



Creating Significant Figures Questions in D2L – D2L Tutorial

This tutorial is for faculty who have previous experience using the Quizzes tool and Question Library in D2L. For further information or assistance, go to our [Team Dynamix Support portal](#) and click the appropriate Category to submit a ticket.

Scenario

This tutorial will describe how to create a **Significant Figures** question for use in the Quizzes tool in D2L. Significant figures questions require respondents to answer in scientific notation and provide solutions that contain a specified number of significant figures. Note that this question type uses an older creation interface that is different from the Multiple Choice question creation interface, and is a bit more complicated to navigate.

Steps

1. Go to the **Quizzes** tool in your course.
2. Click **Question Library**.

The screenshot shows the D2L Quizzes tool interface. At the top, there is a navigation bar with links: Training Course 03, Course Home, My Tools, Edit Course, Accessibility Report, Collaborate, Course Media, and My Media. Below this, there is a sub-navigation bar with links: Manage Quizzes, Question Library (highlighted with a red box and a red arrow), Statistics, and LockDown Browser. A Help icon is also present. Below the navigation bar, there are three buttons: New Quiz, Edit Categories, and More Actions. To the right, there is a View dropdown menu set to 'By Availability' and an Apply button. Below the buttons, there is a 'Bulk Edit' link. The main content area is a table with the following data:

		Published
<input type="checkbox"/>	Current Quizzes	
<input type="checkbox"/>	All About Quizzes	-
<input type="checkbox"/>	Module 1 Quiz	0/3
<input type="checkbox"/>	Quiz 1	4/4



3. Create a **New** → **Section** or click on the title of an existing **Section** (folder) in which to save your Significant Figures question.

Training Course 03 Course Home My Tools Edit Course Accessibility Report Collaborate Course Media My Media

Question Library > Quizzes

Quizzes

New Import

Move Delete Order Edit Values

<input type="checkbox"/>	Name	Type	Points	Difficulty	Mandatory	Last Modified
<input type="checkbox"/>	Creating questions in the Question Library will enable you to reuse your questions on various Quizzes or exams.	T/F	1	1		Aug 21, 2015 12:31 PM
<input type="checkbox"/>	What Quizzing tab do I customize to allow students to have multiple attempts (or opportunities) to take a					

4. Click **New** and select **Significant Figures (x10)** (you may need to scroll down in the list).

Training Course 03 Course Home My Tools Edit Course Accessibility Report Collaborate Course Media My Media

Question Library > Quizzes

Quizzes

New Import

Done Editing Questions

Multiple Choice Question (MC)

Multi-Select Question (M-S)

Written Response Question (WR)

Short Answer Question (SA)

Multi-Short Answer Question (MSA)

Fill in the Blanks Question (FIB)

Matching Question (MAT)

Ordering Question (ORD)

Arithmetic Question (2+2)

Significant Figures (x10)

Likert Question (LIK)

	Type	Points	Difficulty	Mandatory	Last Modified
Creating questions in the Question Library will enable you to reuse your questions on various Quizzes or exams.	T/F	1	1		Aug 21, 2015 12:31 PM
What Quizzing tab do I customize to allow students to have multiple attempts (or opportunities) to take a	MC	1	1		May 5, 2021 10:35 AM
question types NOT	M-S	1	1		Aug 21, 2015 12:31 PM
describe what you feel is er when completing a	WR	1	1		Aug 21, 2015 12:31 PM



5. Leave the **Title** box blank. Give your question a **Points** value, and feel free to leave the **Difficulty** at 1 (use the **Difficulty** level feature to help you sort your questions for a quiz, so change the value if you like).

Add your question to the **Question Text** box. Because this will be what students will need to answer, include all variables for the system to generate. Each variable must be enclosed in curly brackets **{}**. Significant Figures questions are random for each student by default, and the system will use your input in the **Question Text** box to determine the variables.

For our example, there are two variables, **x** and **y**, and the **Question Text** is: Add {x} kilometers and {y} kilometers and round to 4 significant figures.

The screenshot shows a form titled "New Significant Figures" with a "General" section. The "Title" field is empty and marked as optional. The "Points" field is a text input containing the number "4". The "Difficulty" field is a dropdown menu set to "1". The "Question Text" field is a rich text editor containing the text "Add {x} kilometers and {y} kilometers and round to 4 significant figures." The form also includes an "Image" section with an "Insert an Image" button and a bottom navigation bar with "Save", "Save and Copy", "Save and New", "Preview", and "Cancel" buttons. Red arrows and boxes highlight the "Points" and "Question Text" fields.



6. Scroll down to add any required images using **Insert an Image**, or to select **Allow attachments to support answers** if the students will be uploading their work as an attachment. Then scroll to the **Formula** box and enter the formula that will be calculated using the variables in your Question Text.

In our example we have added the formula $\{x\} + \{y\}$ with each variable in curly brackets. Note that the basic math operators used here are * for multiplication, / for division, + for addition, and - for subtraction) as well as those listed at the end of this tutorial.

The screenshot shows a 'Formula *' input field containing the text '{x}+{y}'. A red box highlights this field, and a red arrow points from it to the 'Significant Figures' section below. The 'Significant Figures' section includes a dropdown menu set to '4', a 'Deduct:' dropdown set to '50', and the text '% of points for incorrect significant figures'. Below this is the 'Tolerance' section with three radio button options: the first is selected and labeled '+/- 0.5 from the least significant figure', the second is 'units +/-' followed by two empty input boxes and 'x10', and the third is 'percent +/-' followed by one empty input box.

7. From the **Significant Figures** drop-down menu, select the number of **significant figures** you want for the answer. This determines how many numbers will appear in the answer before and after the decimal that will add up to the number entered here. From the **Deduct** drop-down menu, select the **Percentage** of deduction for incorrect figures in the answer. In this example, we have set the answer to have **4** significant figures, and we set a deduction of **50%** for an incorrect number of significant figures.

Use **Tolerance** levels to accept near-accurate, estimated, or rounded answers. Set the **Tolerance** for how close you want the answer to be to the correct answer. The default is for plus or minus 0.5, but you can choose another option by selecting either **Units** or **Percent**.

This screenshot is similar to the previous one but highlights more elements with red boxes and arrows. A red box surrounds the 'Significant Figures' section (dropdown '4', 'Deduct: 50', and '% of points...'). Another red box surrounds the 'Tolerance' section, specifically the selected radio button and its label '+/- 0.5 from the least significant figure'. Red arrows point from the 'Formula' field to the 'Significant Figures' section and from the 'Significant Figures' section to the 'Tolerance' section.



8. The **Units** box contains a written expression if required for the answer, for example amps, dollars, lbs, kg, etc. Anything entered here will need to be exactly matched in the student answer and can be assigned points. If you add **Units**, you also need to assign a **Worth** in percentage (which will be assigned as part of the grade if the answer contains the correct unit). You will also need to select an **Evaluation Option** (case insensitive, case sensitive, or regular expression) to go with your units. For our example we are entering **Units** in **km** (kilometers) and assigning a **Worth** of **10%**, and the **Evaluation Option** selected is **Case Insensitive**.

Tolerance

+/- 0.5 from the least significant figure

units +/- x10

percent +/-

Units

Worth: % of Points

Evaluation Options:

Case Insensitive

Case Sensitive

Regular Expression

9. In the **Variables** section, enter the variables required for the question. This is the range of numbers the computer can pick from to generate each new question. Each variable in your question must have a set of values assigned. Variables are **Name**, **Min**, **Max**, and **Step** (the **Step** being how D2L will move through the values to display).

In our example, **x** is the first distance and **y** is the second distance. For **x**, the **Min** is 4×10^3 and the **Max** is 5×10^3 with no **Step**. Therefore, the numbers generated for the students would be anything between those amounts, no less than 4.0 and no more than 5.9999 (for example, 4.224×10^3 or 5.4322×10^3). The **Power** can be different for each value to provide more difficulty. Negative numbers can also be used. (**NOTE**: you must enter a **Power** for the Min and Max of each variable – it can be any number including 0. The **Step** can be blank but if you enter a number, you will need a **Power** as well.) Click **Add Variable** to add more variables, or click the trashcan at the right to delete a variable.

Variables

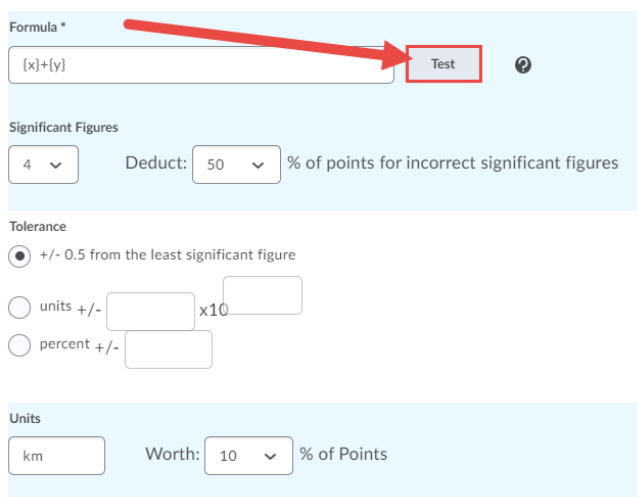
Note: The system assumes that the values entered are reduced to the highest power possible.

+ **Add Variable**

#	Name	Min	Max	Step	Remove
1	<input type="text" value="x"/>	<input type="text" value="4"/> x10 ^{<input type="text" value="3"/>}	<input type="text" value="5"/> x10 ^{<input type="text" value="3"/>}	<input type="text"/> x10 ^{<input type="text" value="0"/>}	
2	<input type="text" value="y"/>	<input type="text" value="3"/> x10 ^{<input type="text" value="3"/>}	<input type="text" value="4"/> x10 ^{<input type="text" value="3"/>}	<input type="text"/> x10 ^{<input type="text" value="0"/>}	



10. To verify the formula, click **Test**. A dialogue box will appear with an example of the entry.



Formula *

{x}+{y} Test

Significant Figures

4 Deduct: 50 % of points for incorrect significant figures

Tolerance

+/- 0.5 from the least significant figure

units +/- x10

percent +/-

Units

km Worth: 10 % of Points

11. Based on our example, the Test has generated the assigned values of $x=4.51780 \times 10^3$, and $y=3.529 \times 10^3$. The **Original Formula** is shown as $\{x\}+\{y\}$, the **Actual Formula** is the formula containing the assigned variable values $(4.51780 \times 10^3) + (3.529 \times 10^3)$, the **Solution** (8.047×10^3 km), and the **Range** (here 8.0463×10^3 to 8.0473×10^3) which is the range of accepted correct answers based on the **Tolerance** that we set as **plus or minus 0.5**. Click **Done** to close the view.

Notice that all the numbers generated will always appear in the following format **#.##### X 10 ^x** regardless of the range of variables. Answers will also need to be formatted in this way.

Test Significant Figures

Variables

Name	Value
{x}	4.51780×10^3
{y}	3.529×10^3

Original Formula

$\{x\}+\{y\}$

Actual Formula

$(4.51780 \times 10^3)+(3.529 \times 10^3)$

Solution

8.047×10^3 km

Range

$8.0463 \times 10^3 - 8.0473 \times 10^3 (8.047 \times 10^3 \pm 5 \times 10^{-1})$

Done



12. Click **Preview** to see a sample of your question, and click **Save** when done.

New Significant Figures

General

Title (optional)

Points*

Difficulty


Question Text*

Paragraph **B** *I* U ~~A~~ | Σ | \int | $\frac{\square}{\square}$ | $\frac{\square}{\square}$ | Lato (Recom... | ...

17.1px | | |

Add {x} kilometers and {y} kilometers and round to 4 significant figures.

Image



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Formula Information

All variables **must be enclosed** in curly braces, i.e. $2 * \{x\} + \{y\} - \{z\}$. Here are some of the supported functions:

Enumerations	Description
<code>+, -, *, /, \, ^</code>	Basic mathematical operators
<code>%</code>	Modulo (remainder) operator
<code>{x}^{y}</code>	x to the power of y
<code>abs({n})</code>	Absolute value of n
<code>cos({n})</code>	The cosine of n (in radians)
<code>sin({n})</code>	The sine of n (in radians)
<code>sqr({n})</code>	The square root of n
<code>tan({n})</code>	The tangent of n (in radians)
<code>log({n})</code>	The log base 10 of n
<code>ln({n})</code>	The log base e of n
<code>atan({n})</code>	The inverse tangent of n
<code>sec({n})</code>	The secant of n
<code>cosec({n})</code>	The cosecant of n
<code>cotan({n})</code>	The cotangent of n
Factorial	Factorial of n, or (n!)
<code>exp</code>	The power of natural log (e)
<code>pi</code>	pi 3.14159 (accurate up to 50 decimal places)
<code>e</code>	e 2.71828 (accurate up to 50 decimal places)

Things to Remember

Ensure you enclose all your variables in **curly brackets {}** in both the questions text and the formula. Double check the order of your formula and that you have used the correct variables in the correct order. Any letter (A-Z) can be used as a variable.



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