

Creating WEBCT Questions for Quizzes and Tests in College Algebra

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One major advantage of creating the questions from WEBCT or from a text file is that the questions can be reused for multiple quizzes. Also, the images used in the questions can be organized in folders so they can be easily identified and maintained. These images can also be reused by multiple questions. Reusing images and questions reduces the amount of disk space used on the server and reduces the size of your backup files. A management package such as *Respondus* does simplify the question and quiz creation process, but it is wasteful with resource usage. When a question is reused in multiple quizzes in *Respondus*, the images for the question are saved for each quiz for which it is used. When changes are made to a question or quiz, all of the information is saved again, leaving the previous version.

In Section One of this paper, a description of the individual components of the five question types on WEBCT is found. Section Two describes the format and components of the five question types for scripting questions using a word processor. The second section also gives examples for each type of question, instructions for uploading the images and text files to WEBCT, and instructions on creating the questions from the files. Section Three gives pointers for extracting images of graphs and equations from test generating programs, word processors, and mathematical software packages. Section Four includes startup instructions for *Respondus*.

Section One. Creating a question using WEBCT:

Question sections common to all types WEBCT of questions:

Title:	Used to identify the question in the category and quiz. This should be unique for each question. This should describe the question for future reference.
Quizzes that use this question:	List of quizzes that use this question. Generated by WEBCT.
Question:	Type the question here. HTML code can be embed within the question.
Equation:	Used to create or edit an equation into the question. MathML can be imported or exported.
Format:	HTML/Text. Method in which the question is entered.
Image:	Attach an image to the question.

Text that has an HTML format can contain valid HTML code for text attributes and it can contain images by using the HTML tag:

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WEBCT Question types:

Under Manage Questions select the type of question to Add:

- Multiple Choice
- Matching
- Calculated
- Short Answer
- Paragraph

WEBCT Multiple Choice question components:

Allow students to choose:	One answer/Multiple answers. Number of answers allowed to be chosen.
Scoring:	Cumulative/All or nothing. Method in which answers are added when multiple answers is selected.. Each correct answer score is accumulated toward the score for the question. Only when all the correct answers are selected will 100% be granted for the entire question otherwise 0 will be given. Positive scores identify correct answers and negative scores indicate incorrect answers.
Allow negative score:	Yes/No. Used to penalize for incorrect answers otherwise 0 is used for incorrect answers.
Answer layout:	Vertical/Horizontal. Arrangement of answers in one column or rows of five columns.
Answer order:	Randomized/As listed below. Ordering of answers when the quiz is generated
Indices:	Numbers/Letters. Index of answers.
Answer i:	
Correct answer:	Check if this is a correct answer.
Answer space:	Type the answer here. HTML code can be embed within the answer.
Format:	HTML/Text Method in which the answer is entered.
Value %	Value of the question points allotted to this answer out of 100%. Negative value for negative score. Blank will assign equal weights.
Feedback i:	
Feedback space:	Type the feedback for the answer here. HTML code can be embed within the feedback.
Format:	HTML/Text. Method in which the feedback is entered.
General feedback:	
Feedback space:	Type the feedback for the question here. HTML code can be embed within the feedback.
Format:	HTML/Text. Method in which the feedback is entered.

WEBCT Matching question components:

Settings:

- Marking scheme: Equally weighted/All or nothing/Right less wrong. Method in which the answers are added. Points are equally weighted among the correct answers with no penalty for incorrect answers when equally weighted is chosen. The full points for the question are granted only when all correct answers are selected and zero points are granted if any incorrect answer is selected when all or nothing is chosen. Each answer is equally weighted and the sum of the correct and incorrect points are granted when right less wrong is chosen.
- Preview columns: Yes/No. Previews answers to choose. Yes must be selected for long answer form.

Matching pairs:

- Answer type: Short answer (single words or short phrases about initially 28 characters)/Long answer (initially 96 characters) Both will expand to fit the information. Choose one for match and one for answer. When long answer is chosen, preview columns will be selected. Images can be used in the match question and match answer by using the HTML tag
``

- Match i: The to match question.
with i: The answer for the match question.

General feedback:

- Feedback space: Type the feedback for the question here. HTML code can be embed within the feedback.
- Format: HTML/Text. Method in which the feedback is entered.

WEBCT Calculated question components:

- Formula: Type the formula here. Place variables in {}'s. Use (), +, -, *, /, **, sqrt(x), log(x) base e, sin(x) in radians, cos(x) in radians, exp(x) e, atan2(x) in radians for the formula.
- Analyze variable: Checks correctness of formula and displays a list of variables.
- Variables:
(For each variable) appears when variables are used in the formula {x}.
- Minimum: minimum value to use for the variable.
Maximum: maximum value to use for the variable.
Decimal places: number of decimal places to use for each variable.
- Calculate answer sets to:
number: number of decimal places or significant digits for the answers, 0 for integers.
type: decimal places/significant digits for the answers.

Answer set:	
Generate random answer set:	Creates random values for the independent variables of the formula and calculates the answer or the formula.
Number/set:	Number of question/answer sets to generate.
Edit answer set:	Edit the independent values that were randomly chosen.
Answer tolerance:	
(+/-):	
number:	error range value for correct answer.
type:	% or Units for the error range.
Units:	Units for the answer.
Value % of the question value:	% Units are worth of the question.
Required:	Yes/ No Are the units required or the answer.
Ignore spaces:	Yes/ No Spaces in the units.
Ignore case:	Yes/ No Case of the units.
General feedback:	
Feedback space:	Type the feedback for the question here. HTML code can be embed within the feedback.
Format:	HTML/Text. Method in which the feedback is entered.

WEBCT Short answer question components:

Number of answer boxes:	Number of short answer boxes to display.
Case sensitive:	Yes/No Case sensitive answers.
Answers:	
Answer i:	Answer to match.
Value (%):	Value of question for answer.
Width:	Field width to display for answer from 5 to 100 pixels.
Grading option:	Equals/Contains/Regular Expression. How the answer will be matched. Exactly equals the answer, contains any part of the answer, or parsed by a regular expression. A regular expression is a formula for matching strings that follow some pattern. WEBCT uses Perl regular expressions to parse the answers, see www.perl.org .
Allow in answer box:	All/1/2/... Specifies which answer box is mapped to this answer. All allows any answer box to match with any answer. 1,2,... maps the specified answer box to this answer only.
General feedback:	
Feedback space:	Type the feedback for the question here. HTML code can be embed within the feedback.
Format:	HTML/Text. Method in which the feedback is entered.

WEBCT Paragraph question components:

Settings:	
Answer box size:	Number of lines and columns for answer box.

Answer:

Pre-fill Answer box:	Test that will be initially displayed in the answer box. Used to start the answer.
Equation:	An equation that will be initially displayed in the answer box. Used to start the answer.
Correct answer:	The correct answer that can be displayed once the quiz is graded.
Equation:	The correct equation that can be displayed once the quiz is graded.
Format:	HTML/Text Method in which the answer is entered.

The paragraph answer is not graded by WEBCT. It must be manually graded.

Section Two. Creating a question using a text editor:

General procedures for scripting questions:

Do not introduce extra spaces.

The field names are case sensitive.

Lines beginning with a colon (:) identify a field name.

Field names end with a colon (:).

The colon (:) is used as a field separator.

Each question must begin with the type declaration line :TYPE:{MC|S|P|M|C}

A :TITLE: may be included in a question which specifies the title of the question.

A :QUESTION: must be specified.

Comment lines begin with a #.

Save the file as an ASCII text file.

Question formats for scripting:

MC Multiple Choice

S Short Answer

P Paragraph

M Matching

C Calculated

Multiple choice question tags:

:TYPE:MC:{1|N}:{0|1}:{C|A}

MC indicates that this a multiple choice question.

{1|N}: 1 or N correct answers are possible.

{0|1}: 0 for no negative scores (default). 1 to allow negative scores.

{C|A}: C for a cumulative score when multiple answers are used (default). A for all or nothing when multiple answers are used, only all the correct answers must be selected to receive the points for the question.

:TITLE:title text (Optional)

title text Used to identify the question in the category and quiz. This should be unique for each question. This should describe the question for future reference. Use \: for a .:

:QUESTION:{H|T}
question text

{H|T} H if HTML code is used in the question. T if the question is plain TEXT.

question text Type the question on a new line. The question can span multiple lines. Do not use a carriage return until the last line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag:

:IMAGE:filename (Optional)

filename The path to an image. This image is displayed after the question text.

:LAYOUT:{horizontal|vertical}(Optional)

{horizontal|vertical} Arrangement of answers in one column or rows of five columns. The default layout is vertical.

:ANSWER1:% value:{H|T}
answer text

% value The percentage value of the question for this answer. 0 or negative for incorrect. 100 or positive for correct. Negative will penalize for incorrect answers.

{H|T} H if HTML code is used in the answer. T if the answer is plain TEXT.

answer text Type the answer on a new line. The answer can span multiple lines. Do not use a carriage return until the final line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag:

:REASON1:{H|T}(Optional)
feedback text

{H|T} H if HTML code is used in the feedback for this answer. T if the feedback for this answer is plain TEXT.

feedback text Type the feedback for this answer on a new line. The feedback for this

answer can span multiple lines. Do not use a carriage return until the final line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag: ``

Repeat for all answers:

:ANSWERi:% value:{H|T}

answer text

:REASONi:{H|T}(Optional)

feedback text

:FEEDBACK (Optional)

general feedback text

general feedback text Type the feedback for this question on a new line. The feedback for this answer can span multiple lines. Do not use a carriage return until the final line.

:CAT:text

text

The category for this question to belong. The category name must match exactly the category name in the Questions Database. If the category does not exist, it will be created.

Multiple choice question script example:

Start of question: 2.3 V 5 Complete the Square

:TYPE:MC:1:0:A

:TITLE:2.3 V 5 Solve Linear Inequality

:FEEDBACK

:QUESTION:H

Find the number needed to complete the square of the expression.

:IMAGE:Test1/Quiz_2/Q2Q3/q15g2.gif

:LAYOUT:vertical

:ANSWER1:0:H

``

:ANSWER2:0:H

``

:ANSWER3:100:H

``

:ANSWER4:0:H

``

:ANSWER5:0:H

``

:CAT:Quiz_2

End of question: 2.3 V 5 Complete the Square

Start of question 2.5 V 1 Even Power Functions

:TITLE:2.5 V 1 Even Power Functions

:FEEDBACK

:QUESTION:H

Choose the five true statements for even power functions $y = x^{\text{even}}$

:IMAGE:

:LAYOUT:vertical

:ANSWER1:20.0:H

<align="absmiddle">

:ANSWER2:-16.7:H

<align="absmiddle">

:ANSWER3:20.0:H

<align="absmiddle">

:ANSWER4:-16.7:H

<align="absmiddle">

:ANSWER5:-16.7:H

the graphs have symmetry with respect to the origin

:ANSWER6:20.0:H

the graphs have symmetry with respect to the y-axis

:ANSWER7:-16.7:H

the graphs have symmetry with respect to the x-axis

:ANSWER8:20.0:H

the graphs are shaped like parabolas

:ANSWER9:-16.7:H

the graphs are not shaped like parabolas

:ANSWER10:20.0:H

as the powers increase, the graphs seem steeper at the "ends" and flatter around the origin

:ANSWER11:-16.7:H

as the powers increase, the graphs seem flatter at the "ends" and steeper around the origin

:CAT:Quiz_2

End of question 2.5 V 1 Even Power Functions

Short answer question tags:

:TYPE:S

S indicates that this a short answer question.

:TITLE:title text (Optional)

title text Used to identify the question in the category and quiz. This should be unique for each question. This should describe the question for future reference. Use \: for a .:

:QUESTION:{H|T}
question text

{H|T} H if HTML code is used in the question. T if the question is plain TEXT.

question text Type the question on a new line. The question can span multiple lines. Do not use a carriage return until the last line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag:

:IMAGE:filename (Optional)

filename The path to an image. This image is displayed after the question text.

:ANSWERS:n

n n specifies the number of answer boxes you wish to use.

:CASE:{0|1} (Optional)

{0|1} 0 for no case sensitivity (default), and 1 for case sensitivity.

:ANSWER1:answer text:value %:{0|1|..n}:width:{0|1|2}

answer text Text for the answer.
value % The numerical value of the answer.
{0|1|..n} The answer box into which this answer should be typed. 0 for any answer box.
width The number of pixels for the width of the short answer answer box.
{0|1|2} How the answer is to be graded: 0 for an exact match; 1 for any part of the answer; and, 2 for a regular expression. WEBCT uses Perl regular expressions to parse the answers, see www.perl.org

Repeat for all answers:

:ANSWERi:answer text:value %:{0|1|..n}:width:{0|1|2}

:FEEDBACK (Optional)

general feedback text

general feedback text Type the feedback for this question on a new line. The feedback for this answer can span multiple lines. Do not use a carriage return until the final line.

:CAT:text

text The category for this question to belong. The category name must match exactly the category name in the Questions Database. If the category does not exist, it will be created.

Short answer question script example:

```
# Start of question: 2.9 V 1 Even Odd Functions
:TYPE:S:
:TITLE:2.9 V 1 Even Odd Functions
:QUESTION:T
Determine if the following is a graph of an even or odd function.
:IMAGE:Test1/Quiz_2/Q6Q2/q6g2.gif
:ANSWERS:1
:CASE:0
:ANSWER1:Even:100:0:10:0
:FEEDBACK1:H
:CAT:Quiz_2
# End of question: 2.9 V 1 Even Odd Functions
```

Paragraph question tags:

:TYPE:P

P indicates that this a paragraph question.

:TITLE:title text (Optional)

title text Used to identify the question in the category and quiz. This should be unique for each question. This should describe the question for future reference. Use \: for a .:

:QUESTION:{H|T}:columns:lines
question text

{H|T} H if HTML code is used in the question. T if the question is plain TEXT.
columns Number of columns.
lines Number of lines.
question text Type the question on a new line. The question can span multiple lines. Do not use a carriage return until the last line. Text that has an HTML

format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag:

:IMAGE:filename (Optional)

filename The path to an image. This image is displayed after the question text.

:TEMPLATE: (Optional)

template text

template text The initial text that will appear in the answer box.

:ANSWER:{H|T} (Optional)

answer text

{H|T} H if HTML code is used in the answer. T if the answer is plain TEXT.
answer text Type the answer on a new line. The answer can span multiple lines. Do not use a carriage return until the final line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag: . This answer will be available after the quiz has been submitted.

:CAT:text

text The category for this question to belong. The category name must match exactly the category name in the Questions Database. If the category does not exist, it will be created.

Paragraph question script example:

Start of question: 2.20 V 2 n Behavior

:TYPE:P

:TITLE:2.20 V 2 n Behavior

:IMAGE:

:QUESTION:H:60:5

Describe the n behavior of a polynomial with a negative leading coefficient and a degree that is odd.

:TEMPLATE

As x approaches infinity

:ANSWER:H

As x approaches infinity, y approaches negative infinity and as x approaches negative infinity, y approaches infinity.

:CAT:Quiz_2

End of question: 2.20 V 2 n Behavior

Matching question tags:

:TYPE:M:{short|long}:{short|long}:{E|A|RW}:{0|1}

M indicates that this is a matching question.

{short|long} Specifies the first column as a short or long answer format.

{short|long} Specifies the second column as a short or long answer format.

{E|A|RW} E for each choice to be equally weighted. A (all or nothing) for all the choices must be correct to get a full score. RW for right less wrong; the score is determined by the number of wrong matches subtracted from the number of correct matches.

{0|1} 1 for preview columns, 0 for no preview columns.

:TITLE:title text (Optional)

title text Used to identify the question in the category and quiz. This should be unique for each question. This should describe the question for future reference. Use \: for a .:

:QUESTION:{H|T}

question text

{H|T} H if HTML code is used in the question. T if the question is plain TEXT.

question text Type the question on a new line. The question can span multiple lines. Do not use a carriage return until the last line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag:

:IMAGE:filename (Optional)

filename The path to an image. This image is displayed after the question text.

:L1

left1 text

left1 text The text for the left match. Images can be imbedded in the text by using the HTML tag: .

:R1

right1 text

right1 text The text for the right match of the left1 text. Images can be imbedded in the text by using the HTML tag:
.

Repeat for all matches:

:Li
 lefti text
:Ri
 righti text

:FEEDBACK (Optional)
 general feedback text

general feedback text Type the feedback for this question on a new line. The feedback for this answer can span multiple lines. Do not use a carriage return until the final line.

:CAT:text

text The category for this question to belong. The category name must match exactly the category name in the Questions Database. If the category does not exist, it will be created.

Matching question script example:

```
# Start of question: 2.10 V 1 Even Odd Functions
:TYPE:M:short:short:E:0
:TITLE:2.10 V 1 Even Odd Functions
:QUESTION:H
Identify the symmetry for the following graphs
:IMAGE:
:L1

:R1
x axis
:L2

:R2
y axis
:L3

:R3
origin
:L4

```

:R4
x axis
:FEEDBACK1:H
:CAT:Quiz_2
End of question: 2.10 V 1 Even Odd Functions

Calculated question tags:

:TYPE:C

C indicates that this is a calculated question.

:TITLE:title text (Optional)

title text Used to identify the question in the category and quiz. This should be unique for each question. This should describe the question for future reference. Use \: for a .:

:QUESTION:{H|T}
question text

{H|T} H if HTML code is used in the question. T if the question is plain TEXT.

question text Type the question on a new line. The question can span multiple lines. Do not use a carriage return until the last line. Text that has an HTML format can contain valid HTML code for text attributes and it can contain images can be imbedded in the text by using the HTML tag: . Enclose variables in braces (for example, {x} for x).

:IMAGE:filename (Optional)

filename The path to an image. This image is displayed after the question text.

:FORMULA:formula text

formula text Type the formula here. Place variables in {}'s. Use (), +, -, *, /, **, sqrt(x), log(x) base e, sin(x) in radians, cos(x) in radians, exp(x) e, atan2(x) in radians for the formula.

:x-MIN:number

number Minimum value for the variable x.

:x-MAX:number

number

Maximum value for the variable x.

Repeat for all variables:

:i-MIN:number

:i-MIN:number

:VALUES:number

number

The number of values to be randomly generated. Used from the Questions Database in WEBCT by the Generate random answer set button. The sets will not be automatically generated, you must edit the question and click the Generate random answer set button. The answer sets can be specified by including the following information.

:x-VAL1:number

number

Value for the independent variable. Substitute your variable for x.

:y-VAL1:number

number

Value for the dependent variable. Substitute your variable for y.

Repeat for all sets.

:x-VALi:number

:y-VALi:number

:ANS-DEC:number

number

The number of Decimal places or Significant Figures for the calculated question.

:TOL:number (Optional)

number

The tolerance for the answer. This gives the \pm variation from the calculated answer.

:TOLTYPE:{percent|units} (Optional)

{percent|units}

Specify the tolerance to be a percent range of the calculated answer, or a unit value deviation.

:UNITS:units text (Optional)

units text The type of units that should be used with the answer.

:UNITREQ:{0|1} (Optional)

{0|1} Units are required. 1 for yes, 0 for no.

:UNITSPACE:{0|1} (Optional)

{0|1} Ignore spaces in units. 1 for yes, 0 for no.

:UNITCASE:{0|1} (Optional)

{0|1} Ignore case of units. 1 for yes, 0 for no.

:UNITVAL:value %

value % The percentage weight of the answer for the correct units.

:ANSTYPE:{dec|sig}

{dec|sig} Decimal answer (DEC) or in significant figures (SIG).

:FEEDBACK (Optional)

general feedback text

general feedback text Type the feedback for this question on a new line. The feedback for this answer can span multiple lines. Do not use a carriage return until the final line.

:CAT:text

text The category for this question to belong. The category name must match exactly the category name in the Questions Database. If the category does not exist, it will be created.

Calculated question script example:

Start of question: 2.12 V 2 Log base b

:TYPE:C

:TITLE:2.12 V 2 Log base b

:QUESTION:T

Find the answer to the nearest 1/1000.

log_{b}({x})

:IMAGE:
:FORMULA: $\log(\{x\})/\log(\{b\})$
:x-MIN:10
:x-MAX:20
:x-DEC:0
:b-MIN:2
:b-MAX:9
:b-DEC:0
:VALUES:10
:x-VAL1:14
:b-VAL1:3
:x-VAL2:19
:b-VAL2:6
:x-VAL3:13
:b-VAL3:4
:x-VAL4:17
:b-VAL4:4
:x-VAL5:13
:b-VAL5:9
:x-VAL6:16
:b-VAL6:8
:x-VAL7:10
:b-VAL7:9
:x-VAL8:16
:b-VAL8:8
:x-VAL9:14
:b-VAL9:7
:x-VAL10:11
:b-VAL10:9
:ANS-DEC:4
grade answers to 1/1000
:TOL:.001
:TOLTYPE:units
:UNITREQ:0
:UNITSPACE:0
:UNITCASE:0
:UNITVAL:0
:ANSTYPE:dec
:FEEDBACK:H
:CAT:Quiz_2
End of question: 2.12 V 2 Log base b

To create the questions on WEBCT from the text script file:

Zip the directories containing any images the questions use.
From the Manage Files page select Upload a File and click go.
Select browse and navigate to the zip file on your PC.
Select the Destination Folder on WEBCT, for example zips under My-Files.
Select Upload.
From Manage Files, expand My-Files and zips and select the image zip file you just uploaded to WEBCT.
Select the Unzip action and Go.
Select the root directory to unzip the files into. My-Files is the root referenced in the Questions Database.
Select Unzip.
The directories and image files should now be under My-Files.

From the Questions Database page select Import Questions from file and Go.
Select Browse and select Upload and Browse again to navigate to the question set text file on the PC.
Select the question set text file on the PC, Select an Upload directory like zips and click upload. When finished the directory tree will be displayed containing the newly uploaded file.
Select the question set text file now located on WEBCT and click Pick.
Now click Import.
The questions will be displayed on the screen. Select continue if they look ok.
If the images do not appear, the image references do not agree with the image locations on WEBCT.
The Questions Database screen will appear and the new questions will be in the categories specified by the question descriptions.

The creation of the questions and answers can be automated by writing programs in C, Java, BASIC, or any programming language. These programs can generate numerous questions and answers and write these questions and answers to a file following the rules for scripting questions. These files can be imported into WEBCT and hundreds of questions can be generated in a short amount of time.

Section Three. Extracting images of graphs and equations from test generating programs, word processors, and mathematical software packages.

Questions can be used from test generating programs such as *TestGen-EQ* by Prentice Hall. Once the test is created, export it as an HTML file. When it is converted to an HTML file, the graphs and equations are converted into gif images. Typically the text is also converted into gif images, but they are not very clear. Text can be retyped when you create the question set. This method is primarily used for generating the graphs and equation images. Most programs will place the images in a question folder. Usually there is a format to the file name used for the images. The images related to a question may contain that question number followed by a

number representing the specific image in the question. The worst case is where all images are simply numbered sequentially. In order to access the images, identify and open the folder containing them and select view as thumbnails. Identify the naming format used by the program. Select the graphs and equations that you want to use in your questions. Save these images in a folder that you will access from the question sets that you will script.

Word processors, like *WordPerfect* by Corel or *Word* by Microsoft, offer a publish to, or save as HTML feature under their file menu. The word processors will convert the drawings and equations to image gif's and reference them from an HTML file that they create. As with the test generating programs, generating the images is the goal. Find the images and save them in a folder where you will access them from the question sets that you will script.

Mathematical software packages, like *Derive* or *TI Interactive* both available through Texas Instruments, can export or save the graphs as images. These images can then be used in the question sets that you will script. You will also need these images for use in *Respondus*.

Section Four. Startup instructions for *Respondus*.

Respondus is a tool for creating and managing the quizzes for WEBCT. The exams are created on the PC in *Respondus* using its equation editor or Math Type by Design Science. Questions can also be imported from a text file into *Respondus*. Graphs still need to be created in another Mathematical software package and imported into *Respondus* as a gif image. The equations are saved in *Respondus* and converted to gif images when posted to WEBCT. *Respondus* has five sections: Start, Edit, Settings, Preview & Publish, and Retrieval & Reports.

Start is used to open an existing file; create a new file; exam wizard which will build a quiz from an existing quiz stored in *Respondus* on the PC, from existing questions stored in *Respondus* on the PC, or from new questions that will be manually entered; import questions from a text file; or create a *Respondus* achieve.

Edit allows the user to create and modify questions stored in *Respondus*. Templates for the multiple choice, matching, short answer, and paragraph questions are provided. Two other templates are provided, a true false question and a multiple answer question. The calculated question is not available in *Respondus*. The normal components for each question type are entry fields in *Respondus*. Simply fill in the information as you would do in WEBCT or the text editor. The equation editor can be opened and the image of the equation will be inserted into the question. Graphical images must be imported into the question by using the insert picture or file feature. As questions are completed they appear in the question list at the bottom of the screen. Previous questions can be used and modified to create new questions just like in WEBCT or the text editor.

The main advantage of *Respondus* is it posts the questions directly into WEBCT and it will create the quiz definition too. There are some glitches when trying to update an existing question set. Duplicate question entries will result in the Question category.

Conclusion:

Even though *Respondus* simplifies the posting of the questions and creates the quiz on WEBCT, it still needs the graphical images to be imported from another package. There is very little difference in using the equation editor in *Respondus*, WEBCT, or a word processor and have it generate the image or MathML. One major drawback of *Respondus* is that the calculated question is not available. This is a very powerful question type to use. Another feature that is not available in *Respondus* that is available from the WEBCT question editor or from scripting the question from a text editor, is the use of regular expressions in the short answer question. These Perl regular expressions allow the parsing of a short answer for a more complex variation of answer matching.

Writing the questions from WEBCT or from a text file creates a question bank so the questions can be reused for multiple quizzes. Also, the images used in the questions can be organized in folders so they can be easily identified and maintained. These images can also be reused by multiple questions. Reusing images and questions reduces the amount of disk space used on the server and reduces the size of your backup files. Repeated copies of the same images and questions are saved on the server for each reference from a quiz in *Respondus*. When changes are made to a question or quiz, all of the information is saved again, leaving the previous version. This approach wastes disk space on the server.