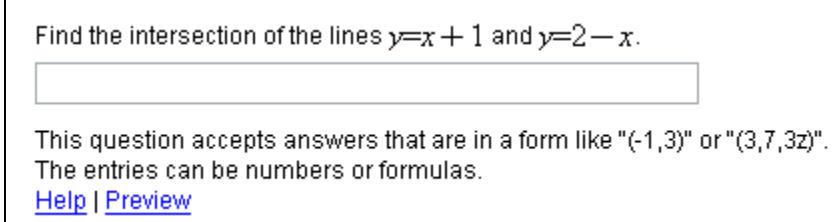
Sample ntuple question in LaTeX

```
\begin{question}{Ntuple}
\qutext{Find the intersection of the lines $y=x+1$ and $y=2-x$.}
\answer{(1/2, 3/2)}
\end{question}
```

Additional notes

```
\answer{(answer1, answer2)}
```

Question displayed in Maple T.A.



Multi Formula

The Multi Formula question type accepts an **unordered list** of numbers or formulas separated by semicolons. The student's response does not need to appear in the same order as the correct answer.

Note: This question type can also be used for unordered lists of ntuples.

Sample multi formula question in LaTeX

```
\begin{question}{Multi Formula}
\qutext{Find all roots of the polynomial $x^2+2x-24$.}
\answer{-6; 4}
\end{question}
```

Additional notes

```
\answer{answer1; answer2}
```

Question displayed in Maple T.A.

Find all roots of the polynomial $x^2+2x-24$.

This question accepts lists of numbers or formulas separated by semicolons.
E.g. "2; 4; 6" or "x+1; x-1".
The order of the list doesn't matter but be sure to separate the terms with semicolons
Help | Preview

Equation

The Equation question type accepts an equation (two formulas separated by an equal sign) as an answer. One side of the correct answer must be a single variable (for example, y=… or …=x). However, the student response does not need to be in this form. Any equivalent equation is graded correct. The **\answer{}** macro must be in calculator syntax, not in TeX.

In the following example, the responses 'y-1=-(x-6)/3' and '3y=9-x' would both be graded correct.

Sample equation question in LaTeX

```
\begin{question}{Equation}
\qutext{Find the equation of the line that passes through the
points $(-3, 4)$ and $(6, 1)$.}
\answer{y=-x/3+3}
```

```
\end{question}
```

Additional notes

\answer{equation}

Question displayed in Maple T.A.

Find the equation of the line that passes through the points $(-3, 4)$ and $(6, 1)$.

This question accepts equations. E.g. y-2 = 5(x-4)+1.
Help | Change Entry Style | Preview

Matrix

The Matrix question type displays an n by m matrix of text fields, each of which accepts a number or formula. In the question code, the correct answer must be presented as a comma-separated list as a[1,1], a[1,2],… a[2,1], a[2,2] …a[n,n]. The required **\size{m}{n}** macro gives the size of the answer matrix, where **m** is the number of rows and **n** is the number of columns.

Sample matrix question in LaTeX

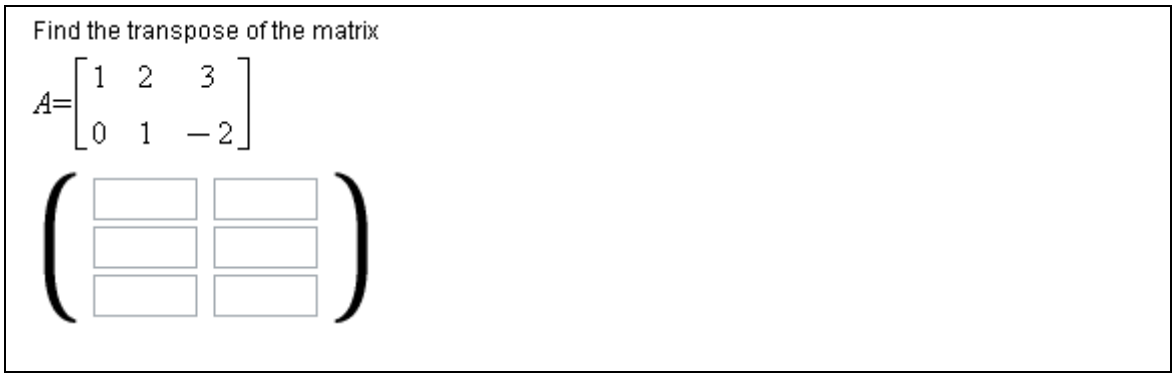
```
\begin{question}{Matrix}
\qutext{Find the transpose of the matrix
$$A=\left[
\begin{array}{ccc}1 & 2 & 3\\ 0 & 1 & -2\end{array}
\right]$$}
\size{3}{2}
\answer{1, 0, 2, 1, 3, -2}
\end{question}
```

Additional notes

\size{m}{n}
\answer{entry_11,entry_12,…,entry_21,entry_22,…,entry_mn}

Comma-separated list of matrix entries

Question displayed in Maple T.A.



Maple Question Type

The Maple question type allows you to create questions that are graded using Maple. Because student responses are graded by Maple, there is no **`\answer{}`** macro. Instead, specify the correct answer in the **`\maple{}`** macro. The syntax is **`\maple{expression}`**, which by default is translated by the LaTeX-to-Maple T.A. converter into the Maple boolean command **`evalb($RESPONSE = expression)`**. You can also include a different evaluation command; see "Custom Grading and Plotting of Responses" later in this section.

The Maple question type has two subtypes:

- Maple Syntax
- Maple Formula

In the Maple Syntax question type, students must enter their answers in Maple syntax. In the Maple Formula question type, students enter their answers in calculator syntax.

Note: for more details on creating Maple-graded questions, see the document "Writing Maple-Graded Questions", available through the Maple T.A. Content Center at http://www.maplesoft.com/tacontent.

Maple Syntax

Using the Maple Syntax subtype, you can create a question that requires a solution entered in Maple syntax. Students will not be given the option of changing the entry to symbol mode. In the following example, the Maple code for the correct answer is Si(x), but the response "int(sin(t)/t, t=0..x)" is also graded correct. When creating Maple-graded questions in LaTeX, Maple Syntax is the default subtype. (In the online interface, the default subtype is Formula.)

Sample Maple syntax question in LaTeX

```
\begin{question}{Maple}
\qutext{Find the solution to the initial-value problem
$xy'=\sin x$, $y(0)=0$. Give your answer as the formula for
$y(x)$.}
\maple{Si(x)}
\end{question}
```

Additional notes

```
\maple{correct answer in Maple syntax}
```

Question displayed in Maple T.A.

Find the solution to the initial-value problem $xy' = \sin x$, $y(0) = 0$.

Give your answer as the formula for $y(x)$.

This question accepts numbers or formulas.
Plot | Help | Change Math Entry Mode | Preview

Maple Formula

Using the Maple Formula subtype, you can create questions that are graded using Maple, and that accept answers written in calculator syntax. Simply add the command **\type{formula}** to your Maple-graded question. In the following example, the student can enter "2x" (rather than the Maple syntax "2*x").

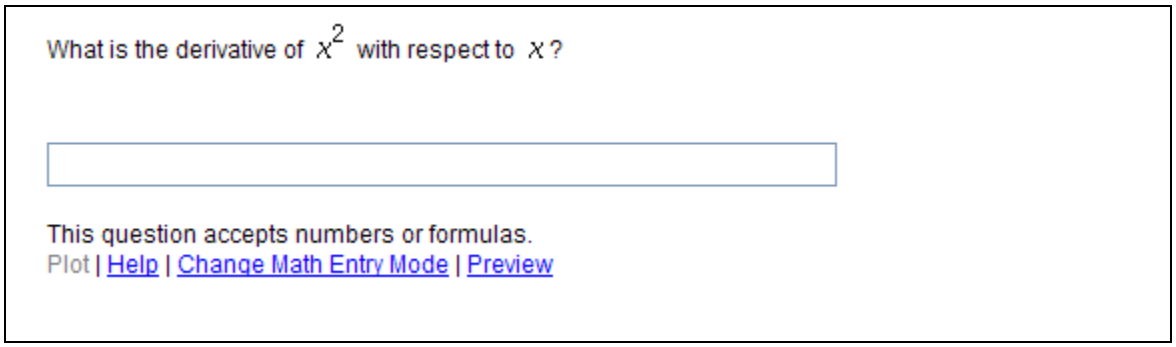
Sample Maple formula question in LaTeX

```
\begin{question}{Maple}
\qutext{What is the derivative of $x^2$ with respect to $x$?}
\type{formula}
\maple{diff(x^2, x)}
\end{question}
```

Additional notes

```
\type{formula}
\maple{correct answer in Maple syntax}
```

Question displayed in Maple T.A.



Plotting a Student Response

In a Maple-graded question, you can allow students to view a plot based on their response. The plot generated can be the function entered by the student, its derivative, or another related graph.

This is done by including a **\plot** macro in the question, outside of **\qutext**. For answers in two variables, a three-dimensional plot can be added by including the **\plot3d** macro. Either of these macros will cause a 'Plot' link to be placed below the response entry cell. A student who clicks on this link will be shown the appropriate plot, without having the response submitted for grading. In the example below, clicking on the Plot link will display a graph of the student's response.

The syntax for these plotting macros is **\plot{variable}{min}{max}** and **\plot3d{variable1}{min1}{max1}{variable2}{min2}{max2}**. For both, you specify the independent variable(s) along with minimum and maximum values of the plotting range(s). These commands will be translated into default Maple plotting commands by the LaTeX-to-Maple converter. For example **\plot{x}{a}{b}** gets translated into the Maple command **plot($RESPONSE, x=a..b)**. You can also include custom plotting commands; see "Custom Grading and Plotting of Responses" later in this section.

Sample question plotting student response in LaTeX

```
\begin{question}{Maple}
\qutext{What is the derivative of $x^2$ with respect to $x$?}
\type{formula}
\maple{diff(x^2, x)}
\plot{x}{-1}{1}
\end{question}
```

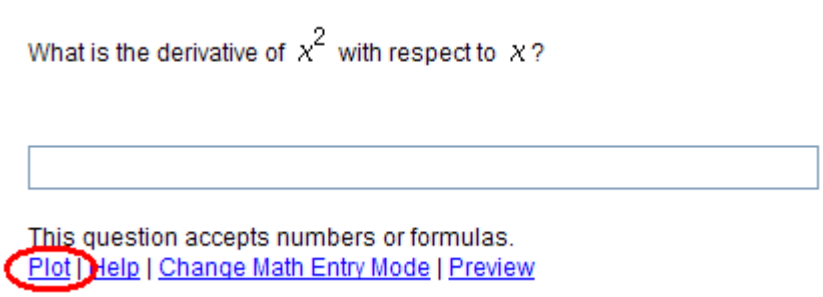
Maple command that evaluates to the correct answer

Additional notes

\type{formula}

```
\plot{}
\maple{correct answer in Maple syntax}
```

Question displayed in Maple T.A.



Custom Grading and Plotting of Responses

The default Maple-grading, **`evalb($RESPONSE = expression)`**, will not be appropriate in every context. You can use the macro **`\maple*{Maple grading code}`** to specify your own custom grading procedure. You may use multiple lines of Maple code, but the last line should evaluate to either true, false, or a floating-point value between 0 and 1, in which case the student will receive partial credit.

Maple also offers many powerful plot structures. Refer to the Maple documentation to learn more about Maple's plotting capabilities. To use a plotting command other than **`plot`** or **`plot3d`**, or to add a plotting option, use **`\plot*`**, the argument to which is a complete Maple plotting command. In the example below, the command is

`\plot*{plot(diff($RESPONSE,x),x=-Pi..Pi)}`

Here, we have defined the grading and plotting based on the *derivative* of a student response. The grading checks to see whether the derivative of the students response is equal to sin(x) and the Plot command will plot the derivative of the student's response.

Sample custom grading and plotting in LaTeX

```
\begin{question}{Maple}
\qutext{Find an antiderivative of $\sin(x)$. Click the plot
button to plot the {\em derivative} of your response.}
\type{formula}
\maple*{is(diff($RESPONSE, x)=sin(x))}
\plot*{plot(diff($RESPONSE,x),x=-Pi..Pi)}
\end{question}
```

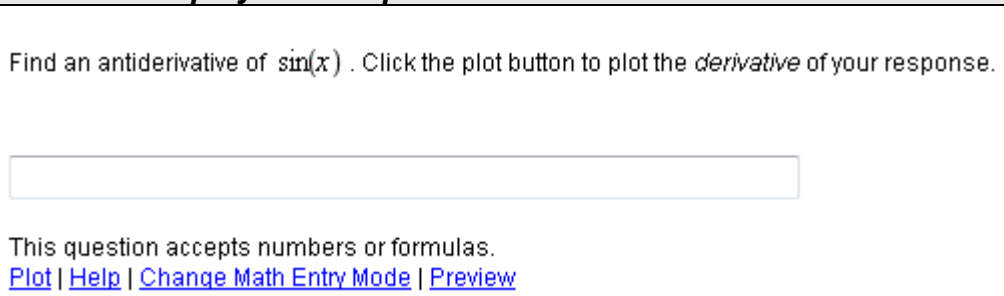
Checks whether the derivative of the student's response is equal to sin(x)

Additional notes

```
\type{formula}
\maple*{grading code in Maple syntax}
\plot*{plotting code in Maple syntax}
```

Plots the derivative of the student's response

Question displayed in Maple T.A.



Graph Sketching Questions

The Sketch question type displays introductory text accompanied by a set of axes. The student draws a graph on the axes by clicking points to be used as interpolation nodes.

Use the **`sketch`** environment to configure the applet, and to declare the ranges of the axes, a sample correct response, and a list of criteria that the student answer must meet. The **`\begin{sketch}`** macro takes one option and four required arguments, in the following format.

```
\begin{sketch}[gridlines]{xMin}{xMax}{yMin}{yMax}
  \example{point-list}
  \check{criterion}
  \check{criterion}
   ...
  \check{criterion}
\end{sketch}
```

`gridlines`	Number of horizontal and vertical gridlines in addition to the axes (default is 10)
`xMin`	Minimum x-value displayed on the x-axis
`xMax`	Maximum x-value displayed on the x-axis
`yMin`	Minimum y-value displayed on the y-axis
`yMax`	Maximum y-value displayed on the y-axis

The **`\example{<point-list>}`** macro describes a sample correct answer that is displayed if the student gives an incorrect response. The sketch is given as <point-list>, a

space-delimited set of coordinates of the form x, y. The resulting sketch is a single curve interpolated from these points.

The **\check{criterion}** macro sets a criterion that the student's sketch must satisfy. Available criteria include:

`goes_through(xcoord, ycoord)`	Sketched function must pass through the point (xcoord, ycoord)
`increasing`	Sketched function must be increasing
`decreasing`	Sketched function must be decreasing
`concave_up`	Sketched function must be concave up
`concave_down`	Sketched function must be concave down
`linear`	Sketched function must be linear

In addition, you can perform many other checks (for example, evaluating the slope of the student's response at a given x-value). For a complete list along with detailed examples, visit the "Graph Sketching Question in LaTeX" page in the *Maple T.A. Help System*.

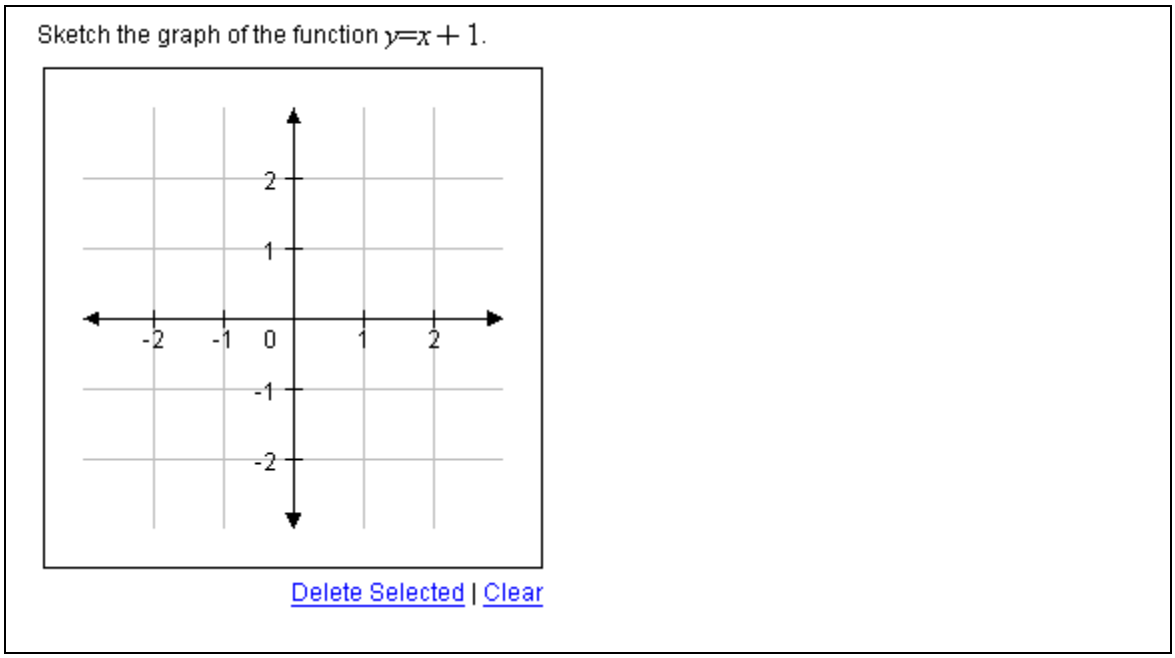
Sample graph sketching question in LaTeX

```
\begin{question}{sketch}
\qutext{Sketch the graph of the function $y=x+1$.}
\begin{sketch}[4]{-2}{2}{-2}{2}
  \example{-2,-1  1,2}
  \check{linear}
  \check{goes_through(0,1)}
\end{sketch}
\end{question}
```

Additional notes

```
\begin{sketch}[gridlines]{xMin}{xMax}{yMin}{yMax}
  \example{point-list}
  \check{criterion}
  \check{criterion}
   …
  \check{criterion}
\end{sketch}
```

Question displayed in Maple T.A.



Other Response Types

List

The List question type generates a fill-in-the-blank question where authors specify multiple correct (and even incorrect but expected) answers, along with the grade each answer earns. Any student answer that does not appear on the list earns a grade of zero. By default, the student response region is displayed as a text box. Adding **`\display{menu}`** will cause the response object to be displayed as a drop-down menu, listing the responses specified with the **`\answer{}`** macros. List questions do not support free response mathematical formula entry. You can, however, provide students with a drop-down list of expressions.

You can control the amount of credit awarded for each specified answer using a decimal value between 0 and 1, and define response-specific comments for answers. The format for List questions is **`\answer{credit}{answer}`**. More than one **`\answer`** may appear in each question, but at least one answer must give full credit (equal to 1). Using the **`\grader`** macro, the List question type grades a response as an exact, relaxed, or regular expression.

> **`exact`** – strings of spaces are collapsed to a single space, but all capitalization and punctuation must match. This is the default grading style.
>
> **`relaxed`** – strings of spaces are collapsed to a single space; case and punctuation are ignored.

regex – allows you to use a regular expression pattern to define a set of acceptable (or partially acceptable) responses. For details and examples, consult the page "List Questions" in the *Maple T.A. Help System*.

List questions can have multiple comments, with one assigned to each specified response, and one default comment. The value of each **\comment{}** macro will be assigned as the feedback associated with the preceding **\answer{}** macro. If a **\comment{}** macro appears in a question prior to any answer, that comment will be displayed if the student's response does not match any of the specified responses.

Sample list question in LaTeX

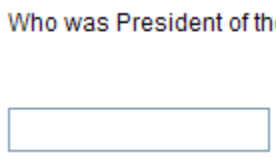
```
\begin{question}{List}
\qutext{Who was President of the USA during the Civil War?}
\grader{relaxed}
\comment{That response is incorrect.}
\answer{1.0}{Abraham Lincoln}
\comment{Exactly correct.}
\answer{1.0}{Lincoln}
\comment{Yes, although you should use his first name too.}
\answer{0.25}{Jefferson Davis}
\comment{Your answer is partially correct - Davis was President
of the CSA, but not the USA.}
\end{question}
```

Default comment used when student answer does not match any of the \answer fields.

Additional notes

```
\grader{grading style}
\answer{credit}{answer}
\comment{comment}
```

Question displayed in Maple T.A.



Key Words

The Key Words question type is an open response question that looks for specific words in a student's response. The **\answer{}** macro consists of a segment of text in which the keywords are enclosed in parentheses. A student response that includes all of the

words in parentheses is graded correct. If the question is not answered correctly, the full answer text (excluding the parentheses) is displayed. In the following example, any response that includes both of the words “Faraday” and “Henry” is graded correct. This question type is not supported by the Question Bank Editor. You must author Key Word questions using either LaTeX or plain-text script files.

Sample key words question in LaTeX

```
\begin{question}{Key Words}
\qutext{Which two scientists independently discovered
inductance?}
\answer{Michael (Faraday) and Joseph (Henry)}
\end{question}
```

Additional notes

\answer{…(correct answer) …}

Question displayed in Maple T.A.

Which two scientists independently discovered inductance?

Essay

The Essay question type is an open response question where the system does not grade responses. You must grade each student’s answer personally and assign a score using the Gradebook. For additional information on working with the Gradebook, consult the *Maple T.A. Help System*. Essay questions do not require additional macros.

Sample essay question in LaTeX

```
\begin{question}{Essay}
\qutext{State the definition of the derivative of a function.}
\end{question}
```

Question displayed in Maple T.A.

State the definition of the derivative of a function.

This question will not be graded by the computer. It will be reviewed by your instructor, who will assign a grade at a later date.

Multiple-Part Types

Fill-in-the-blanks Question

Fill-in-the-blanks questions can include questions with blank text regions or drop down menus. Several **\blank{}** macros can be included in a single question; they can be the same type (all blanks or all drop-downs) or mixed.

\blank[text]{ }

This macro creates a text region. Since text is the default, you may also use the abbreviated form, **\blank{}**. Specify the correct answer within the braces, { }. When the question displays, the text inside a **\blank{}** macro is removed and an empty text region remains. Blanks cannot contain TeX math-mode content.

Sample fill-in-the-blanks question in LaTeX

```
\begin{question}{Blanks}
\qutext{In the equation $E=mc^2$, $E$ represents \blank{energy},
$m$ represents \blank{mass}, and $c^2$ is the speed of light
squared.}
\end{question}
```

Additional notes

\blank{correct answer}

Question displayed in Maple T.A.

In the equation $E = mc^2$, E represents [ ], m represents [ ], and c^2 is the speed of light squared.

\blank[menu]{ }

Use this macro to set a list of choices to be displayed in a drop-down menu. You must provide the choices in a comma-delimited list, with the correct answer listed first. Blanks cannot contain TeX math-mode content. If more than one drop down menu exists, entries in each menu remain separate.

Sample blank menu question in LaTeX

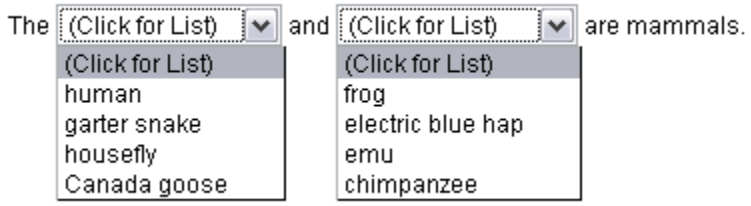
Correct choice is listed first

```
\begin{question}{Blanks}
\qutext{The
\blank[menu]{human, Canada goose, garter snake, housefly} and
the \blank[menu]{chimpanzee, emu, frog, electric blue hap} are
mammals.}
\end{question}
```

Additional notes

```
\blank[menu]{correct choice, other choices}
```

Question displayed in Maple T.A.



\blank[formula]{ }

This question type has been deprecated. Existing blank[formula] questions will continue to work, but please use the Inline question type in place of the blank[formula] type for all new questions.

Inline Question

Inline questions are a more flexible and extensible form of free response question that can include multiple question types. The Inline question type in LaTeX gives you the same flexibility as the Question Designer question type in the Maple T.A. Question Bank Editor.

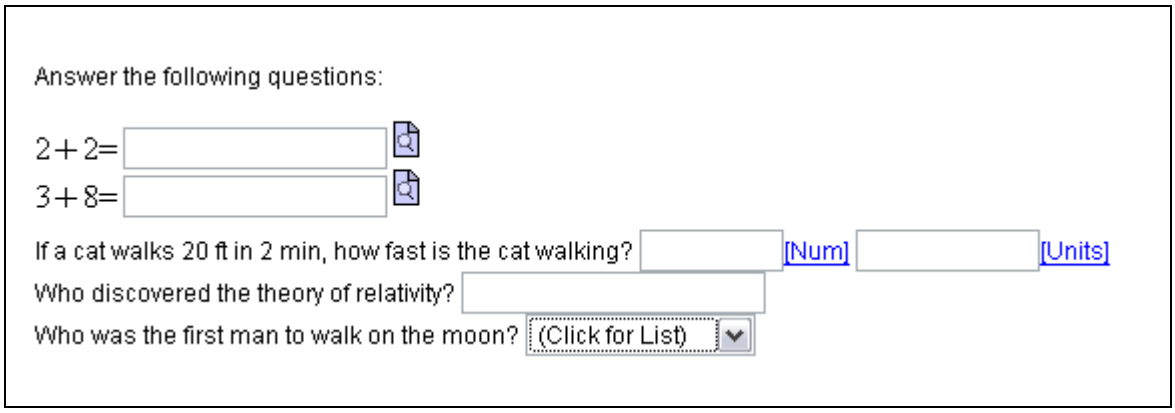
Inline questions support the widest variety of types of response objects anywhere within the body of a question, including within HTML tables. Use the **\blank{}** macro, with no arguments, to place a response cell within **\qutext{}**. The type of blank, correct answer, and other details are specified within sequential blank environments outside of **\qutext{}**. In this way, Inline questions are written much like Multipart questions (see next section), where each blank functions as one part.

As in a Multipart question, each subpart of an Inline question must itself be a well formed question. The only exception is that, when used to define a blank inside an Inline question, any of the above question types may omit the **\qutext{}** statement because this is actually defined in the body of the larger question statement.

Sample inline question in LaTeX

```
\begin{question}{Inline}
\qutext{Answer the following questions: \newline \newline
$2+2=$\blank\\
$3+8=$\blank\\
\\
If a cat walks 20~ft in 2~min, how fast is the cat walking? \blank\\
Who discovered the theory of relativity? \blank\\
Who was the first man to walk on the moon? \blank}
\begin{blank}{Formula}
  \answer{4}
  \tol{1.0E-9}
\end{blank}
\begin{blank}{Formula}
  \answer{11}
  \tol{1.0E-9}
\end{blank}
\begin{blank}{Numeric}
  \answer[ft/min]{10}
\end{blank}
\begin{blank}{List}
  \answer{1.0}{Einstein}
  \answer{1.0}{Albert Einstein}
  \grader{exact} % not necessary, since 'exact' is the default
\end{blank}
\begin{blank}{List}
  \display{menu}
  \answer{1.0}{Neil Armstrong}
  \answer{0.5}{Edwin Aldrin}
  \answer{0.0}{Michael Collins}
\end{blank}
\end{question}
```

Question displayed in Maple T.A.



Multipart Question

Multipart questions can display several sub-questions as parts of one question. Each part is a well-formed question and can be of any type. To make a Multipart question in a LaTeX document, simply declare a question of type Multipart and include other questions within its body. Multipart questions may be nested inside other Multipart questions but a maximum of four levels of nesting are allowed.

Multipart structure:

```
\begin{question}{Multipart}
…
      \begin{question}{Numeric}
      …
      \end{question}
\end{question}
```

By default, question parts are designated (a), (b), (c), etc., regardless of nesting level. That is, if part (a) of a question is itself a Multipart question, then its parts will also be designated (a), (b), etc. Numbering within a question part can be changed to (i), (ii), etc. with **`\numbering{roman}`**.

Each subpart of a Multipart question must itself be a well formed question. The Multipart structure is internally consistent with other question types; therefore, a Numeric question inside a Multipart question will grade the same as a single-part Numeric question. Each embedded question type will support all of the features offered with that individual question type (e.g. margin of error, significant figures, tolerance, etc.).

Each blank receives equal weighting when the question is graded. To specify a non-uniform weighting, use the **`\weighting{}`** macro. The **`\weighting{}`**macro requires one argument, a comma-delimited list of non-negative integers, specifying the relative values assigned to each part.

Sample multipart question in LaTeX

```
\begin{question}{Multipart}
\weighting{1,2}
\qutext{Answer the following questions:}

% part (a)
\begin{question}{Formula}
\qutext{Differentiate the function
$f(x)=\frac{x}{1+x^2}$.}
\answer{(1 - x^2)/(1 + x^2)^2}
\end{question}

% part (b)
\begin{question}{Multipart}


\numbering{roman}

% part (i)
\begin{question}{Ntuple}
\qutext{Find the absolute minimum point on the graph of the
function $f(x)=\frac{x}{1+x^2}$.}
\answer{(-1,-1/2)}
\end{question}

% part (ii)
\begin{question}{Ntuple}
\qutext{Find the absolute maximum point on the graph of the
function $f(x)=\frac{x}{1+x^2}$.}
\answer{(1,1/2)}
\end{question}
\end{question}
\end{question}
```

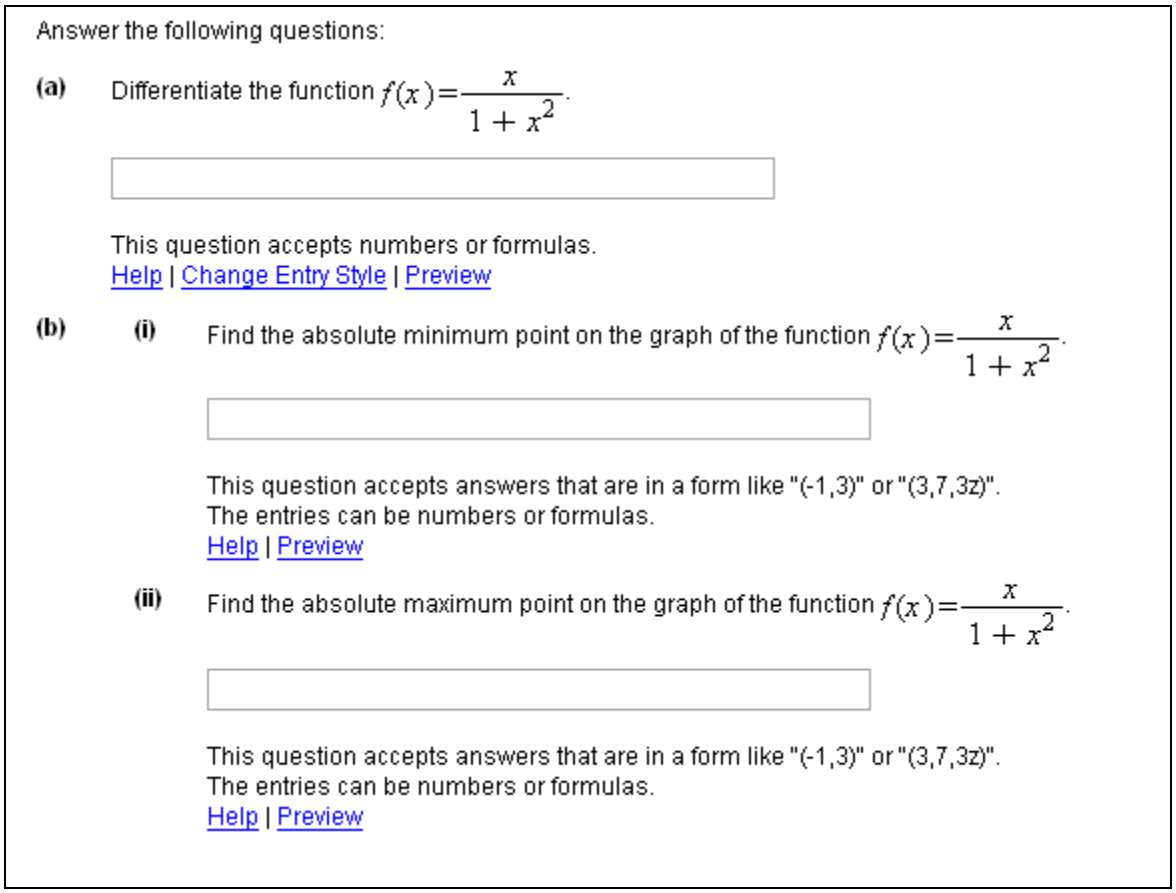
Part (b) is worth twice as many marks as part (a).

The 2/3 of the points assigned to part (b) are split evenly between its subparts because \weighting is not used.

Additional notes

\weighting{1,2}

Question displayed in Maple T.A.



Images, Plots and Links

Maple T.A. questions, as well as choices, comments, and solutions, may contain any valid HTML markup. Authors can include custom markup using the **`\html`** macro. However, specialized macros exist for placing images and hyperlinks.

Placing Images in Questions

Setting the Image Base

To include graphics in your question:

1. Select a location in your Maple T.A. class Web site for graphics files. It is recommended that you use a distinct folder for the images in each question bank. Upload the graphics to a folder on your class Web site. Now click on the icon to the left of any of these graphics files to see its full path, which will have the form

   http://.../web/<class>/Public_Html/<folder>/...

   where <class> is Maple T.A.'s internal name for your class, and <folder> is the

folder that contains the images.

2. Insert the **\setImageBase** directive near the top of the LaTeX file to specify the path you determined in step 1. For example, if your Maple T.A. class name is "myclass" and the folder that contains your graphics is "Images", use the directive:

   \setImageBase{web/myclass/Public_Html/Images}

Note: \setImageBase has a global effect on your document, and grouping \setImageBase within braces will not localize its effect. The image base defined within the group will apply to the remainder of your document.

You may temporarily override the image base with **\ignoreImageBase**. This macro takes no arguments. Its effect is local, so upon leaving the current group or environment, the image base will revert to its previous value. For further details, see the *Maple T.A. Help System*.

Inserting an Image

To include graphics in a question, use the **\image{}** macro. The format for the **\image** macro is **\image[extension]{filename}**. The extension argument is optional. It specifies the extension to be appended to the filename when the question bank is converted to Maple T.A. format. The default value is jpg.

Sample question with image in LaTeX

```
\begin{question}{Numeric}
\qutext{Quadrilateral $ABCD$ is circumscribed about a circle, as
shown, with $AB$=\var{a} cm, and $CD$=\var{b} cm. Find the
perimeter of the quadrilateral.

\image{InsertImage.gif}}

\code{$a=range(5,25);
$b=range($a+1,$a+5);
$ans=2*(($a)+($b));}
\answer{$ans}[cm]
\end{question}
```

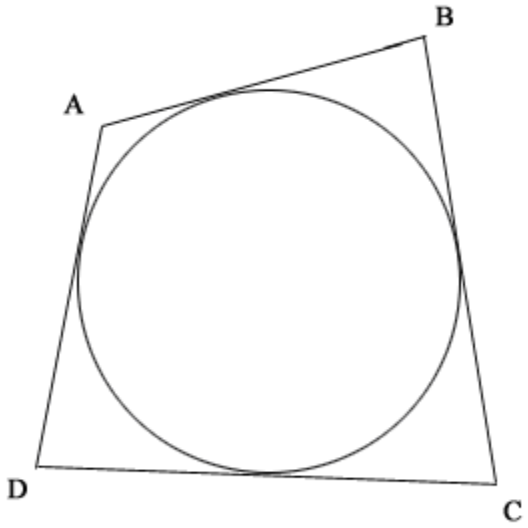
The value of $b will be within 5 units of $a, to roughly match the illustration.

Additional notes

\image[extension]{filename}

Question displayed in Maple T.A.

Quadrilateral $ABCD$ is circumscribed about a circle, as shown, with AB =21 cm, and CD =24 cm. Find the perimeter of the quadrilateral.



Number Units

Labeling an Image

The **labelgraphic** environment allows you to add text labels to gif and jpg graphics files. The format is **\grlabel{label}{x-coordinate}{y-coordinate}**. The x- and y-coordinates are measured from the upper left corner of the graphic.

Sample question with labeled image in LaTeX

```
\begin{question}{Multi Formula}
\qutext{Suppose that you throw a rock from the top of a \var{h}
m cliff with a velocity of \var{v} m/s in the three directions
shown. Neglecting aerodynamic drag, use the principle of work
and energy to determine the velocity of the rock as it hits the
ground in the upward, horizontal, and downward angles,
respectively.
\begin{labelgraphic}{LabeledGraphic.gif}{300}{260}
  \grlabel{$h m}{80}{174}
  \grlabel{$angle}{200}{134}
  \grlabel{$angle}{200}{97}
\end{labelgraphic}}
\code{$angle=rand(10,50,2);
$h=rand(7,14,2);
$v=rand(8,17,2);
$ansa=sig(3, sqrt(2*9.8*$h + $v^2));
```

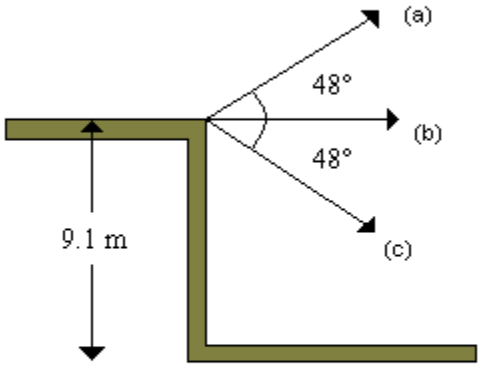
```
$ansb=$ansa;
$ansc=$ansa;
$tol=lsu(2, $ansa);}
\answer{$ansa ? $tol)*m/s;($ansb ? $tol)*m/s;($ansc ? $tol)*m/s}
\end{question}
```

Additional notes

\begin{labelgraphic}{image name}{width}{height}
\grlabel{label text}{x-coordinate}{y-coordinate}

Question displayed in Maple T.A.

Suppose that you throw a rock from the top of a 9.1 m cliff with a velocity of 12 m/s in the three directions shown. Neglecting aerodynamic drag, use the principle of work and energy to determine the velocity of the rock as it hits the ground in the upward, horizontal, and downward angles, respectively.



This question accepts lists of numbers or formulas separated by semicolons.
E.g. "2; 4; 6" or "x+1; x-1".
The order of the list doesn't matter but be sure to separate the terms with semicolons
Help | Preview

Maple Plotting

In Maple T.A. you can use the **plotmaple** command to assign a Maple plot to a variable name within a question's algorithm. Then to insert the plot in your question, simply refer to the corresponding variable. Consult the Maple online help system for further information on Maple plotting commands.

Sample question using plotmaple in LaTeX

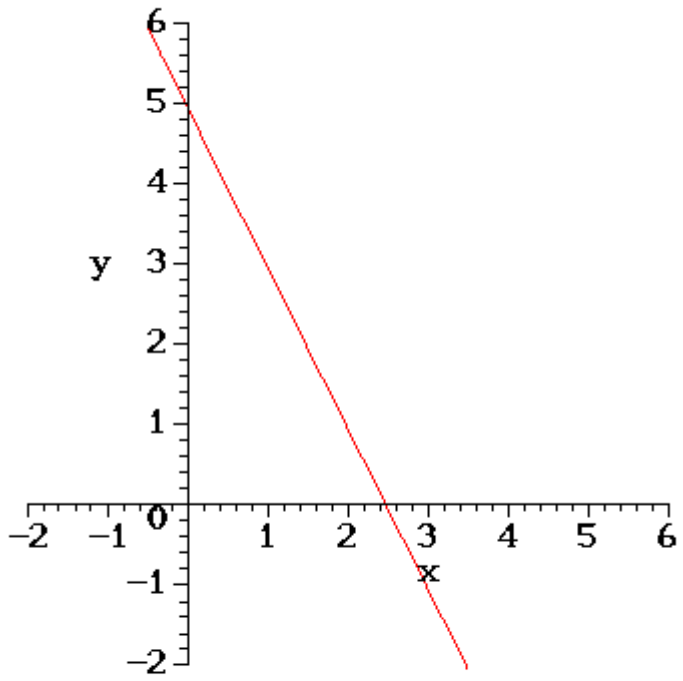
```
\begin{question}{Equation}
\qutext{Determine the equation of the line shown below.\\
\var{plt}}
\code{$m=range(-5,5);
$b=range(1,5);
condition:not(eq($m,$b));
$plt=plotmaple("plot($m*x+$b,x=-2..6,y=-2..6),
plotoptions='width=400, height=400'");}
\answer{y=$m*x+$b}
\end{question}
```

Additional notes

$var=\plotmaple("Maple plot syntax, plotoptions")

Question displayed in Maple T.A.

Give the equation of the line shown below.



This question accepts equations. E.g. y-2 = 5(x-4)+1.
Help | Change Entry Style | Preview

Notes:

- When using **plotmaple**, note that the image is defined as a variable in the algorithm section of the question.
- Two other macros, **\drawMaplePlot{ }** and **\drawMaplePlot3d{ }**, have been deprecated. Existing questions will continue to work, but please use **plotmaple** in place of both **\drawMaplePlot** and **\drawMaplePlot3d** in all future questions.

Graph Plotting Applet

The Graph Plotting Applet displays a plot region in a question with one or two curves to assist the student when answering a question. Any question type can include a Graph Plotting Applet. The applet allows the student to scroll or pan the graph, or view the xy-coordinates based on the position of the mouse. The **\graph{}** macro plots one curve using the format,

\graph[gridlines]{formula}{xMin}{xMax}{yMin}{yMax}.

The **\multigraph{}** macro plots two curves on the same axes using the format,

\multigraph[gridlines]{formula1, formula2}{xMin}{xMax}{yMin}{yMax}.

The arguments and options must be in the order specified.

gridlines	Number of horizontal and vertical gridlines in addition to the axes (default is 10)
formula *	Formula of the function in calculator syntax, not TeX
formula1 **	Formula of first function in calculator syntax, not TeX
formula2 **	Formula of second function in calculator syntax, not TeX
xMin	Minimum x value on the x-axis
xMax	Maximum x value on the x-axis
yMin	Minimum y value on the y-axis
yMax	Maximum y value on the y-axis

* argument is for the **\graph** macro only

** arguments are for the **\multigraph** macro only

Sample graph plotting applet question in LaTeX

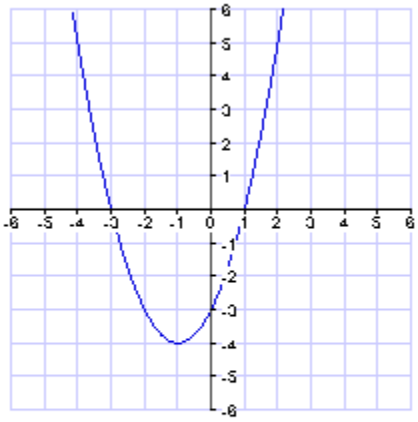
```
\begin{question}{MultiFormula}
\qutext{What are the $x$-intercepts of the graph shown?
\graph[12]{(x-1)(x+3)}{-6}{6}{-6}{6}}
\answer{1;-3}
\end{question}
```

Additional notes

`\graph[gridlines]{formula}{xMin}{xMax}{yMin}{yMax}`

Question displayed in Maple T.A.

What are the x-intercepts of the graph shown?



This question accepts lists of numbers or formulas separated by semicolons.
E.g. "2; 4; 6" or "x+1; x-1".
The order of the list doesn't matter but be sure to separate the terms with semicolons
Help | Preview

Inserting a Hyperlink

To insert a hyperlink in your question, use the **`\link{ }{ }`** macro. A typical call would look like **`\link{url}{link-text}`** where *url* is the URL of the page to which the link refers and *link-text* is the link text.

Inserting HTML Code

To include custom html code in your question, use the **`\html{ }`** macro. A typical call would look like **`\html{text}`** where *text* is the html markup text to be placed directly into the Maple T.A. script. For example, you could type **\html{my bold text}**, although in this case you could accomplish the same with **{\bf my bold text}**.

Glossary of Commands

Command name	Description
\answer	
\answer{answer}	Formula mod C and Equation questions
\answer{answer1, answer2, …}	Formula list and Matrix questions
\answer{answer1; answer2}	Multiformula question
\answer{(answer1, answer2)}	Ntuple question
\answer[unit]{answer}	Numeric question
\answer{answer ? error}	Blanks question with margin of error
\answer{credit}{answer}	List question with a credit value
\begin	
\begin{document} | \end{document}	Beginning of a document
begin{question}{question name} | \end{question}	Beginning of a question
\begin{sketch}[4]{-2}{2}{-2}{2} | \end{sketch}	Beginning of a sketch region
\begin{topic}{topic name} | \end{topic}	Beginning of a topic
\blank	
\blank{answer}	Blank text region
\blank[menu]{correct choice, other choices}	Blank drop down menu region
\blank[formula]{answer}	Blank text region for a Mathematical Formula question
\check{criterion}	Graph sketching question criterion
\choice{option} \choice*{correct option}	Multiple choice options
\code{variable 1; variable 2; … }	To specify algorithmic statements
\comment	Feedback shown to the student
\digits{n}	Number of significant digits
\display{menu}	Display drop down menus for a List question
\drawMaplePlot{Maple plot syntax}	Generate a Maple plot in the question text
\end	
\end{document}	End of the document
\end{question}	End of the question
\end{sketch}	End of the sketch region
\end{topic}	End of the topic
\err{error}	Absolute tolerance
\example{}	Sample correct answer to a Graph Sketching question
\false | \true	Value of a True or False question
\grader{}	Grading type for list questions
\graph[gridlines]{formula}{xMin}{xMax}{yMin}{yMax}	Graph plotting applet syntax

`\hint`	Hint to a question
`\image[extension]{filename}`	Include graphics in the question text
`\maple{maple syntax}`	Maple syntax needed to grade the student response
`\match{choice} | \with{option}`	Matching question type choice
`\name`	An identifier for a question
`\perc{error}`	Percent tolerance
`\plot{Maple plot syntax}`	Plot the student response of a Maple-graded question type
`\plotmaple("Maple plot syntax, plotoptions")`	Generate a Maple plot in the algorithm section
`\property`	Information fields
`\qutext{ }`	Text of the question
`\setImageBase{ }`	Sets the location of any images used in the questions
`\size{m}{n}`	Size of the answer matrix, where m is the number of rows and n is the number of columns
`\true | \false`	Value of a True or False question
`\type{formula}`	Maple question type indicator
`\usepackage{ }`	The ed package is needed when writing questions in LaTeX.
`\var{variable name} | \code{ }`	To specify algorithmic variables
`\with{option} | \match{choice}`	Matching question type option