Baumann Software Calculator

Display

Angle Mode : **RAD - DEG - GON.**

Operator : Active Operation [+][-][x][:] Top Left

Memory Value : M 0.0 (0.0 = Memory is Zero)

Invert [INV] : Displayed Right beside the Angle-Mode and show if the Angle-Reverse Function is **On** or **Off**

Shift-Status : Shown Top Left as Status of the Mode of the Angle-Functions **Sine, Cosine, Tangent** or it's **SinH, CosH** and **TanH** Hyperbel-Functions

Mantisse : 25 Digits, *23 including Prefix and Decimalpoint*

Function-Buttons

Mode :
Shift : Switching the Hyperbel-Function for **Sine, Cosine** and **Tangent.**

Angle-Invert : Switching the Anglefunctions **Sine, Cosine** and **Tangent to** it's Reverse-Functions ($^{-1}$).

Round : Round the displayed Value to two Digits behind Decimalpoint. Scientific-Formats can be shown *Normal* (if Possible).

Screen Change: Convert Values/Units, the Display-Value will be shown in the Convert-Screen and can be used it to calculating on. 3 Screens are available.

Baumann Software Calculator

Memory Functions

MC : Clear Memory.
M+ : Adding the Display-Value to the Memory-Value
RM : Get the Memory-Value to the Display.

Constants

Button PI:

Get the Value of PI to the Display, to use PI for Calculations.

Button PI/4:

for Ex. Circle-Area Calculation Formula: d^2 x PI / 4

Example Diameter = 100
Input: 100, Button [x^2] Button [PI/4] = 7853,98

Length of Diagonal in a Square:

Example Square-Sidelength = 100
Input: 100, Press Button, = 141,4
Note: Square-Diagonal = $\sqrt{2}$ x Sidelength,

Fast Divides

The Divisor Buttons have all the same Function, they divide the Displayed-Value with the used Button.

Example:
Input 9 Button [½] /2 = 4.5
Input 356,8765 Button [¾] /0.75 = 267.66

Baumann Software Calculator

Constants and Power

Euler Constant/Golden Number Phi:

With this both Buttons you can use the irrational Numbers of the Euler-Constant [2.71828...] and in [Shift-Mode] the golden Number Phi [1.61803...] to calculating on.

Power to Base (Base and Exponent editable):

Input 2, press Button:	Take Value **2** as Base, the Display doesn't show a Value, the Calculator expecting an Input of another Value (Exponent).
Input 3,	Take Value **3** as an Exponent
in Sense 2^3 (2x2x2)	= 8

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Square Power 2 (Base editable):

Input 2, press Button,	*(2x2)*	= 4
Input 3, press Button,	*(3x3)*	= 9

Cubic Power 3 (Base editable):

Input 2, press Button,	*(2x2x2)*	= 8
Input 3, press Button,	*(3x3x3)*	= 27

Baumann Software Calculator

Root-Calculation

Square-Root Calculation:

Input 81, press Button = 9 (9x9 or 9^2 = 81)

Root Y of Base X Calculation:

Input 81, press Button,	Take **81** as Base-Value, the Display doesn't show a Value now, the Calculator expecting the Input of another Value.
Input 2, (Square-Root) 2nd Root of 81 (Power 2)	Take **2** as Exponent = 9 *(9^2 = 81)*
Input 81, press Button,	Take Value **81** as Base, the Display doesn't show a Value now, the Calculator expecting the Input of another Value.
Input 3, (Cubic-Root) Root of 81 (Power 3)	Take **3** as Exponent = 4.3267 *(4.3267^3 = 81)*

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Invert Value

Input 5, press Button *(1 divided by 5)* = 0,2

Baumann Software Calculator

Logarithm Base 10

log

Input 1000, press Button = 3

Natural Logarithm(Euler-Base) [Shift-Mode]

ln

Input 25, press Button = 3.2188758

Angle-Functions

sin | cos | tan

Example Sine of 20° (Mode **DEG**)

Input 20, press Button [sin] = 0.3420201

Example Cosine of 20° (Mode **DEG**)

Input 20, press Button [cos] = 0.9396926

Example Tangent of 20° (Mode **DEG**)

Input 20, press Button [tan] = 0.3639702

Switching the Modes for Angle-Calculations can be set via the Buttons **Shift**, **Mode** and **INV**, see the Explanation for[Shift,Inv and Mode] at the Top of this Document and see also the additional Notes at the End of this Document.

Baumann Software Calculator

Percent

Example 23% of 3568:

Input 23, press Button [%]	Take **23** as a Percent-Value, the Display doesn't show a Value now, the Calculator expecting the Input of the Base-Value.
Input 3568,(Base-Value) *23% of 3568*	Take **3568** as the Base-Value = 820.64

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Logarithm of a Number to a Base

Example Logarithm of 8 to Base 2:

Input 8, press Button	Take 8 as Input, the Display doesn't show a Value now, the Calculator expecting the Input of another Value, Input of Base.
Input 2, (Base) *Logarithm Base2 of 8*	Take 2 as the Base. = 3

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Baumann Software Calculator

Calculation

This Calculator have a simple Possibility to calculate Costs or Prices via a variable Value for Money/Hour. The predefined Value is 42,90 Money/Hour (for Ex. €/h). This Value can be changed by edit a new Value and clicking on the old Value 42.90.

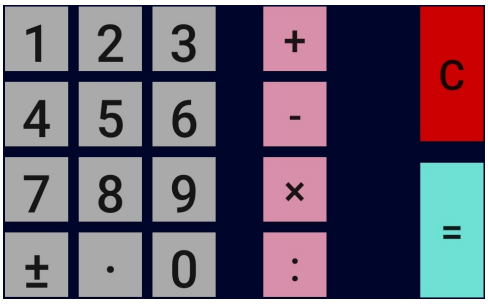
Example 1:
You have a Sum of Money 3500,- and you need to calculate how much Time you can work for this 3500,-

Input 3500, press Button [Hours] = 86.42 Hours

Example 2:
You have a predefined Time of 80 Hours and you need to calculate the Costs for your Work.

Input 80, press Button [Price] = 3240

The Input Field



This Buttons for the Number-Input are trivial and don't need an Explanation. Additional to the Numbers, there is one Button for set the Prefix and one to set the Decimalpoint.

Button **C** deleting all Registers and set back the Calculator.

The Result-Button [=] gives the Results of Calculations with the Base-Calculations or Functions. Go on press on [=] calculating on.

Example: 2 [+] 2 [=] 4, [=] 6, [=] 8, [=] 10

This Function [Calculating On] is also available by clicking on the Buttons [+] [-] [x] [:].

Baumann Software Calculator

Example Inputs

Addition and calculating on:
2[+]2[=] 4*[+][+]*= 6 *[+]* = 8 (**+2** stay as Operator [+] Button)
2[+]2[=] 4*[=]* = 6 *[=]* = 8 (**+2** stay as Operator [=] Button)

Subtract and calculating on:
8[-]2[=] 6*[-][-]*= 4 *[-]* = 2 (**-2** stay as Operator [-] Button)
8[-]2[=] 6*[=]* = 4 *[=]* = 2 (**-2** stay as Operator [=] Button)

Multiply and calculating on:
4[x]2[=] 8*[x][x]*=16 *[x]* =32 (**x 2** stay as Operator [x] Button)
4[x]2[=] 8*[=]* =16 *[=]* =32 (**x 2** stay as Operator [=] Button)

Divide and calculating on:
8[:]2[=] 4*[:][:]*= 2 *[:]* = 1 (**:2** stay as Operator [:] Button)
8[:]2[=] 4*[=]* = 2 *[=]* = 1 (**:2** stay as Operator [=] Button)

Input Examples:

The actual Version 2.0 Code 21 do NOT provide the Dot before Dash Rule!

Example 1 (Basic Calculations/Changing Operators):
3 [+] 2 [x] 2 = 10 (Calculating 5 x 2, **+2** replaced by x 2)

Variant:
3 [+] 2 [=] [x] 2 = 10 (Calculating 5 x 2)

Example 2 (Basic Calculations/Changing Operators):
3 [x] 2 [+] 2 = 8 (Calculating 6 +2, **x 2** replaced by +2)

Variant:
3 [x] 2 [=] [+] 2 = 8 (Calculating 6 +2)

Example 3 (Basic Calculations with Constants):
3[x][PI][+]2 = 11.42 (Calculating 9.42 +2, **x PI** replaced)

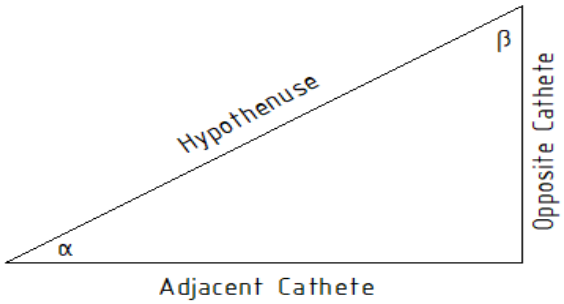
Variant:
3[x][PI][=][+] 2 = 11.42 (Calculating 9.42 +2)

Example 4 (Basic Calculations with Pow):
3[x]2[x^2][+]2 = 14 (Calculating 3 **x [4] + 2**)

Variant:
3[x]2[x^2][=][+]2 = 14 (Calculating 12 + 2)

Baumann Software Calculator

Angle-Functions



Example Tangent

(1)
Given: Adjacent Cathete = 325 mm
Opposite Cathete = 180 mm

Find Angle α :

Angle-Function Tangent **tan = Opposite Cathete/Adjacent Cathete**
tan = 180 mm / 325 mm
tan = 0.5538462

Press Button Angle Reverse-Function

Angle α = 28.979°

(2)
Given: Angle α = 25°
Aligned Cathete = 550 mm

Find the Opposite Cathete:
Formula Change ~ Opposite Cathete **= tan α 25° x Adjacent Cathete**
Opposite Cathete = 0.4663076 x 550 mm
Opposite Cathete = 256.47 mm

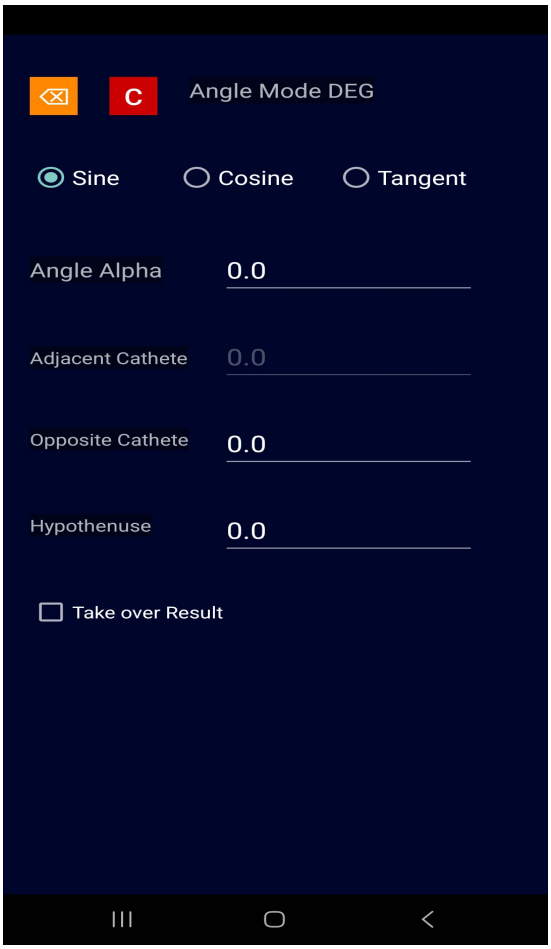
(3)
Givenn: Angle α = 18°
Opposite Cathete = 185 mm

Find the adjacent Kathete:
Formula Change ~ **Adjacent Cathete = Opposite Cathete / tan α 25°**
Adjacent Cathete = 185 mm / 0.3249196
Adjacent Cathete = 569.37 mm

Baumann Software Calculator

Calculating Angles via Screen 2

Press Button 



The Screen2 is made for easier calculating Angles and it's Functions.

Choose the Mode for **Sine, Cosine** or **Tangent** and do the Inputs for this Calculations.

In this Example for **Sine** we give an Angle as an Input and the Length of the opposite Cathete, during the Input, the Calculator calculating the Length of the Hypothenuse.

Button [Arrow-Left] returning to the Main Calculator-Screen.

The Result can be use in the Main Calculator-Screen by check the [Take over Result] CheckBox before click the Button [Arrow-Left].

Button [C] set all Inputs back.

Convert Units

Button to change to the Convert-Screen (Values in Display get take over if it is available)

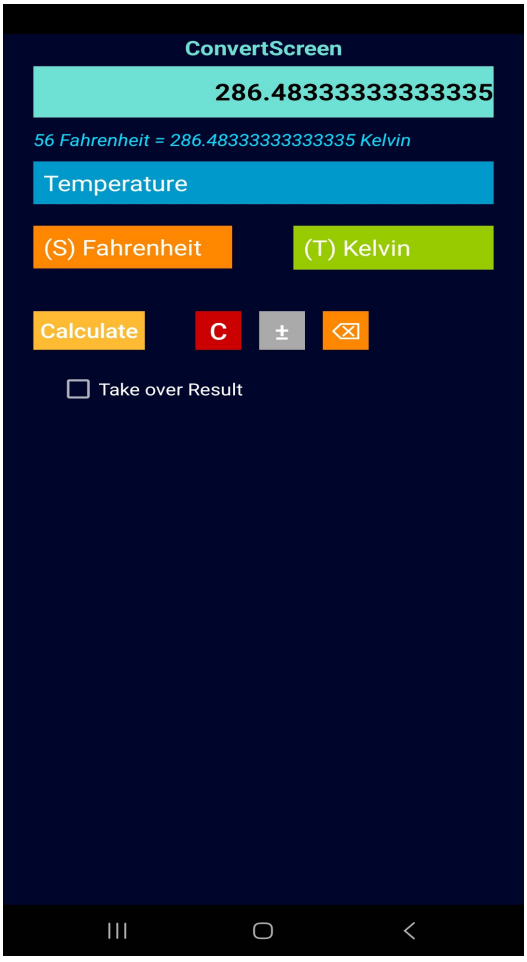
Example: Convert 56F Fahrenheit to Kelvin and back.

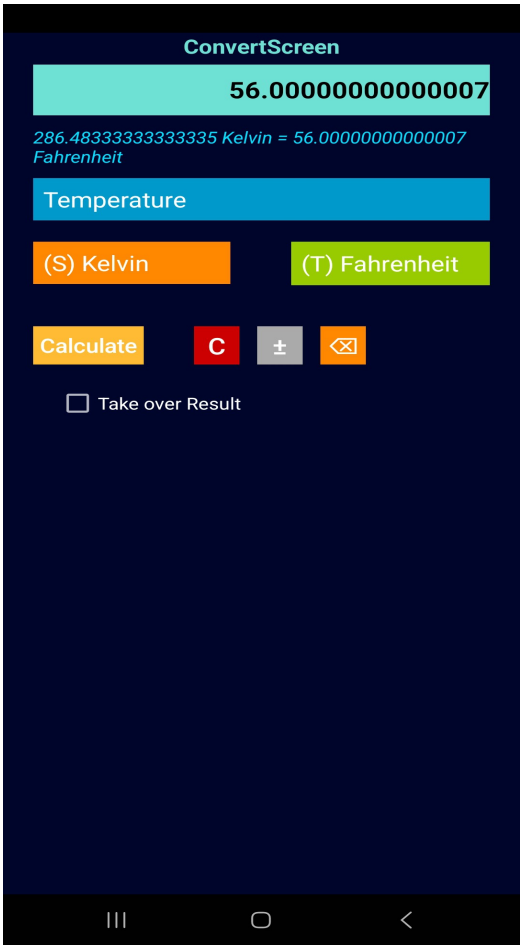
Choose Category Temperature:

Source (S) Choose Unit [**Fahrenheit**]
Target (T) Choose Unit [**Kelvin**]
Button [**Calculate**] = 286.48K

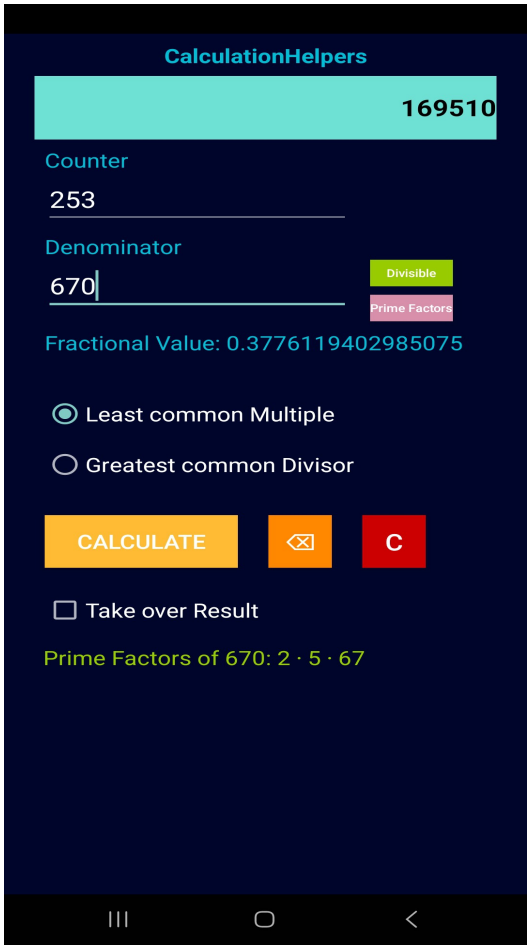
Calculate back (Test):
Source (S) Choose Unit [**Kelvin**]
Target (T) Choose Unit [**Fahrenheit**]
Button [**Calculate**] = 56F

Results can be take over to the Main Calculator-Screen by check the [Take over Result] CheckBox and click [⌫].





Calculation Helpers



This new Screen provides you with some Functions, that are commonly used in Mathematics.

The Display-Value of the Calculator is dislayed as the Fractional Counter.

If a Counter and a Denominator is given, you can calculate the GCD or the LCM.

The GCD and LCM are mostly used by fractioanl Calculation if you need to reduce or expanding Fractions.

gcd(counter,denominator);
lcm(counter,denominator);
Fract. Value = conter/denominator;

The fractional Value will also be calculated and displayed, by click on [Calculate]. Additional, you can check the Divisibly and the Primefactors of the Denominator-Value.

In this Example we calculate the **lcm** of **253** and **670**, and we get the Primefactors of 670 by clicking on the [PrimeFactors] Button.

Primefactors of 670: 2 x 5 x 67

lcm (the 1st or smallest Multiple for both Numbers 253 & 670)
Multiples of 253 = 253x1, 253x2 . . . 253x670 = 169510
Multiples of 670 = 670x1, 670x2 . . . 670x253 = 169510

The Button [Divisible] checking the divisibly of 670, and give back the Integer-Numbers that divide 670 without a Rest-Value (Modulo).

670 is divisible without Rest by the Numbers 1, 2, 5, 10, 67, 134, 335, 670.

This Screen is available since ***Code20***.

Baumann Software Calculator

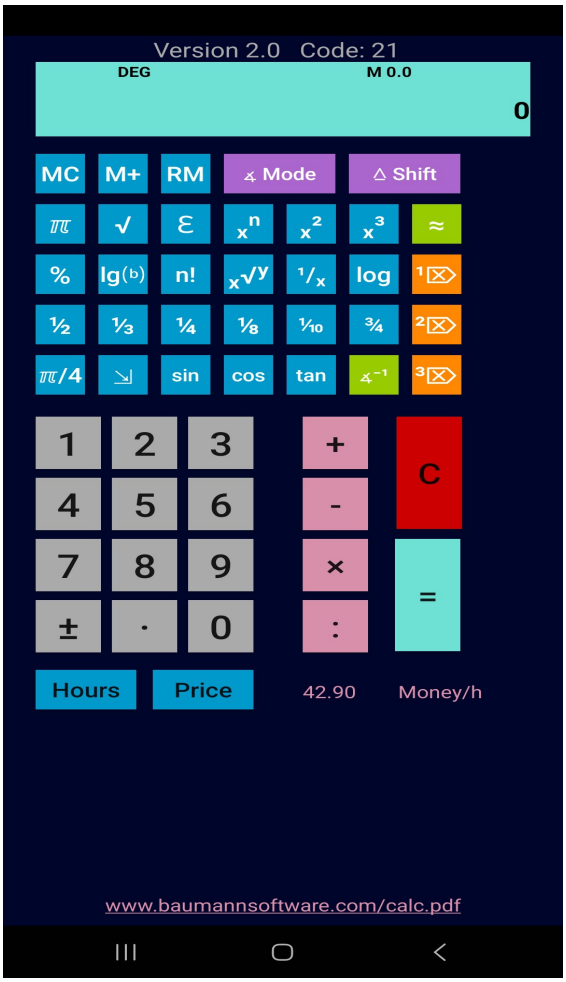
Programming

Elmar Baumann
Moerser Straße 245
47228 Duisburg

admin@baumannsoftware.com

Developed with Android Studio

Get it free on Google Play
https://play.google.com/store/apps/details?id=com.test.taschenrechner&hl=de



Baumann Software Calculator

Last Release

Code 21, Version 2.0, Release 30.04.2024

Android Studio Koala 2024.1.1

Baumann Software Calculator

Short History

Code 6:
The variable Value for Calculation of **Price** or **Hours** is stored since **Code 6.**

to change this Value:

- Type in a new Value (Money/hour)
- Fingerclick on the Value Text Bottom Right near **Price**
- New Value is set

The Calculator can be closed or terminate now, at the next Start of the Calculator, it get this (new) stored Value.

Code 8:
Button [10^x] are removed and replaced by [ε], with this new Button, the Euler-Constant can be used for calculations.

Code 13:
The Button [‰] (Per 10000) removed and replaced by the Factorial-Funktion Button [n!]. Natural Numbers f.Ex. 4 will be calculated: 1x2x3x4 = 24 (4! == 24). Decimal Numbers will be calculated by the Euler Gamma-Function.
For Example: 4.2! == 32.58

Code 15:
Check of all Functions- and Inputs as a Quality-Control done.

Code 16:
Adaption for bigger Screens [Tablets], Shift-Modus extended – Natural Logarithm [ln], Euler-Base Logarithm added.

Code 17:
Gamma-Function Decimal-Number Factorial **[n!]** Code-Revision for a better Accuracy.

Extensions:
Shift-Modus, Button ¾ erhält den Modus **DigitSum [DS]**
Shift-Modus, Button ⅒ erhält den Modus **DigitProduct [DP]**

```
DS = Digit Sum  for Ex.      1234 (1+2+3+4) = 10
DP = Digit Product           1234 (1x2x3x4) = 24,  120 (1x2x0) = 0
```

Code 18
Code-Changes at the Input-Validation of the Basic-Calculations (**+ - x :**),

The Convert-Screen is extended, all Items the can be used on both Sides (Source/Target) now. Overall **208** possible Pairings of the Categories Length, Weight, Volume, Speed and Temperature as Calculation-Methods are available.

Convert Hints:

*Unit Pint = **UK** Pint (Imperial Pint)*
*Unit Barrel = **US** Barrel for Oil*
*Unit Zentner = **DE** 50 Kg*

Code 19
Input-Errors removed, (Methods like f.Ex. [%] that needs a 2nd Input-Value, crashing the App in Case the the Display have NO Value AND the Prefix-Button [+-] was clicked

Extensions:
Result-Checkings for:

Prime Numbers (Result is only divisible by itself OR 1)

Armstrong Number (Count of the Digits is Exponent – every Digit is added by the Power of the Exponent)

Palindrome Number (A Number that have the same Value if it is mirrored f.Ex. 131, 4224)

Every ONE Digit Number > 0 is a Palindrome and also Armstrong Number (1,2,3,4,5,6,7,8,9)

Examples: 151 (Prime Number, Palindrome)

153 (Armstrong Number) – Count of Digits = 3 (3 = Exponent) $1^3 + 2^3 + 3^3 = 153$

A Text Output shows the Result everytimes if the Result-Button [**=**] is clicked.

Example:

Search a Prime-Number near 100

Input:
[100]+[1][=] 101 (Prime Number)(Palindrome)
[=]   102
[=]   103 (Prime Number)
[=]   104
[=]   105
[=]   106
[=]   107 (Prime Number)

Fixes:

- Input-Validation recoded.
- Factorial-Calculation recoded to Datatypes BigInteger/BigDecimal (Java).

  Example 50! = 3.041409320171337804E064

  50! Factorial have 65 Digits. Count of Nulls at the End is 12

  50!=30414093201713378043612608166064768844377641568960512000000000000

- New Inputvalidation permit the 90° Input for the Tangent-Function in DEG Mode.
- Big Numbers (Factorials) can be displayed if the Shift-Mode is active:

Example:

Input:
[**Shift**] 102 [**n!**] = 9.614466715035126609E161

```
96144667150351266092686555869725954845535590505965946436944471404853171513025459
06033149618823644513849855959803620591575037100428655329280000000000000000000000
00
```

Code 20:
Screen4 Calculation Helpers implemented, Calculation of the greatest common Divisor (**gcd**) and the least common Multiple (**lcm**) of two Values.

Code 21:
Screen4: Extension for Functions [Divisible] and [Primefactors].

Screen2: All Convertings checked.

Button [‰] replaced by a Logarithm-Function to a given Base.

The Calculator-App is translated to the English Language. The Language of the Android-System is (if *NOT* English is setted) set the Application to German Language.

Shift Modus Extensions:

Minimum and Maximum:

Example Minimum:

Input 23.75, Button [⇊] Result = 23

This Function cutting all Digits after Decimalpoint and return the Value before Decimalpoint (Next lower Integer).

Example Maximum:

Input 23.34, Button [⇈] Result = 24

This Function cutting all Digits after Decimalpoint and increase the Value before Decimalpoint with 1 (Next higher Integer).

Integer:

Example:

Input 23.75, Button [int] Result = 24 (Round up)
Input 23.5, Button [int] Result = 24 (Round up)
Input 23.25, Button [int] Result = 23 (Round down)

This Function rounding a Decimal-Number up- or down into the resulting Integer-Number.

Next lower Integer if the Digit after Decimalpoint is < 0.5
Next higher Integer if the Digit after Decimalpoint is >= 0.5

Logarithm to a given Base:

Example: ***$\log_2 8$***

Input 8, press Button [lg(b)],
Input 2, press Button [=], (Base is now 2) ***Result = 3***

This Function is helpful if you need to calculate an unknown Power of a Number.

For this Example:

$2^x = 8$ | $\log_2$
$\log_2 (2^x) = \log_2 (8)$
$x = \log_2 (8)$
$x = \log_2 / \log_8$ (Internal Calculation)
$x = 3$

Code 22
English Language implemented if the Android System set to an English Language.

Code 23
Fontsize-Adaption, if the Android System is set to bigger/smaller Fontsizes.

Code 24
Error removed in gcD (greatest common Divisor) Calculation on Screen 3, the Recursive-Function did crashing the App in some Cases.

Code 25
Screen 3 Divisibility expanded to the Euler Totient Function.

ϕ(n) = Amount of the coprime Numbers in Area **1 to n**, a Divisor to another Number applies coprime, if it divides the Number with a Rest-Value.

Examples:

ϕ(4) = 2
ϕ(5) = 4 (**n** = Prime Number, ϕ(n) = **n-1** = 5-1)
ϕ(7) = 6 (**n** = Prime Number, ϕ(n) = **n-1** = 7-1)
ϕ(9) = 6
ϕ(12) = 4