



Workshop: Using Meclib in STACK Questions

Prof. Dr.-Ing. Martin Kraska

2023 STACK Community Meeting


Give the general formula for [Tidy STACK question tool](#) |  Question is missing tests or variants.
 the length of the hypotenuse c of a right-angled triangle with sides a and b .

$\sqrt{a^2}$

 Missing variable: b (b).


What is the exact length of the hypotenuse if the grid width is L ?

$2 \cdot \sqrt{5}$

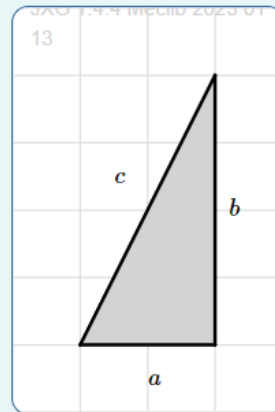
 Missing variable: L (L).

What is the length of the hypotenuse if the grid width is 1 cm ?

2 cm

 The absolute value is at least 50% too small.

Check





Outline

- Ressources
- Task
- Creating a static Meclib image
- Randomize the question
- Add formative feedback
- Add interactivity
- Add teachers solution for the graphics



Ressources

Meclib Wiki on Github <https://github.com/mkraska/meclib/wiki>

- Primary handbook for Meclib
- Description of objects and functions

Demo Moodle Course at TH Brandenburg <https://extmoodle.th-brandenburg.de/course/view.php?id=138§ion=1>

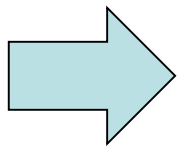
- Set of Meclib interactive demo questions
- Set of interactive and automatic tests for feedback functions
- Publications

Jsfiddle <https://jsfiddle.net/gbt7y8cw/1/>

- Site for rapid prototyping
- Uses JSXGraph 1.4.4 (as of STACK 4.4.2)
- Limitation: No variables in object definitions

key: stack23

[Demo Moodle Course for the STACK 2023 Community Meeting](#)





Task

Compute the length of the hypotenuse in the given rectangular triangle and interactively specify the center of gravity.

Meclib Demo

Tidy STACK question tool | ! Question is missing tests or variants.

Indicate the center of gravity using the blue crosshair.

✓ The distance to the actual CG is 0.00 grid units.

Give the general formula for the length of the hypotenuse c of a right-angled triangle with sides a and b .



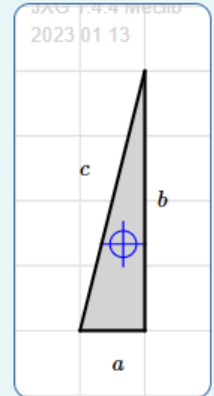
What is the exact length of the hypotenuse if the grid width is L ?



What is the length of the hypotenuse if the grid width is 1 cm?



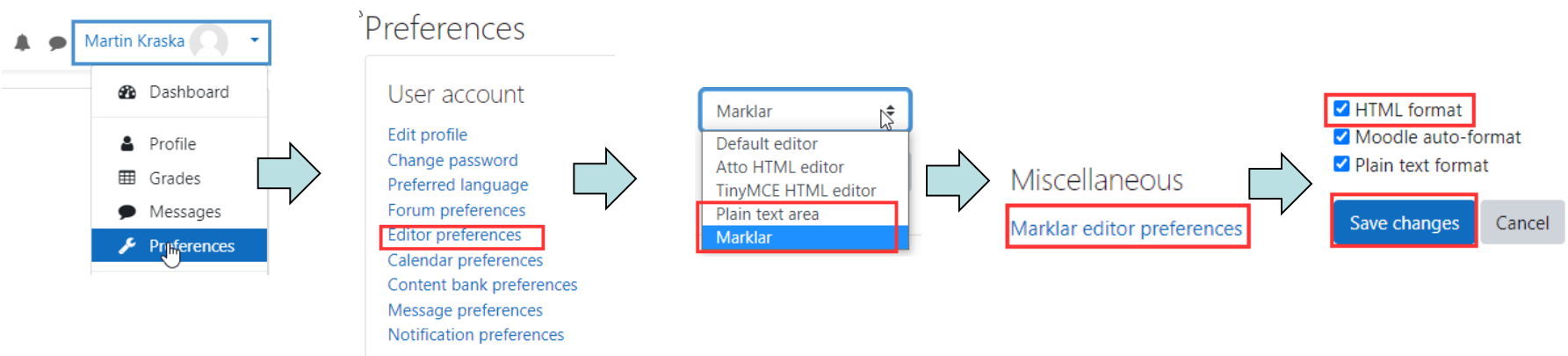
Check





Moodle Editor Settings

- In your profile, select „Preferences“
- Select „Editor preferences“
- Select „Marklar“ or „Plain text area“, Save changes.
- If you selected Marklar, you get a link to it's preferences.
 - Make sure that HTML format is checked
 - Save changes





Creating The Quiz

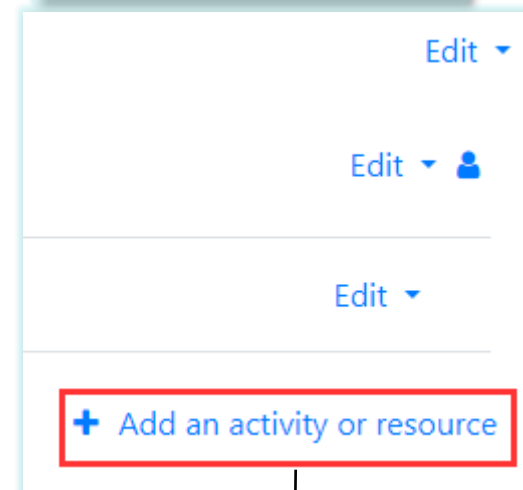
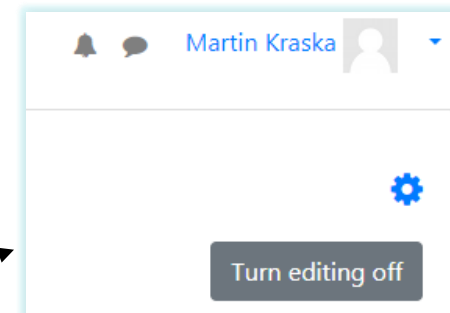
- Enter a moodle course where you are trainer with editing rights.
- Turn editing on
- Add a quiz activity
- Name it „Meclib Demo by <your name>“
- Set Question behaviour to „Adaptive mode“
- Save and display

The screenshot shows the Moodle course editor interface. At the top right, the user's name 'Martin Kraska' is displayed next to a profile picture. Below this, there is a 'Turn editing off' button. To the right of the 'Turn editing off' button, there are three 'Edit' buttons with dropdown arrows. In the bottom right corner, a red box highlights the '+ Add an activity or resource' button. On the left side, the 'Question behaviour' section is expanded, showing 'Shuffle within questions' set to 'Yes' and 'How questions behave' set to 'Adaptive mode'. A 'Quiz' icon with a checkmark is also visible. Arrows point from the 'Adaptive mode' dropdown and the 'Quiz' icon to the 'Add an activity or resource' button.

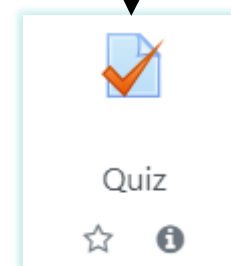
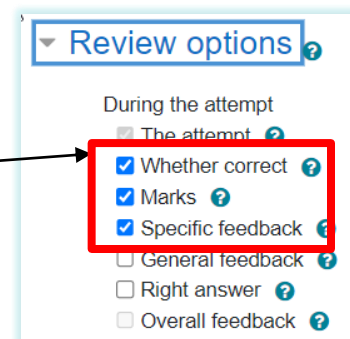


Creating The Quiz

- Enter a moodle course where you are trainer with editing rights.
- Turn editing on
- Add a quiz activity
- Name it „Meclib Demo by <your name>“
- Set Question behaviour to „Adaptive mode“



- Enable review options
- Save and display





Creating The Question

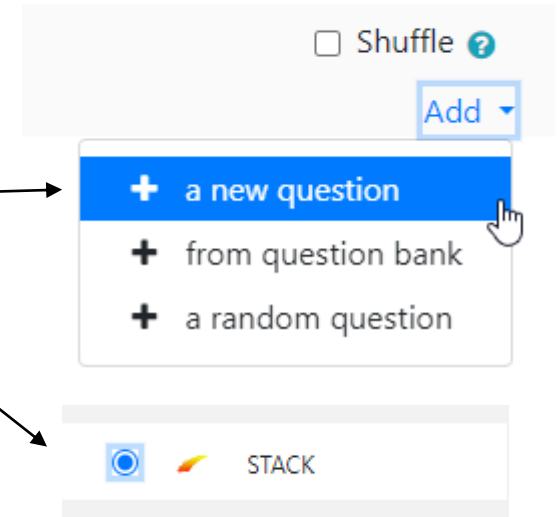
Maximum grade

10.0

Save

Total of marks: 0.00

- Quiz administration > Edit quiz
- Add > a new question
- Choose a question type to add > STACK
 - Press button „Add“
- Next, we make the minimal edits which allow us to save the question.





Creating The Question

- **Category:** Meclib Workshop Sandbox (if you use the Demo course)
- **Question name:** <your name> Meclib Demo
- **Question text**

```
<p>[[input:S_Ha]] [[validation:S_Ha]] [[feedback:Ha]]</p>
```
- **Specific feedback:** Remove contents

Press button „Verify the question text and update the form“

- **Input ans1:** Confirm removal
- **Input S_Ha:** Set model answer to Ha
- **Potential response tree: prt1:** Confirm removal
- **Potential response tree: S_Ha:**

Enter SAns and TAns (S_Ha and Ha)

Input: ans1

This input is no longer referred to in the question text. If you save you want to do this. Alternatively edit the question text to put b

☒ I confirm that I want to remove this input from this question.

Input: S_Ha

Input type

Model answer

Node 1

Answer test

SAns

TAns

Test options

- Press button „Save changes and continue editing“



Creating The Question

Now the lower part of the question should look like this:

Press „Preview“

Make sure the question behaviour is set to „Adaptive mode!“ in the preview window

[Verify the question text and update the form](#)

▶ [Input: S_Ha](#)

▶ [Potential response tree: Ha](#)

▶ [Options](#)

▶ [Tags](#)

▶ [Created / last saved](#)

[Save changes and continue editing](#) [Preview](#)

Fix dollars ☐ Replace $\$ \dots \$$ with $\backslash(\dots \backslash)$, $\$ \$ \dots \$ \$$ with $\backslash[\dots \backslash]$ and $@ \dots$

[Save changes](#) [Cancel](#)

Question 1
Not complete

Tidy STACK question tool | Question is missing tests or variants.

[Check](#)

[Start again](#) [Save](#) [Fill in correct responses](#) [Submit and finish](#) [Close preview](#)

▼ [Attempt options](#)

How questions behave

Adaptive mode

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Technische Hochschule Brandenburg · University of Applied Sciences

STACK Community Meeting 2023, April 24-26

18.04.23

Page

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Save Point 1

Import this question to start over from here:

MK Meclib workshop P1 minimum version

Tidy STACK question tool | ! Question is missing tests or variants

Ha

Your last answer was interpreted as follows:

Ha

The variables found in your answer were: [*Ha*]

Correct answer, well done.

Check

Question 1
Not complete

Tidy STACK question tool | ! Question is missing tests or variants

Check

Start again Save Fill in correct responses Submit and finish Close preview

Here, we pressed „Fill in correct responses“ and then „Check“

Save Points in the Conference Course

- Edit> Duplicate opens an editor with a copy of the question
- Change the title to <your name> instead of MK and press „Save changes and continue editing“

Select a category: Meclib Workshop Sandbox (10)

No tag filters applied

Filter by tags...

☐ Show question text in the question list

Search options v

☒ Also show questions from subcategories

☐ Also show old questions

Create a new question ...

Question	Actions	Created by
Question name / ID number		First name / Surname / Date
<input checked="" type="checkbox"/> MK: Meclib workshop P1 Minimum version	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P1b Extended version	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P2 Meclib image	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P3 Randomization	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P4 Input 2	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P5 Input 3	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P6 Feedback on unit input	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P7 More Feedback	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P8 Interactive	Edit	Martin Kraska 19 April 2023, 9:38 AM
<input type="checkbox"/> MK: Meclib workshop P9 Tans	Edit	Martin Kraska 19 April 2023, 9:38 AM




Creating The Question

Close the preview and save the question (Button „Save changes“)

- ▶ Input: S_Ha
- ▶ Potential response tree: Ha
- ▶ Options
- ▶ Tags
- ▶ Created / last saved

Verify the question text and update the form

Save changes and continue editing  Preview

Fix dollars

☐ Replace \$...\$ with \(...\), \$\$...\$\$ with \[...\] and @...


Save changes Cancel

In the quiz editing page
press „Save“

To continue editing the question,
press the gearwheel symbol

Editing quiz: Meclib Demo by Martin Kraska?

Questions: 1 | This quiz is open

Maximum grade 10.0 

Repaginate

Select multiple items

Total of marks: 1.00



☐ Shuffle ?

Page 1

Add ▾

1



MK: Meclib worksho...



1.00

Add ▾



Adding Solution and Question text

Question variables: $Ha: \sqrt{a^2+b^2};$

Question text: add this at the beginning

`<p>Give the general formula for the length of the hypotenuse \sqrt{c} of a right-angled triangle with sides \sqrt{a} and \sqrt{b} .</p>`

„Save changes and continue editing“

„Preview“ →

Next step:
Compact validation
Compact feedback

Give the [Tidy STACK question tool](#) | ! Question is missing tests or variants.

general formula for the length of the hypotenuse c of a right-angled triangle with sides a and b .

Your last answer was interpreted as follows:

$$\sqrt{b^2 + a^2}$$

The variables found in your answer were: $[a, b]$

Correct answer, well done.

Check



Compact Validation and Feedback


Input S_Ha

- Insert stars: Insert stars for spaces only
- Show the validation: Yes, compact


Potential response tree: Ha:

- PRT feedback style: Compact

Save changes, Preview

Give the [Tidy STACK question tool](#) |  Question is missing tests or variants.

general formula for the length of the hypotenuse c of a right-angled triangle with sides a and b .




Next step: Meclib image



Save Point 1b

Import this question to start over from here:

MK Meclib workshop P2b extended version

Give the [Tidy STACK question tool](#) |  Question is missing tests or variants.

general formula for the length of the hypotenuse c of a right-angled triangle with sides a and b .



Check



Meclib image

- Goto Meclib Wiki <https://github.com/mkraska/meclib/wiki>
- Goto Page Meclib Question Setup
- Find the template for meclib objects for the question variables.
- **Question variables:** Copy the template to the question variables and remove the dummy line including the comma at the end of the second line:

```
initdata: [  
    [ "grid", "x", "y", -5, 5, -4, 5, 50 ]  
];  
init: stackjson_stringify(initdata);
```
- Find the text block for Meclib image in section Question text, **Non-interactive mode**
- **Question text:** Copy the block to the question text between text and input definition



Meclib image

Should look like this (Marklar editor)

```
Ha: sqrt(a^2+b^2);

initdata: [
  [ "grid", "x","y", -5,5,-4,5, 50 ]
];
init: stackjson_stringify(initdata);
```

<p>Give the general formula for the length of the hypotenuse \sqrt{c} of a rectangular triangle with cathedes \sqrt{a} and \sqrt{b} .</p>

```
<div style="float:right">
[[jsxgraph width='250px' height='250px' ]]
var mode = "STACK";
var stateRef;
const initstring = {#init#};
const centeredLabelStyle = {size:0, showInfobox:false, label:{offset:[-6,0],
  anchorX:'left', anchorY:'middle'}};
// End of STACK header
[[include src="https://raw.githubusercontent.com/mkraska/meclib/main/meclib.js" /]]
[[/jsxgraph]]</div>
```

<p>[[input:S_Ha]] [[validation:S_Ha]] [[feedback:Ha]]</p>

HTML format



Show syntax

Insert image

Insert file

Preview

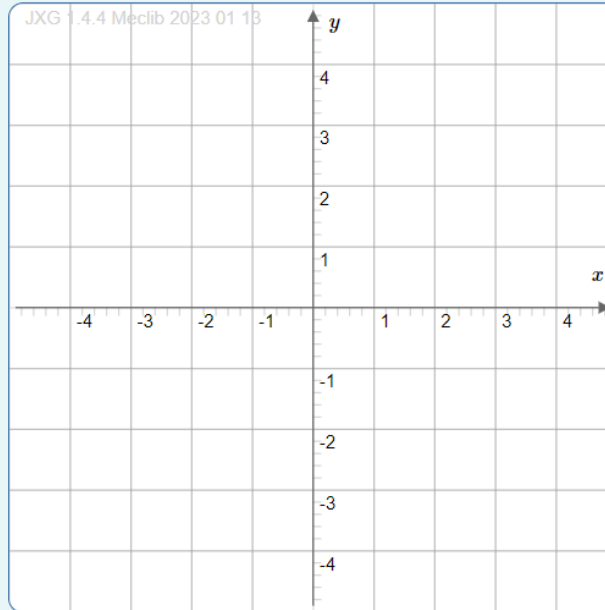


Meclib image

Save changes and continue editing, Preview. The appearance depends on the width of the window.

Tidy STACK question tool | ! Question is missing tests or variants.

Give the general formula for the length of the hypotenuse c of a right-angled triangle with sides a and b .





Congratulation, this is your first STACK question with a Meclib image. We are going to adjust the canvas and add objects.



Meclib image

Add a triangle with edges at B at $[0,0]$, C at $[a,0]$ and A at $[a,b]$

- Goto Wiki, find the [List of Objects page](#) (link in the bottom line) and look for appropriate objects.
- Candidates are „polygon“ and „line“. We want a solid triangle, so we go to the „polygon“ page

"line"		0	
"polygon"	Switch	state	

- A polygon without a hole is defined by the vertex points
["polygon", "",], [2,3], [3,2], [2.5,1],
[1.5,1]]
- We will define the polygon using some helper variables, which later also facilitate randomization.



Meclib image

Question variables:

- Add some definitions, adjust the grid and add a line for the polygon

```
Ha: sqrt(a^2+b^2);
```

Use aa and bb in order to keep a and b free for symbolic input

```
aa:4; bb: 3;
```

```
pB: [0,0]; pC: [aa,0]; pA: [aa,bb];
```

```
initdata: [  
  [ "grid", "", "", -1,aa+1,-1,bb+1, 40 ],  
  [ "polygon", "", pA, pB, pC ]  
];  
init: stackjson_stringify(initdata);
```

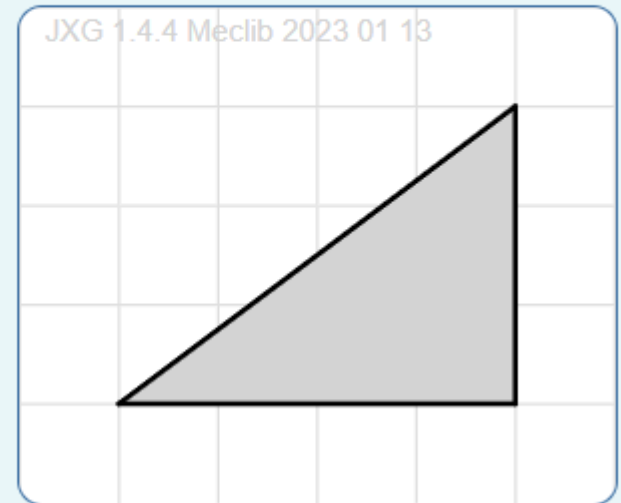


Meclib image

- Save changes and continue editing,
- Switch to the preview Window and refresh (Ctrl-R)

Give the general formula for the length of the hypotenuse c of a right-angled triangle with sides a and b .

[Tidy STACK question tool](#) | Question is missing tests or variants.

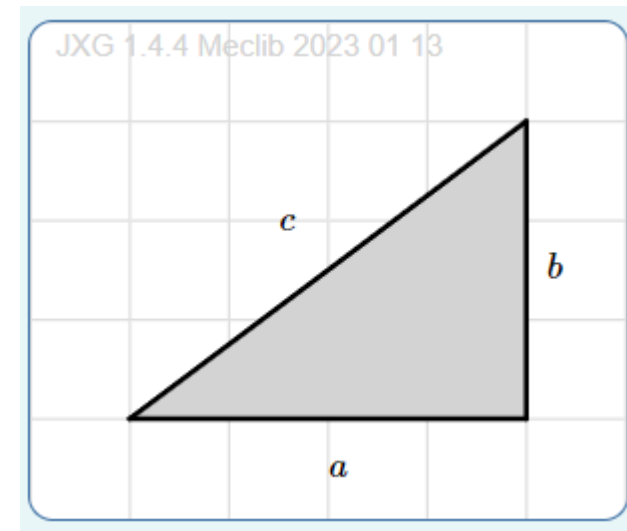




Meclib image

Question variables:

- Add labels. Position them at the center of the edges plus a manually adjusted offset.
- Text of „label“ objects is not in TeX mode by default.
- ```
initdata: [
 ["grid", "", "", -1, aa+1, -1, bb+1, 40],
 ["polygon", "", pA, pB, pC],
 ["label", "\\(a\\)", (pB+pC)/2 + [0, -0.5]],
 ["label", "\\(b\\)", (pA+pC)/2 + [0.2, 0]],
 ["label", "\\(c\\)", (pA+pB)/2 + [-0.5, 0.5]]
];
init: stackjson_stringify(initdata);
```
- Save changes and continue editing,
- Switch to the preview Window and refresh (Ctrl-R)






## Save Point 2

Import this question to start over from here:

### MK Meclib workshop P2 Meclib image

Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .

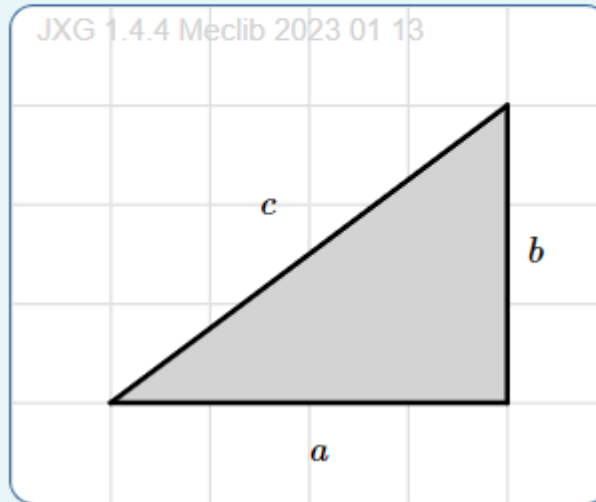
[Tidy STACK question tool](#) |  Question is missing tests or variants.

$\text{sqrt}(b^2+a^2)$

$\sqrt{b^2 + a^2}$



Check






# Randomization

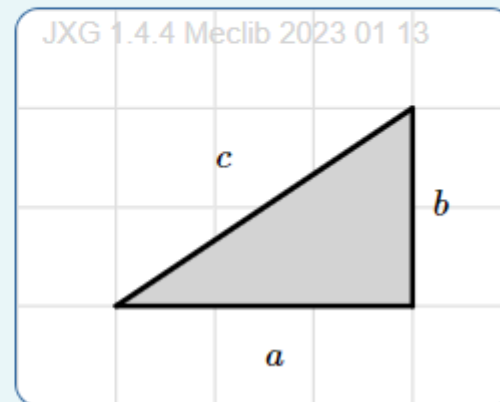
**Question variables:** add symbolic and numeric reference values for the length of  $c$  (below or replacing  $aa:4$ ;  $bb: 3$ ;)

```
[aa,bb]: rand([[1,4], [1,3], [2,4], [2,3], [2,2],
[3,3], [3,2], [3,1], [4,2], [4,1]]);
```

**Question note:** { @ ' a=aa@ } , { @ ' b=bb@ }

Give the general [Tidy STACK question tool](#) |  Question is missing tests or variants.  
formula for the length of the hypotenuse  $c$  of a right-angled triangle  
with sides  $a$  and  $b$ .

Check







## Save Point P3

Import this question to start over from here:

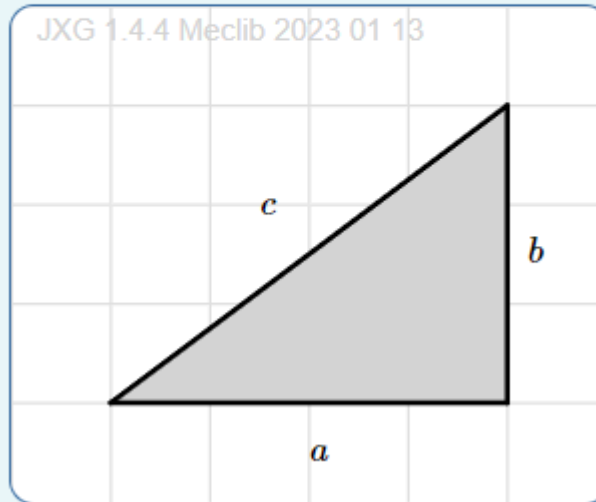
### MK Meclib workshop P3 Randomization

Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .

[Tidy STACK question tool](#) | ! Question is missing tests or variants.



Check





## Add Input for Exact Length

**Question variables:** add reference values for exact and numeric result

```
Ha: sqrt(a^2+b^2);
```

```
aa:4; bb: 3;
```

```
[aa,bb]: rand([[1,4], [1,3], [2,4], [2,3], [2,2],
[3,3], [3,2], [3,1], [4,2], [4,1]]);
```

```
H: sqrt(aa^2+bb^2)*L;
```

```
Hnum: float(sqrt(aa^2+bb^2));
```

We will need that for the numeric input

**Question text:** additional input field for exact length:

<p>What is the exact length of the hypotenuse if the grid width is  $\backslash(L\backslash)$ ?</p>

<p>[[input:S\_H]] [[validation:S\_H]]  
[[feedback:H]]</p>

Press button „Verify question text and update the form“



# Add Input for Exact Length

## Input S\_H:

- Model answer: H
- Insert stars: Insert stars for spaces only
- Syntax hint: `expression`
- Hint attribute: Placeholder
- Show the validation: Yes, compact

## Input S\_Ha: add syntax hint (could have been done earlier)

- Syntax hint: `expression`
- Hint attribute: Placeholder

## Potential response tree: H:

- PRT feedback style: Compact

|             |          |   |      |     |      |   |
|-------------|----------|---|------|-----|------|---|
| Answer test | AlgEquiv | ↕ | SAns | S_H | TAns | H |
|-------------|----------|---|------|-----|------|---|



# Save Point P4

Import this question to start over from here:

## MK Meclib workshop P4 Input 2

Give the general [Tidy STACK question tool](#) | ! Question is missing tests or variants.

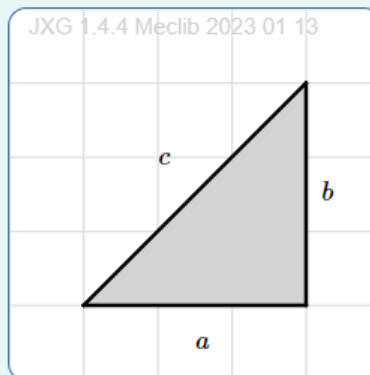
formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .



What is the exact length of the hypotenuse if the grid width is  $L$ ?



Check





## Add Input for Numeric Length

**Question text:** add input field for numeric length:

<p>What is the numeric value of the length of the hypotenuse if the grid width is  $\sqrt{1}$ ,  $\text{cm}$ ?</p>

<p>[[input:S\_Hnum]] [[validation:S\_Hnum]]  
[[feedback:Hnum]]</p>

Press button „Verify question text and update the form“



# Add Input for Numeric Length

## Input S\_Hnum:

- Input type: Units
- Model answer:  $\text{Hnum} * \text{cm}$
- Insert stars: Insert stars for spaces only
- Syntax hint: `number with unit`
- Forbidden words: `+, -, sqrt`
- Hint attribute: Placeholder
- Forbid floats: No
- Show the validation: Yes, compact

## Potential response tree: Hnum:

- PRT feedback style: Compact

|              |               |       |        |      |         |
|--------------|---------------|-------|--------|------|---------|
| Answer test  | UnitsRelative | SAAns | S_Hnum | TAns | Hnum*cm |
| Test options | 0.05          | Quiet | No     |      |         |



# Add Input for Numeric Length

## Preview>

### Fill in correct responses

Parallel use of Units and Algebraic input fields has unintended cross effects. The validation of the Algebraic input checks for unknown units but should not do that.

Mitigation is by explicitly allowing the variables  $a$  and  $b$  in the input.

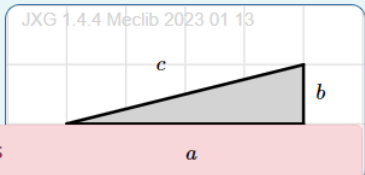
### Input S\_Ha:

- Allowed words:  $a, b$

Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ . Tidy STACK question tool | Question is missing tests or variants.

Input:  $\text{sqrt}(b^2+a^2)$

Feedback: This answer is invalid. Input of units is case sensitive:  $b$  is an unknown unit. Did you mean one from the following list  $[B]$ ? Input of units is case sensitive:  $a$  is an unknown unit. Did you mean one from the following list  $[A]$ ?



Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ . Tidy STACK question tool | Question is missing tests or variants.

Input:  $\text{sqrt}(b^2+a^2)$

Feedback:  $\sqrt{b^2+a^2}$  ✓

What is the exact length of the hypotenuse if the grid width is  $L$ ?

Input:  $\text{sqrt}(17)*L$

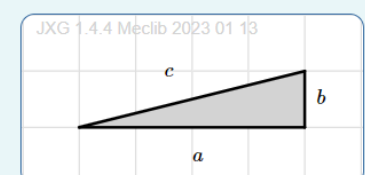
Feedback:  $\sqrt{17} \cdot L$  ✓

What is the length of the hypotenuse if the grid width is 1 cm?

Input: 4.123 cm

Feedback: 4.123 cm ✓

Check





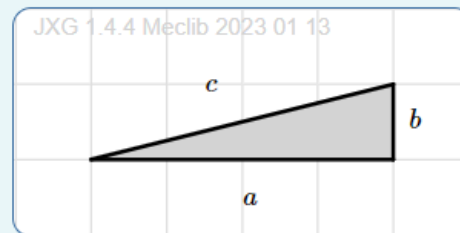
# Save Point P5

Import this question to start over from here:

## MK Meclib workshop P5 Input 3

Give the general [Tidy STACK question tool](#) | ! Question is missing tests or variants.

formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .

 ✓

What is the exact length of the hypotenuse if the grid width is  $L$ ?

 ✓

What is the length of the hypotenuse if the grid width is 1 cm?

 ✓

Check





## Add Feedback

- Goto Meclib Wiki <https://github.com/mkraska/meclib/wiki>
- Goto Page [Meclib Question Setup](#)
- Find the command for inclusion of feedback functions (English version)
- **Question variables:** Copy the command as last line.  
`stack_include("https://raw.githubusercontent.com/mkraska/meclib/main/Maxima/fb_value_EN.mac");`



# Add Feedback

## Potential response tree: Hnum:

- Change Quiet to Yes
- Change Text format to HTML
- Add `{@fb_unit(S_Hnum, Hnum*cm, 0.05)@}` to the false feedback

|                                                                                                                                           |               |             |          |         |         |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|----------|---------|---------|
| Answer test                                                                                                                               | UnitsRelative | SAns        | S_Hnum   | TAns    | Hnum*cm |
| Test options                                                                                                                              | 0.05          | Quiet       | Yes      |         |         |
| Mod                                                                                                                                       | =             | Score       | 1        | Penalty |         |
| Next                                                                                                                                      | [stop]        | Answer note | Hnum-1-T |         |         |
| <div>HTML format</div> <div>Show syntax Insert image Insert file Preview</div>                                                            |               |             |          |         |         |
| Mod                                                                                                                                       | =             | Score       | 0        | Penalty |         |
| Next                                                                                                                                      | [stop]        | Answer note | Hnum-1-F |         |         |
| <div><code>{@fb_unit(S_Hnum, Hnum*cm, 0.05)@}</code></div> <div>HTML format</div> <div>Show syntax Insert image Insert file Preview</div> |               |             |          |         |         |



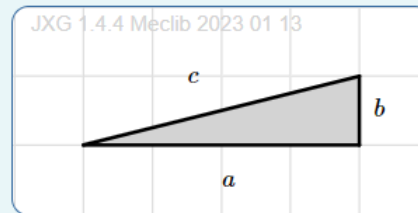
# Save Point P6

Import this question to start over from here:

## MK: Meclib workshop P6 Feedback on unit input

Give the general [Tidy STACK question tool](#) | ! Question is missing tests or variants.

formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .



What is the exact length of the hypotenuse if the grid width is  $L$ ?



What is the length of the hypotenuse if the grid width is 1 cm?

✗ The mantissa is correct, yet the value is off by at least one order of magnitude. Check your unit conversions.

Check



# Add More Feedback

## Potential response tree: Ha:

- Change Text format to HTML
- Add `{@fb_vars(S_Ha, Ha)@}` to the false feedback

## Potential response tree: H:

- Change Text format to HTML
- Add `{@fb_vars(S_H, H)@}` to the false feedback

The image displays three screenshots of a quiz configuration interface, likely from a learning management system. Each screenshot shows the settings for a specific question, including the answer test, test options, and feedback configuration.

**Top Screenshot (Question Ha):**

- Answer test:** AlgEquiv
- SAns:** S\_Ha
- TAns:** Ha
- Test options:** Quiet, No
- Mod:** =
- Score:** 1
- Penalty:** (empty)
- Next:** [stop]
- Answer note:** Ha-1-T
- Feedback configuration:** The text format is set to HTML (highlighted with a red box). The false feedback (Ha-1-F) contains the code `{@fb_vars(S_Ha, Ha)@}` (highlighted with a red box).

**Middle Screenshot (Question H):**

- Answer test:** AlgEquiv
- SAns:** S\_H
- TAns:** H
- Test options:** Quiet, No
- Mod:** =
- Score:** 1
- Penalty:** (empty)
- Next:** [stop]
- Answer note:** H-1-T
- Feedback configuration:** The text format is set to HTML (highlighted with a red box). The false feedback (H-1-F) contains the code `{@fb_vars(S_H, H)@}` (highlighted with a red box).

**Bottom Screenshot (Question H):**

- Answer test:** AlgEquiv
- SAns:** S\_H
- TAns:** H
- Test options:** Quiet, No
- Mod:** =
- Score:** 1
- Penalty:** (empty)
- Next:** [stop]
- Answer note:** H-1-T
- Feedback configuration:** The text format is set to HTML (highlighted with a red box). The false feedback (H-1-F) contains the code `{@fb_vars(S_H, H)@}` (highlighted with a red box).



# Save Point P7

Import this question to start over from here:

**MK: Meclib workshop P6 More Feedback**

Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .

✗ Missing variable:  $b$  ( $b$ ).

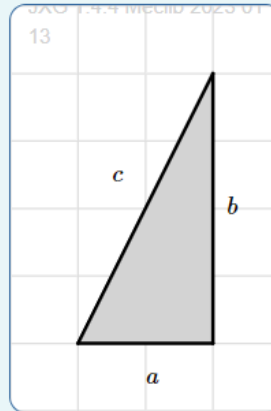
What is the exact length of the hypotenuse if the grid width is  $L$ ?

✗ Missing variable:  $L$  ( $L$ ).

What is the length of the hypotenuse if the grid width is 1 cm?

✗ The absolute value is at least 50% too small.

Check



Another glitch if mixing Algebraic and Units input in a single question.  $L$  is taken as unit and not written italic.



# Interactive Input

Objective: Interactive input of the center of gravity and feedback on the error.

**We have to switch to interactive use of Meclib.**

- Goto Meclib Wiki <https://github.com/mkraska/meclib/wiki>
- Goto Page [Meclib Question Setup](#)
- Find the text block for Meclib image in section Question text, interactive mode
- **Question text:**
  - Replace the existing Meclib block with the new one (move it to the top of the question text.
  - Add instruction and feedback definition for the center of gravity  
`<p>Indicate the center of gravity using the blue crosshair.</p>`  
`<p>[[feedback:CG]]</p>`



# Interactive Input

- Two hidden input definitions are added. They need some settings later.
- Also, the `[[jsxgraph]]` block has different contents.

```
<p hidden>[[input:objects]] [[validation:objects]]</p>
<p hidden>[[input:names]] [[validation:names]] </p>
<div style="float:right">
[[jsxgraph width='500px' height='400px' input-ref-objects="stateRef" input-ref-
names="fbd_names"]]
var mode = "STACK";
const initstring = {#init#};
const centeredLabelStyle = {size:0, showInfobox:false, label:{offset: [-6,0],
 anchorX:'left', anchorY:'middle'}};
// End of STACK header
[[include src="https://raw.githubusercontent.com/mkraska/meclib/main/meclib.js" /]]
[[/jsxgraph]]</div>
```



# Interactive Input

## Question text:

- Add a title to the text

```
<p>Meclib Demo</p>
```
- and add instruction and feedback definition for the center of gravity below the graphics (any other location would also do)

```
<p>Indicate the center of gravity using the blue crosshair.</p>
<p>[[feedback:CG]]</p>
```
- Push button „Verify the question text update the form“





# Interactive Input

- Add the [crosshair](#) to the Meclib objects and store the object index of the crosshair for use in the feedback tree.

- **Question variables:**

```
initdata: [
 ["grid", "", "", -1, aa+1, -1, bb+1, 40],
 ["crosshair", "", [0, bb], [0,0], [1,1], [2,2]],
 ["polygon", "", pA, pB, pC],
 ["label", "\\(a\\)", (pB+pC)/2 + [0, -0.5]],
 ["label", "\\(b\\)", (pA+pC)/2 + [0.2, 0]],
 ["label", "\\(c\\)", (pA+pB)/2 + [-0.5, 0.5]]
];
init: stackjson_stringify(initdata);
ic: 2;
```



# Interactive Input

Push button „Verify the question text update the form“

## Input objects

- Input type: String
- Model answer: tans
- Students must verify: no
- Show validation: no

Stores the state of the Graphics  
Initialized with variable init and is modified by interactive input

## Input names

- Input type: algebraic
- Model answer: []
- Forbid float: no
- Students must verify: no
- Show validation: no

Conveys data for feedback generation



# Interactive Input

## Potential response tree: CG

- PRT feedback style: Compact

- Feedback variables:

CG:  $[2/3*aa, 1/3*bb]$ ;

S.CG: names[ic];

vec: CG-S.CG;

dist:  $\sqrt{\text{vec}[1]^2 + \text{vec}[2]^2}$ ;

Actual CG

Crosshair location

Distance vector

Distance

- Feedback text

The distance to the actual CG is  $\{\text{@dispdp}(\text{dist}, 2)\}$  grid units.

Must be smaller than 0.05.

Save changes, Preview

The screenshot displays the interactive input interface with two feedback scenarios. The top scenario, labeled 'CG-1-T', shows a feedback text field containing the text: 'The distance to the actual CG is  $\{\text{@dispdp}(\text{dist}, 2)\}$  grid units.' The bottom scenario, labeled 'CG-1-F', shows a feedback text field containing the text: 'The distance to the actual CG is  $\{\text{@dispdp}(\text{dist}, 2)\}$  grid units. Must be smaller than 0.05.' Both scenarios have a 'NumAbsolute' test option set to 0.05, a 'Quiet' option, and a 'No' option. The 'Answer test' is set to 'NumAbsolute' and the 'SAns' is 'dist'. The 'Ans' is '0'. The 'Mod' is set to '=' and the 'Score' is 1 for the top scenario and 0 for the bottom scenario. The 'Penalty' is empty. The 'Next' button is '[stop]'. The 'Answer note' is 'CG-1-T' for the top scenario and 'CG-1-F' for the bottom scenario. The 'HTML format' button is highlighted in red in both scenarios. The 'Show syntax', 'Insert image', and 'Insert file' buttons are also visible. The 'Preview' button is visible in the top scenario.



# Interactive Input

Inspection of the names field

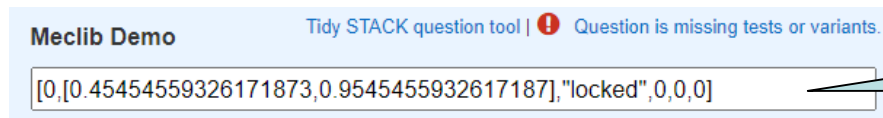
## Question text:

- Remove the „hidden“ attribute from the names input field

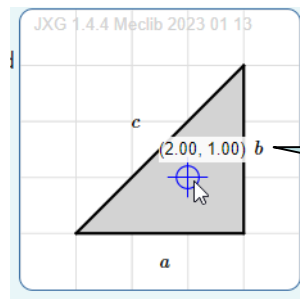
```
<p hidden>[[input:objects]]
[[validation:objects]]</p>
```

```
<p >[[input:names]] [[validation:names]] </p>
```

Save changes, preview:



„crosshair“ returns the coordinates  $[x,y]$  (second entry in the names list.



The infobox display shows rounded values (two decimal places, as specified in the definition



# Save Point P8

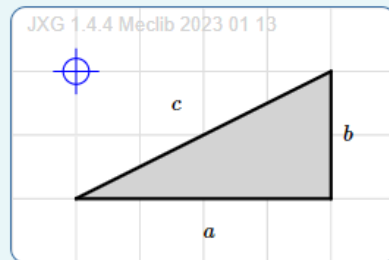
Import this question to start over from here:

## MK: Meclib workshop P8 Interactive

### Meclib Demo

Tidy STACK question tool | ! Question is missing tests or variants.

Indicate the center of gravity using the blue crosshair.



✖ The distance to the actual CG is 2.98 grid units. Must be smaller than 0.05.

Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .

What is the exact length of the hypotenuse if the grid width is  $L$ ?

What is the length of the hypotenuse if the grid width is **1 cm**?

Check



# Convenience Stuff

Add a reference solution for the graphics for „Fill in correct responses“ in the preview.

**Question variables:** Insert this below definition of initdata

```
CG: [2/3*aa, 1/3*bb];
tansdata: initdata;
tansdata[ic]: ["crosshair", "", CG, [0,0], [1,1], [2,2]];
tans: stackjson_stringify(tansdata);
```

**Potential response tree: CG:**

- Feedback variables:  
The definition of CG can be removed

**Meclib Demo** Tidy STACK question tool | Question is missing tests or variants.

Indicate the center of gravity using the blue crosshair.

✓ The distance to the actual CG is 0.00 grid units.

Give the general formula for the length of the hypotenuse  $c$  of a right-angled triangle with sides  $a$  and  $b$ .

✓

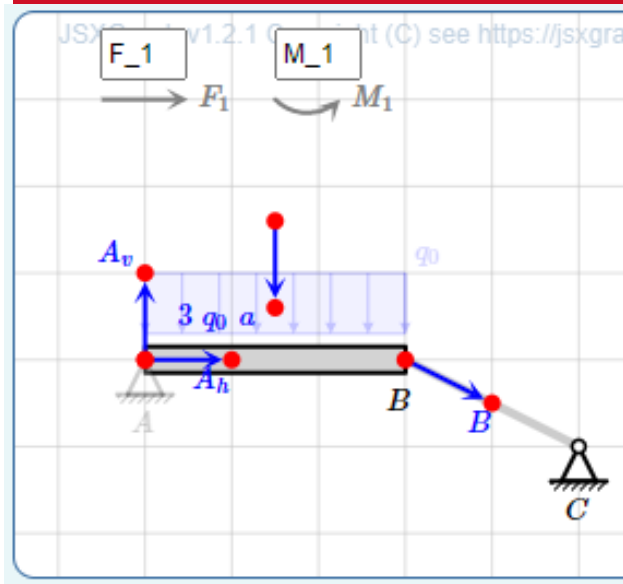
What is the exact length of the hypotenuse if the grid width is  $L$ ?

✓

What is the length of the hypotenuse if the grid width is 1 cm?

✓

Thank you for your attention!



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