

# Variable Numeric question type

Two side-by-side screenshots of a Variable Numeric question type. The left screenshot shows the question "Please simplify this fomula:  $\int_2^7 49xdx$ " with an "Answer:" field below it. The right screenshot shows the question "Please simplify this fomula:  $\int_2^6 36xdx$ " with an "Answer:" field below it.

An example of Variable Numeric question type

## Overview:

This guide will show you how to create a Variable Numeric question type.

## What to know:

The features of Variable Numeric question type is listed below.

1. It supports random variables into the questions. ( As can be seen from the example above, one student sees the question as shown in the first picture, while another student sees the question as shown in the second picture. It is because this question uses random variables.)
2. It supports variables defined by other expressions.
3. It supports variables with pre-defined values.
4. It supports answer tolerance and the use of units.

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### Step 1: Access the Quiz activity where you want to create the question

In your module area/course, click the link of the Quiz activity where you want to create a question.

## ▼ Topic 5



Example Quiz

Receive a grade

**Opened:** Wednesday, 8 November 2023, 1:31 PM

Note: If an appropriate Quiz activity doesn't exist in your module area/course, please see [Add a quiz](#) for details of how to create one.

### Step 2: Open the 'Questions' tab

1. Open the 'Questions' tab

The screenshot shows the 'Example Quiz' interface. At the top left is a pink square icon with a white checkmark. To its right is the title 'Example Quiz'. Below the title is a navigation menu with tabs: 'Quiz', 'Settings', 'Questions', 'Results', 'Question bank', and 'More'. The 'Questions' tab is highlighted with a red rectangular box. Below the navigation menu is a 'Receive a grade' button. Underneath that is the text 'Opened: Wednesday, 8 November 2023, 1:31 PM'. At the bottom left is a blue 'Preview quiz' button. Below the button is the text 'Attempts allowed: 1'.

### Step 3: Add a new question

1. On the following page, click the 'Add' link.
2. Click the 'a new question' link in the dropdown menu.

# Example Quiz

Quiz Settings Questions Results Question bank More ▾

## Questions

Questions: 1 | This quiz is open Maximum grade  Save

Repaginate Select multiple items Total of marks: 1.00

Page 1  Shuffle ?

1 ⋮ ⚙️ **The Loch Ness Monster is a type of?** The Loch Ness Monster ... Always Add ▾

- + a new question
- + from question bank
- + a random question

### Step 4: Choose a question type

1. Locate and select the Variable Numeric question type from the pop-up window.
2. Click the 'Add' button.

#### Choose a question type to add ✕

- 12 Numerical Allows a numeric response, expressions are evaluated on the fly and the evaluated expression is compared to the student response
- 2+2 = ? Calculated
- 2\*2 = ? Calculated simple
- 2+2 = ? Calculated multichoice
- x<sup>2</sup> Variable numeric
- {12} Variable numeric set
- {m} Variable numeric set with units
- 🔥 STACK
- 📺 VPL Question
- Cr CodeRunner

AddCancel

### Step 5: Give a question name

Give a question name in the 'Question name' setting.

Question name ▲

Variable numeric

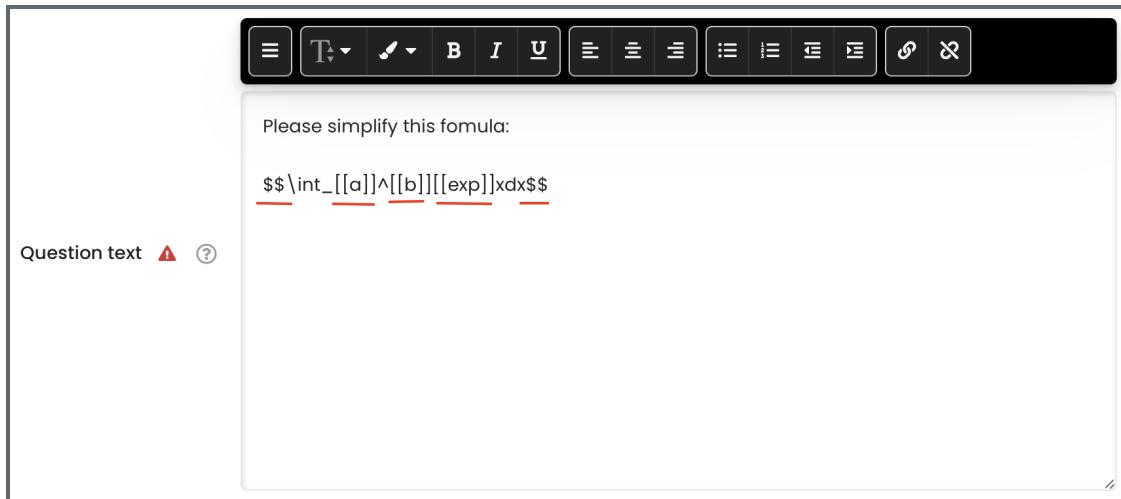
## Step 6: Give the question text

Type in the question in the 'Question text' box, such as the example in the screenshot below.

The special Mathematical formulas and symbols can be written in Latex/Tex. You either edit the formula in Latex editors or click the icon on the top left of the text box and click the icon highlighted icons in the screenshot to edit Latex formula.

Hint:

1. The random variables, such as variable a and b, need to be covered with '[' and '']' so that the system knows it is a variable.
2. The whole formula needs to be covered with '\$\$' before and after.



The screenshot shows a question editor interface. On the left, there is a label 'Question text' with a red warning triangle and a question mark icon. The main text area contains the text 'Please simplify this fomula:' followed by a LaTeX formula: 
$$\int_a^b \exp(x) dx$$
. The formula is enclosed in double dollar signs '\$\$' and underlined. Above the text area is a rich text editor toolbar with icons for text color, background color, bold, italic, underline, bulleted list, numbered list, indent, outdent, link, and unlink.

## Step 7: Set up the full mark and the general feedback (optional)

If you do not need to change the full mark and give general feedback, you can skip this step.

1. Under the 'Default mark', you can change the full mark of this question from 1 mark to another mark.
2. Under the 'General feedback', you can add feedback that every student will see.

Default mark ⚠

10

General feedback ?

This question checks the use of knowledge related to . You can check the Lecture 10.

## Step 8: Set up variables

There are two types of variables:

1. Calculated variables: random variables. e.g. variables  $a$  and  $b$  in the screenshot below.
2. Predefined variables: variables with pre-defined values. e.g. variable  $exp$  in the screenshot below.

Define variables:

1. To define a random variable , please write 'rand\_int()', which means random integer. Then, in the bracket, please write the range of the random integers. e.g. rand\_int(1, 4) means random integer between 1 and 4.
2. This question type supports most of the commonly used expressions. Please follows the expressions that this question type supports to define your variables as the following image.
3. To define a predefined variable, the teacher needs to define the values that can be given to this variable.

**Variables**

	<div style="border: 1px solid red; display: inline-block; padding: 2px;">Calculated variable <span style="font-size: small;">↕</span></div>
Variable 1 <span style="font-size: x-small;">?</span>	<u>a=rand_int(1,4)</u>
Value <span style="font-size: x-small;">?</span>	2
	<div style="border: 1px solid red; display: inline-block; padding: 2px;">Calculated variable <span style="font-size: small;">↕</span></div>
Variable 2 <span style="font-size: x-small;">?</span>	<u>b=power(2,a)</u>
Value <span style="font-size: x-small;">?</span>	8
	<div style="border: 1px solid red; display: inline-block; padding: 2px;">Predefined variable <span style="font-size: small;">↕</span></div>
Variable 3 <span style="font-size: x-small;">?</span>	<u>exp</u>
Value <span style="font-size: x-small;">?</span>	64

average(a, b...): Returns the average of a list of arguments.

max(a, b...): Returns the maximum value in a list of arguments

min(a,b...): Returns the minimum value in a list of arguments

mod(dividend, divisor): Calculates the remainder of a division.

ln(number): Returns the natural logarithm of number.

log(number): Returns the natural logarithm of number.

pi(): Returns the value of the number Pi.

power(base,exponent): Calculates the value of the first argument raised to the power of the second argument.

round(number, count): Rounds a number to a predefined accuracy.

sqrt, abs, exp

sin, sinh, arcsin, asin, arcsinh, asinh

cos, cosh, arcos, acos, arccosh, acosh

tan, tanh, arctan, atan, arctanh, atanh

## Step 9: Give the correct answer

1. You can type in the correct answer in the 'Answer' setting.

For variables with random values, such as variable 'a' and 'b' here, it needs to be covered within '[ ]', so that ICE recognizes them as variables.

2. You also need to add error (so-called 'tolerance') and a grade to this answer.

3. Define the grade of this answer. If it is the correct answer, it is 100% in grade.

**Answers**

For all answers

Require scientific notation

Correct answers You must provide at least one possible answer. Answers left blank will not be used. "\*" can be used as a wildcard to match any number. The first matching answer will be used to determine the score and feedback.

**Answer 1**

Answer 1  Accepted error +/-  Significant figures

Grade

Feedback

Give feedback and partial credit where answer is partially wrong

If numerically correct  If scientific notation required but not used

If power of 10 is off  If rounding is incorrect

For each error deduct

### Step 10: Give partially correct answers (optional)

You can also add partially correct answers with the relevant grades and feedback in 'Answer 2' and 'Answer 3' part (optional). (If you do not need to do it, you can skip this step.)

**Answer 2**

Answer 2  Accepted error +/-  Significant figures

Grade

Feedback

Give feedback and partial credit where answer is partially wrong

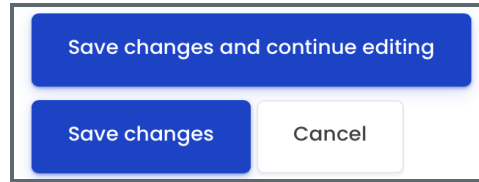
If numerically correct  If scientific notation required but not used

If power of 10 is off  If rounding is incorrect

For each error deduct

### Step 11: Save the question

Click 'save changes and continue editing' or 'save changes' button to save the question.



### Tips:

The random variables, such as variable a and b, need to be covered with '[[ ]]', the whole formula needs to be covered with '\$\$' before and after so that the system knows it is a random variable.

### Note:

For more information about Variable Numeric question type, please access the official documentation:

<https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=52747&section=2.1.2>

Online URL: <https://knowledgebase.xjtlu.edu.cn/article/variable-numeric-question-type-178.html>