

Module 3

CREATE NEW FORMULA

**Create the first formula with MyVariables,
Standardvariables and Constants**

**The exciting world of IS measurement units opens with
abaCal**

Creating formulas is the big challenge in abaCal

How do I create a formula with My Variables, SI Unit, Standardvariables and Constants.

To get to know "Create formulas" we have chosen a simpler formula. It is only about the implementation of the formula in the abaCal editor.

The formula consists of 3 blocks:

1. Name and **description of the formulas**. Name of the category and subcategory. The category has to fit the formula, because it indicates which MyVariables and Standvariables are used in the formula.
2. **Editor + calculator**: The editor is a continuous text editor. The formula is written from top to bottom. There are no restrictions on the length and width of the formula definition. We have already written formulas well over 1000 lines.
The variables and constants for the formula definition are to the right of the editor. The syntax of all formula commands is at the bottom right.
3. The third block contains **formula variables** and the **results**..

Block 1:
Formula name

Name	PENDULUM	Description	mathematical pendulum oszi
Category	Physics	Subcategory	Classical mechanics

Block 2:
Editor +
Calculator

```
/* The period of oscillation of a pendulum is */
T = 2* [π]* SQRT(J / (m*[g]*r))

/* For a mathematical pendulum (a mass hanging on a very thin thread of the length "r") is the moment of inertia J
relative to the axis of rotation J = m * r^2 . Therefore the period of oscillation of a mathematical pendulum is
independent of the mass of the ball hanging on a thin thread.*/

TMaPend = 2*[π]* SQRT( r / [g])
```

Block 3:
Variables and
Results

Formula Display				Significant numbers	
Show Errors			<input checked="" type="checkbox"/>	4	
π	Ratio of the circumference of a circle to its diameter	3.14159		T	3.276 s
J	moment of inertia	8	kg·m ²	TMaPend	3.475 s
m	mass	1	kg		
g	Standard acceleration due to gravity	9.80665	m/s ²		
r	Radius	3	m		

Block 1: Definition of the formula

Press **My Formulas / Create**: an empty editor appears.

Name: **PENDULUM** and Description: enter **mathematical pendulum**

Enter **Category: Physics** and **Subcategory: Classical mechanics**

Block 2: Formel in den Editor eingeben

Formula: $T = 2 * [\pi] * \text{SQRT}(J / (m * [g] * r))$
$$T = 2 * \pi * \sqrt{\frac{J}{(m * g * r)}}$$

1. Result field: write **T=**
2. Write **2*** and insert the constant **[π]** from the **constants table** with a click, it must be inserted with a click, because abaCal perceives that it is a constant because of the brackets.
3. Write ***** and insert variable **J** from **Standardvariables** with one click
4. Generate with the left bracket **m** via **Create MyVariable** (see below)
Create MyVariable by pressing "**Enter unit manually**"
Create the variable "**m**" with "**1kg**" via Save this MyVariable

Create MyVariable

Variable: m

Data

<p>Category <input type="text" value="Physics"/></p> <p>Name <input type="text" value="Enter variable name manually"/> <input type="text" value="m"/></p> <p>Format <input type="text" value="numeric"/></p> <p>Code <input type="text" value="No"/></p> <p>Default value <input type="text" value="1"/></p> <p>Constant value <input type="text" value="No"/></p>	<p>Subcategory <input type="text" value="all Subcategories"/></p> <p>Description <input type="text" value="mass"/></p> <p>Informations (Optional) <input type="text"/></p> <p>Tables <input type="checkbox"/></p> <p>Unit definition <input type="text" value="Enter unit manually"/></p> <p>Unit <input type="text" value="kg"/></p> <p>Dimension <input type="text" value="Mechanics"/></p> <p>Quantity <input type="text" value="Mass"/></p>
--	---

Save
Back

Generate with the left bracket **m** via

MyVariable

Create MyVariable by pressing „Enter unit manually“

Create „m“ und „1kg“ variables via Save this MyVariable



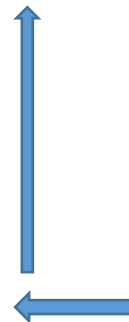
My Variables

	ideal gas	
Vtang	tangential velocity	[m/s]
Vu	Unitarian volume	[m^3]
angle	any plane angle	[°]
beta	plane angle	[rad]
d	distance	[m]
m	mass	[kg]
r	Radius	[m]
radprosec	rad pro sec	[rad/s]
spring_constant	used in Hooke's law	[N/m]

5. Insert * and Constant **[g]** from Constants table with a click
6. Generate ***r** via Create MyVariable and put a bracket
7. Paint formula part **J / (m * [g] * r)** with cursor, get root function **SQRT** with one click.

Square root of a

SQRT(a)



Tips for syntax

- Results
- Math operations
- Logical operations
- Functions
- Sum and iteration
- Call a formula
- Tables
- Prefix

8. Press the **Calculate** key and check the formula with the **Formula Display**.

$$T = 2 * \pi * \sqrt{\frac{J}{(m * g * r)}}$$

Formula: $TMaPend = 2 * [\pi] * \text{SQRT}(r / [g])$ $TMaPend = 2 * \pi * \sqrt{\frac{r}{g}}$

1. Result field write: **TMaPend=**
2. Write **2*** and insert constant **[π]** from Constants table.
3. Write ***** and generate and insert after bracket **r** using Create MyVariable, see MyVariable m = 1kg
4. **/** write and insert constant **[g]** from Constants table
5. Paint the formula part **r / [g]** with the cursor, get the root function **SQRT** with a click.
6. Press the **Calculate** key and check the formula with the **Formula Display**.

Block 3: Variables und Results:

$$TMaPend = 2 * \pi * \sqrt{\frac{r}{g}}$$

Show Errors	<input checked="" type="checkbox"/>	Significant numbers	<input type="text" value="4"/>
π Ratio of the circumference of a circle to its diameter	3.14159	T	3.276 <input type="text" value="s"/>
J moment of inertia	<input type="text" value="8"/>	TMaPend	3.475 <input type="text" value="s"/>
m mass	<input type="text" value="1"/>		
g Standard acceleration due to gravity	9.80665		
r Radius	<input type="text" value="3"/>		