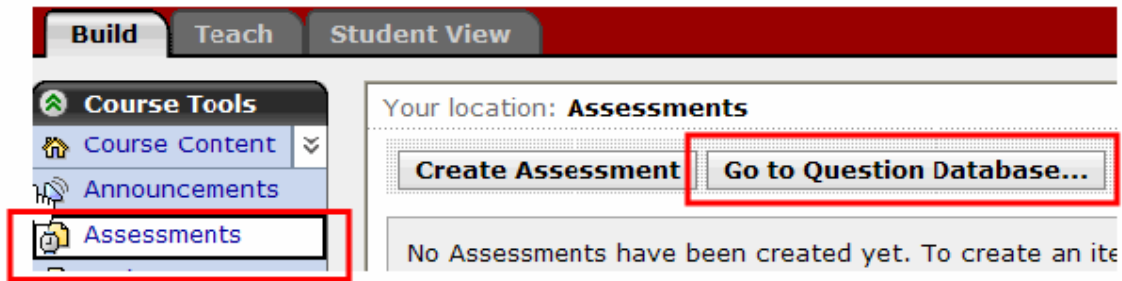


## Creating Calculated Questions

Calculated questions are questions that students answer mathematically. You can specify a mathematical formula and a set of variables, along with a range of values for each variable, using the option in Vista. Vista will generate a set of answers for a randomly selected set of variables. Depending on the size of your set, a calculated question can be unique for each student when taking the assessment.

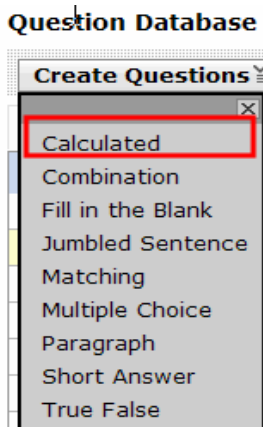
### Creating Calculated Questions

Make sure you are on the Build tab and select Assessment under Course Tools; then click **Go to Question Database**.



**Note:** If you cannot view Assessments under Course Tools, see the ITS handout, "Managing Your Course."

On the Question Database screen, select **Calculated** from the drop-down menu under Create Questions.



You must enter information into several fields when creating calculated questions. Here are descriptions for these areas:

## Title

In the Title textbox, enter a descriptive title for the question. Titles should easily identify questions when searching the Question Database. When students view questions, titles may or may not show depending on the assessment settings.

### Create Calculated Question

\*Title:

## Question Text

In the question textbox, enter the question. If you want to use HTML coding and do not know the tags, you can use the HTML Creator by clicking **On**. If you want to use HTML coding either through the creator or through your own coding, make sure to click the **Use HTML** checkbox. You can also insert an equation by using the Equation Editor. The equation is inserted within the question. In addition, you can also add an image by clicking the **Browse** button next to Image. The image will be shown below the question text. If an image is not listed under the File Manger area, you will need to upload the image from your local computer first. You can upload an image file in one step by clicking **Browse**.

Use variables within this type of question that represent the numbers you want randomly generated by Vista and where you want them placed. For Vista to recognize these variables, you need to place straight brackets around the variable (as shown in the following example). You can use as many variables as you want — just make sure the variables are different if they are representing different numbers.

**Example:** Question: How many kilograms are equal to [p] pounds? Answer: Depending on the range an instructor specifies, values are inserted for [p]. Students calculate the answer and enter it in the answer box.

To indicate a variable, enter the variable name as specified in the formula in square brackets.  
Example: What is the sum of [x] and [y]?

HTML Creator:  On /  Off

Question text:

Use HTML    Insert equation:

---

Image:

## Settings Information

**Formula:** Use the textbox to enter a mathematical formula required to solve a question. For example, the formula,  $[p] * 0.45$ , is shown in the following screenshot. Variables specified in the Formula and Question fields must be enclosed within straight brackets so Vista can generate random answer sets. The variables that are in the straight brackets must be the same as the variables in the question.

---

### Formula:

Enclose variables in square brackets. Example:  $[x] + [y]$ . Values for variables will be inserted when the answer set is generated. You can also use constants in place of variables.

[View a list of supported formulas.](#)

**Units:** Enter any units that may be required as part of the correct answer in the Unit box. The following are checkbox options:

- **Required:** Students must include units within their answer. Whatever students enter must match your units answer exactly. If you want

students to enter units, make sure you tell them explicitly how you want the units to appear. For example, if your unit is inches, decide if you want "inches," which is spelled out completely, or "in.," which is abbreviated.

- **Ignore Spaces:** With this setting, Vista will ignore spaces within the units answer. This is helpful with beginning or trailing spaces.
- **Ignore Case:** Vista will ignore the case (either uppercase or lowercase) of the units answer while grading.
- **Percentage of the question value:** You decide how much the unit answer is worth. If the question is worth 5 points and you want the units to be worth 20%, the calculated answer will be worth 1 point and the unit will be worth 1 point.

**Units:**

Required  Ignore spaces  Ignore case  
Percentage of the question value:

## Analyze Variables

In this area you specify how you want numbers to appear. Vista randomly generates the list based on your settings. You can view all the variables you have placed in the question and formula.

- **Minimum:** Enter a minimum value for the variable specified. Vista will use this as the lower limit when generating random values for the variable. In the following figure, the minimum value is set to 2.
- **Maximum:** Similarly, a maximum value must be specified using the maximum field. Vista will use this as the upper limit when generating random values for the variable. In following figure, the maximum value is set to 40.

- **Calculated decimal places:** Set the number of decimal places the minimum and maximum values will contain. If you are using whole numbers, set the decimal place to "0."

---

**Variables:**

**P** Minimum:  Maximum:  Calculate to   decimal places

**Answers**

- **Specify the number of answers per set:** The variables in the formula together create a set. You determine how many sets you want from 10 to 100. Each set will include numbers between the ranges you specified. This is the list Vista will randomly draw from to create the questions. When you click **Generate Answer Set**, you will see the number of sets you specified.
- **Calculate the answer set to Decimal:** You can decide how many decimal points are showing in the answers generated by Vista. In the following figure, the decimal points for answers are set up to be 2.
- **Answer Tolerance:** This field lets you specify how much error can be tolerated in student answers. In the following figure, the answer tolerance is specified to accept an answer which is within +/- 5% (0.05) of the correct answer. Therefore, if a student received  $p = 7.74$ , the answer would be 3.38. Since the tolerance is 0.05, the student's answer can range between 3.31 and 3.43.
- **Generate Answer Set:** Clicking this button allows Vista to generate random answer sets using the specified formula and ranges. If you do not like an answer or if the answer that Vista generated is not an acceptable (for example, undefined), you can manually change the value of the variable in the sets area. If you change any of the values, you must click **Update Answer Set** to save your changes.

Answer Set:  
 Specify the number of answers per set: 10  
 Calculate the answer sets to: 2 Decimal  
 Answer Tolerance (+/-): 0.05 Units:  Decimal  Percent  
 Generate Answer Set

|    | p     | Answer |
|----|-------|--------|
| 1  | 23.76 | 10.69  |
| 2  | 16.11 | 7.25   |
| 3  | 33.20 | 14.94  |
| 4  | 21.84 | 9.83   |
| 5  | 36.95 | 16.63  |
| 6  | 15.85 | 7.13   |
| 7  | 38.27 | 17.22  |
| 8  | 37.95 | 17.08  |
| 9  | 5.86  | 2.64   |
| 10 | 27.64 | 12.44  |

Update Answer Set

## More Options

- You can provide students with general feedback. Instead of (or in addition to) specific answer feedback, you can give the chapter and page number where this answer can be found. If you want to use HTML coding, click the **Use HTML** checkbox. General feedback displays when students view their graded assessment.
- If you want to enter notes to use for all designers who are grading your assessment, add this information in the Section Designer notes box. Notes can be displayed to students when they review their results if you choose to release notes to them.

▼ **More Options** (Expand this area to see more options.)

General feedback:   Use HTML

Section Designer notes:

All questions should be automatically stored in the Question Database. Since the Question Database can contain many questions, it is helpful to organize questions into different categories. If you want to add questions to a category, you can use one of the following methods:

- To add questions to an existing category, click the **Specify an existing category** radio button. From the drop-down list, select the category.
- Uncategorized Questions is a default category. If you do not specify a category, questions will automatically be placed under this category.
- To add questions to a new category, select the **Create a category** radio button and enter a category name.

---

Category: Questions may be placed in categories in the Question Database, for organizational purposes.

Specify an existing category:

Create a category:

## Preview

If you prefer to preview questions to ensure that they display and get graded correctly, click **Preview**. The Preview Question pop-up window appears and the question is displayed as it will appear in the student view. If you want to check the grading scheme and feedback, enter your answer and click **Grade**. The question will be graded and the answers are displayed, including the percentage and any feedback.

**kilograms and pounds conversion**

How many kilograms are equal to 16.11 pounds?

Answer

Units

Previewing questions allows you to check that everything is correct. Now you can save the question by clicking **Save**. If you added a new category, you will find that it has just been added. For example, "Chapter 1 - math" is shown as a new category in the following figure. You may need to open the category by clicking the plus (+) sign. Once a category is open, you can view a list of all questions that have been added; for example, kilograms and pounds conversion, as shown in the following figure.

|                          |   |            |
|--------------------------|---|------------|
| <input type="checkbox"/> |  <b>Chapter 1 -- math (1)</b>                    | Category   |
| <input type="checkbox"/> |  <a href="#">kilograms and pounds conversion</a> | Calculated |
| <input type="checkbox"/> |  <b>Chapter 4 -- Geography (1)</b>               | Category   |

You can repeat the same procedure to create as many calculated questions as you wish.