

# BizMathica™ Quick Start Guide

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# Chapter 1: Getting Started

## Starting BizMathica

To start BizMathica select the application icon on the BlackBerry main screen and press the **ENTER** key or trackwheel to run it. You can also just press the letter “Z” to run BizMathica while the BlackBerry Home Screen is displayed (only if the Phone application is not configured to allow dialing from the Home Screen).



## Important BizMathica Configuration

After running BizMathica for the first time or at any time after that you should configure the BizMathica Global Parameters appropriately so that formulas that depend on them will be computed correctly.

For example, for the **tip** formulas to be computed correctly it is important that you set the **TipPercent** and **TaxPercent** global parameters correctly. Similarly, for the exchange rate related formulas to be computed correctly you must set the **ExchgRateToHome** and **ExchgRateToOther** global parameters correctly.

See “Main BizMathica Menu” for information on how to display and edit the current value of a Global Parameter.

## Some Definitions

### Expressions

Expressions consist of numbers, operators, functions and parameters (global and input parameters) and represent the mathematical expression you want BizMathica to evaluate.

### Operators

Operators are one of:

- +, -, \*, /
- ^
- %
- (, )
- E

### Functions

Functions are named built-in mathematical operations supported by BizMathica that take either a fixed or variable number of parameters (global, input or numeric parameters) and return a value. Function names are case-insensitive.

### Global Parameters

Global Parameters are named variables representing a particular numeric value that can be referenced in expressions. Global Parameter names are case-insensitive.

### Input Parameters

Input Parameters are named, unassigned variables that are referenced in an expression.

During evaluation of an expression the user is prompted to specify numeric values to use for each input parameter.

Input Parameters names that end with “?” are special in that they can take “?” as a value – see the sections “Solver Functions”, “Solver Parameter” and “Solver Formulas” for more information regarding this special value.

### Solver Functions

Solver Functions are similar to regular Functions except their names end with “?” and the result to be computed is represented by the Input Parameter whose value is specified as “?”. Exactly one parameter can have a value of “?”. Only Input Parameters whose names end with “?” (i.e. a Solver Parameter) may take a value of “?”. Solver Function names are case-insensitive.

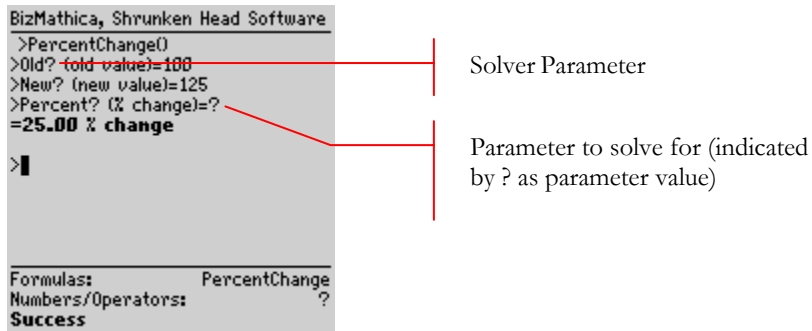
## Solver Parameter

A Solver Parameter is similar to a regular Input Parameter except its name ends with “?” and its value can be specified as “?”.

Solver Parameters are used with Solver Functions and Solver Formulas to indicate which parameter to compute as the result.

```
BizMathica, Shrunken Head Software
>PercentChange()
>Old? (old value)=100
>New? (new value)=125
>Percent? (% change)=?
=25.00 % change
>|

Formulas:      PercentChange
Numbers/Operators:  ?
Success
```



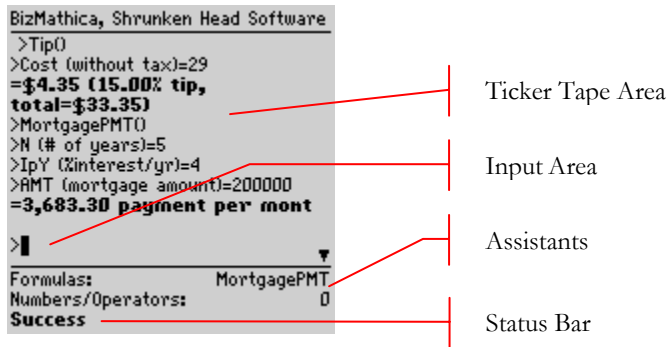
## Formulas

A Formula is a named entity representing a specific expression. A Formula can be thought of as a shorthand for specifying an expression and can be referenced in the Input Area to tell BizMathica what expression to calculate. A Formula cannot be combined with any other entity when used to tell BizMathica what to calculate. Formula names are case-insensitive.

## Solver Formulas

A Solver Formula is a Formula that contains a reference to at least one Solver Function. See the sections “Formulas” and “Solver Functions” for more information.

## Guide to the BizMathica User Interface



### Ticker Tape Area

The Ticker Tape Area is located at the top of the main BizMathica screen. The Ticker Tape Area displays the results of previous calculations evaluated during your current BizMathica session. See “Scroll Arrows” below for information on how to navigate the Ticker Tape Area.

### Input Area

The Input Area is just below the Ticker Tape Area and just above the Assistants. As its name implies, the input area is where you specify what you want BizMathica to calculate.

### Assistants

Assistants are located at the bottom of the main BizMathica screen. You can configure which Assistants are displayed using the Options menu item.

It is important to understand how to use the Assistants as they are a highly efficient way of specifying what you want to calculate with a minimum number of keystrokes.

### Status Bar

The Status Bar is located at the bottom of the main BizMathica screen. It shows the status (**Success, Working, Error, or Cancelled**) of the currently in-progress or last completed calculation. The status bar also shows the first line of the result for a successful calculation.

### Scroll Arrows

Small Scroll Arrows (or triangles) appear as needed on the right side of the main BizMathica screen toward the top and bottom of the display. Scroll arrows are displayed to indicate that accessible text has scrolled off the top or bottom of the screen. By rolling the trackwheel up or down you can scroll the offscreen text back into view. A scroll arrow is displayed as long as there is offscreen text in the direction the scroll arrow is pointing.

## Main BizMathica Menu

The main BizMathica menu is displayed by pressing the trackwheel while the main BizMathica screen is displayed.

Table 1: Key BizMathica Menu Items

Menu Item	Purpose
Go To Assistants	<p><b>OPTIONAL:</b> Only displayed when cursor is in the Input Area.</p> <p>Jumps the cursor to the Assistant Area without changing the Input Area insertion point. This makes it easy to insert text in the middle of an Input Area expression.</p>
Build Expression	Helps you build an expression to be evaluated.
Formulas	<p>Allows you to view the currently defined formulas and select one to be evaluated.</p> <p>Also allows you to create, edit or delete a formula.</p>
Global Parameters	<p>Allows you to view the currently defined global parameters and select one to be inserted into the Input Area.</p> <p>Also allows you to create, modify the value of, or delete a global parameter.</p>
Options	Display the current values of the configurable options and allows you to change them.
Copy To >	<p><b>OPTIONAL:</b> Only displayed when the cursor is on an Assistant.</p> <p>Allows you to copy the Assistant's displayed item to the Input Area.</p>
Cancel	<p><b>OPTIONAL:</b> Only displayed when a calculation is in progress (i.e. status is <b>Working</b>).</p> <p>Cancels the in progress calculation.</p>

## Specifying what you want to calculate

To specify what you want to calculate you need to enter either a Formula or Expression in the Input Area and press **ENTER**. A highly efficient way to do this is to use the BizMathica Assistants. For information on using the Assistants see the section “Using the BizMathica Formulas and Functions Assistants”.

A BizMathica input expression is similar to a mathematical expression as you were taught in school and follows the same rules for order of evaluation.

Table 2: Input Expression Order of Evaluation

Order of Evaluation	Operator	Purpose
First	(,)	Subexpressions enclosed in braces are evaluated first. If braced subexpressions are nested (i.e. one braced subexpression contained in another) then they are evaluated in the order of nesting with the innermost braced subexpression evaluated first.
Second	/,*	Division, Multiplication in order of appearance from left to right
Third	+,-	Addition, Subtraction in order of appearance from left to right

Numbers can be expressed as:

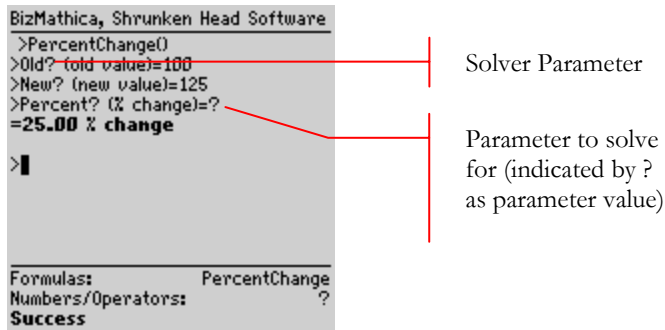
- Plain integers: 3
- Floating/Fixed point numbers: 2.5
- Scientific Notation: 1E+3, 1E3 or 10.5E-2

A BizMathica input expression can also contain references to Functions, as well as Input and Global Parameters. Input Parameter values will be prompted for when evaluating expressions.

If a Formula or Expression contains a reference to a Solver Function then you must specify “?” as the value for exactly one of the Input Parameters whose names ends with “?” (i.e. Solver Parameter) in order to indicate what parameter you want BizMathica to calculate.

## GETTING STARTED

For example:



```
BizMathica, Shrunken Head Software
>PercentChange()
>Old? (old value)=100
>New? (new value)=125
>Percent? (% change)=?
=25.00 % change
>|

Formulas:      PercentChange
Numbers/Operators: ?
Success
```

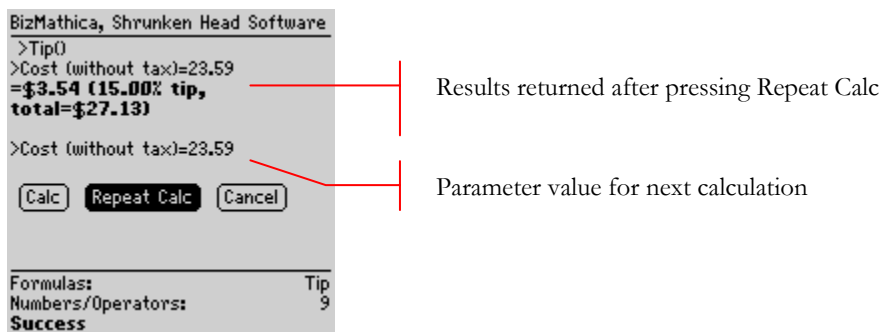
For some sample calculations see the section “Sample Calculations”.

## Input Parameters

If you evaluate a Formula or Expression that contains one or more Input Parameters then BizMathica will prompt for a value for each parameter. After you enter a valid value for each parameter the following buttons will be displayed:

- **Calc** – press to evaluate input using currently specified parameter values
- **Repeat Calc** – press to evaluate input using currently specified parameter values, display result in ticker tape area and allow parameter values to be specified again differently for another evaluation of the same Formula or Expression.
- **Cancel** – press to cancel calculation even while in progress

Before you press one of the calculation buttons you can scroll to any displayed parameter value and change what you have entered.

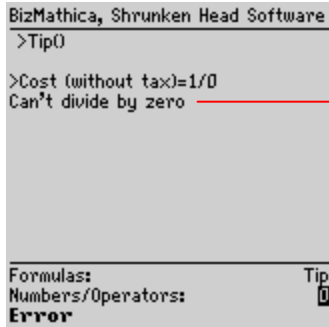


```
BizMathica, Shrunken Head Software
>Tip()
>Cost (without tax)=23.59
= $3.54 (15.00% tip,
total=$27.13)
>Cost (without tax)=23.59
[Calc] [Repeat Calc] [Cancel]

Formulas:      Tip
Numbers/Operators: 9
Success
```

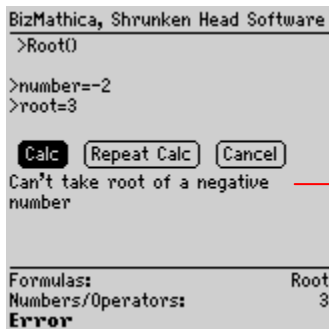
If you enter an invalid parameter value then an error message will be displayed below the value; you can correct the value (the error message will be removed) and continue.

## GETTING STARTED



Invalid parameter error message

If the calculation results in an error then an error message will be displayed below the calculation buttons; you can correct the error (the error message will be removed) and press **Calc** or **Repeat Calc** to try again.



Calculation error message

## Canceling a Calculation

There are three ways in which you can cancel a calculation depending on the state of the calculation.

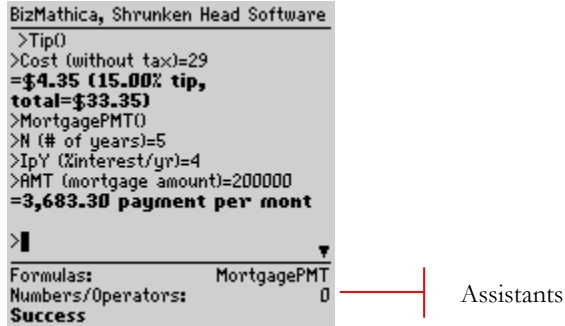
**Prompt For Input Parameter** - If you are evaluating a formula/expression and being prompted for an Input Parameter value you can cancel the calculation by simply pressing **ENTER** in response to the prompt without entering a value for the parameter.

**Calculation In Progress** - To cancel a calculation that is in progress display the BizMathica menu using the trackwheel and select the **Cancel** item. The **Cancel** menu item is only available while a calculation is in progress.

**Calculation Cancel Button** - If the **Cancel** button is displayed you can press it to cancel either a pending calculation or a calculation that is in progress.

## Using the BizMathica Formulas and Functions Assistants

To work efficiently with BizMathica it is important to master the use of the Formulas and Functions Assistants.



The purpose of each assistant is to allow you to enter text into the Input Area without directly typing in the area and with a minimum number of keystrokes.

### Formulas and Functions Assistants

After moving the cursor into one of these Assistants you can scroll through its values by holding **ALT** and rolling the trackwheel. If you know the name of the Formula or Function you want to find then you can type its first letter repeatedly until it is scrolled into view. For example to find the Formula named **Tip**, type **T** repeatedly in the Formulas Assistant until **Tip** is displayed.

To paste the displayed formula/function into the Input Area press **ENTER**. In the case of a function you will be prompted for any required parameters.



Table 3: Operators supported in Input Expressions

Operator	Purpose
+	Addition or Optional sign for positive numbers
-	Subtraction or Negative sign
.	Decimal point – used in floating/fixed point numbers
*	Multiplication
/	Division
^	Power (e.g. $2^4 = 2$ to the power of 4)
%	Percent – divide by 100
(	Right brace – specifies order of operation.
)	Left brace – specifies order of operation.
@	Used in expression to reference last result
?	Specifies that input parameter is actually the parameter to solve for. Only input parameters whose names end with “?” (e.g. PV?) are candidate solver parameters and can accept “?” as a value.

## Sample Calculations

### Simple Expression

Problem: Calculate the result of multiplying 40.5 by 9/5 and adding 32.

Input Parameters:

> 9/5\*40.5+32

The screenshot shows a calculator interface with a grey background. At the top, the input expression is displayed as `>9/5*40.5+32` and the result is `=104.90`. Below the main display, there is a smaller display showing `>|`. At the bottom of the screen, there are two columns of text: 'Formulas:' and 'Functions:' on the left, and 'Breakeven' and 'Abs' on the right. The value `104.90` is also displayed in the bottom left corner.

Steps:

1. Press the “9” key (which is also the key marked with the letter “C” – in this step as well as all following steps there is no need to press the ALT key to get the shifted state of the key since calculator keyboard mode is on by default).
2. Press the “/” key (also the “G” key)
3. Press the “5” key (also the “D” key)
4. Press the “\*” key (also the “A” key)
5. Press the “4” key (also the “S” key)
6. Press the “0” key (also the LEFT SHIFT key)
7. Press the “.” key (also the “M” key)
8. Press the “5” key (also the “D” key)
9. Press the “+” key (also the “T” key)
10. Press the “3” key (also the “R” key)
11. Press the “2” key (also the “E” key)
12. Press the ENTER key

## Square the Last Result

Problem: Determine the square of the last computed result.

Input Parameters:

> @^2



Steps:

1. Press the “@” key (which is also the key marked with the letter “L” – there is no need to press the ALT key to get the shifted state of the key since calculator keyboard mode is on by default).
2. Press the “SYM” key followed by the “O” key
3. Press the “2” key (also the “E” key – no need to press the ALT key)
4. Press the ENTER key

## Evaluate Function

Problem: Determine the sin of a 45 degree angle

Steps:

1. Scroll cursor to Functions assistant
2. Press & release letter "S" until the Sin function name is shown in the Functions assistant.
3. Press the ENTER key
4. Press the number keys on the keyboard to enter 45 for the "degrees" parameter (no need to press the ALT key).
5. Press the ENTER key – moves focus to the OK button
6. Press the ENTER key – closes the Sin() Parameters Screen and copies Sin(45) to “>” prompt.
7. Press the ENTER key – evaluates function and displays result

## Present Value

Problem: Determine the present value of \$10,000 payable at the end of 5 years assuming an interest rate of 10% compounded semiannually.

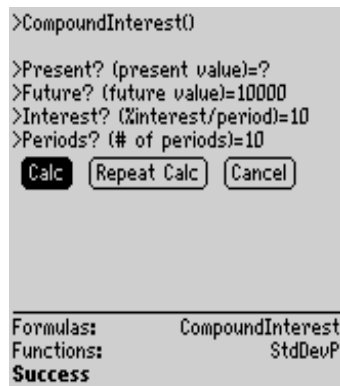
Formula & Input Parameters:

>CompoundInterest()

>Present? (present value)=?

## GETTING STARTED

>Future? (future value)=10000  
>Interest? (%interest/period)=10  
>Periods? (# of periods)=10



Steps:

1. Scroll cursor to Formulas assistant
2. Press & release letter "C" until the CompoundInterest formula name is shown in the Formulas assistant.
3. Press the ENTER key
4. Press the "?" key on the keyboard for the "Present? (present value)" parameter (which is also the key marked with the letter "V – in this step as well as all following steps there is no need to press the ALT key to get the shifted state of the key since calculator keyboard mode is on by default).
5. Press the ENTER key
6. Press the number keys on the keyboard to enter 10000 for the "Future? (future value)" parameter.
7. Press the ENTER key
8. Enter 10 for the "Interest? (%interest/period)" parameter
9. Press the ENTER key
10. Enter 10 for the "Periods? (# of periods)" parameter
11. Press the ENTER key
12. Press the Calc button

## Loan Payment Per Month

Problem: I have a \$100,000 loan payable over 60 months with an interest rate of 7.5%. What are my monthly payments?

Formula & Input Parameters:

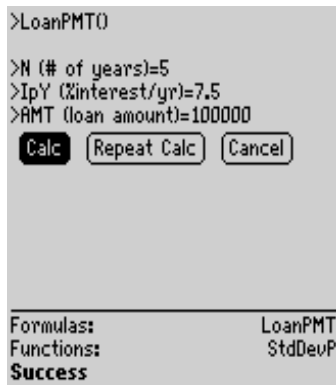
>Tvm()  
>N? (# of periods)=60  
>IpY? (%interest/yr)=7.5  
>PV? (present value)=100000  
>PMT? (payment: -outflow, +inflow)=?  
>FV? (future value)=0  
>PpY (payments/yr)=12

## GETTING STARTED

>CpY (compounding periods/yr)=12  
>BeginPeriodPMT (Payments: 0=End-of-period PMT, 1=Beginning-of-period  
>PMT)=0  
=-2,003.79 payment: -outflow, +inflow

Or more simply –

>LoanPMT()  
>N (# of years)=5  
>IpY (%interest/yr)=7.5  
>AMT (loan amount)=100000  
=2,003.79 payment per month



Steps:

1. Scroll cursor to Formulas assistant
2. Press & release letter "L" until the LoanPMT formula name is shown in the Formulas assistant.
3. Press the ENTER key
4. Press the "5" key on the keyboard for the "N (# of years)" parameter (which is also the key marked with the letter "D" – in this step as well as all following steps there is no need to press the ALT key to get the shifted state of the key since calculator keyboard mode is on by default).
5. Press the ENTER key
6. Enter 7.5 for the "IpY (%interest/yr)" parameter
7. Press the ENTER key
8. Enter 100000 for the "AMT (loan amount)" parameter
9. Press the ENTER key
10. Press the Calc button

## Amortization Schedule

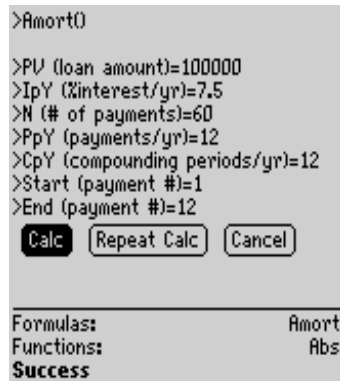
Problem: I have a \$100,000 loan payable over 60 months with an interest rate of 7.5%. Generate an amortization schedule for the first 2 years.

Formula & Input Parameters for Year 1:

>Amort()  
>PV (loan amount)=100000  
>IpY (%interest/yr)=7.5

## GETTING STARTED

>N (# of payments)=60  
>PpY (payments/yr)=12  
>CpY (compounding periods/yr)=12  
>Start (payment #)=1  
>End (payment #)=12  
=Pmt 2,003.79, Bal 82,873.75  
Period 1-12 Totals:  
Pmts 24,045.48  
17,126.25 Prin + 6,919.23 Int



Steps for Year 1:

1. Scroll cursor to Formulas assistant
2. Press & release letter "A" until the Amort formula name is shown in the Formulas assistant.
3. Press the ENTER key
4. Press the number keys on the keyboard to enter 100000 for the "PV (loan amount)" parameter (no need to press the ALT key).
5. Press the ENTER key
6. Enter 7.5 for the "IpY (%interest/yr)" parameter
7. Press the ENTER key
8. Enter 60 for the "N (# of payments)" parameter
9. Press the ENTER key
10. Enter 12 for the "PpY (payments/yr)" parameter
11. Press the ENTER key
12. Enter 12 for the "CpY (compounding periods/yr)" parameter
13. Press the ENTER key
14. Enter 1 for the "Start (payment #)" parameter
15. Press the ENTER key
16. Enter 12 for the "End (payment #)" parameter
17. Press the ENTER key
18. Press the "Repeat Calc" button
19. Scroll up to see the complete results of the calculation

Formula & Input Parameters for Year 2 (input changes are in bold):

>PV (loan amount)=100000  
>IpY (**%interest/yr**)=7.5

## GETTING STARTED

>N (# of payments)=60  
>PpY (payments/yr)=12  
>CpY (compounding periods/yr)=12  
>Start (payment #)=**13**  
>End (payment #)=**24**  
=Pmt 2,003.79, Bal 64,417.95  
Period 1-12 Totals:  
Pmts 24,045.48  
18,455.80 Prin + 5,589.68 Int

Steps for Year 2:

1. Scroll down to the input parameters and change the parameter values as follows.
2. Enter 13 for the “Start (payment #)” parameter
3. Press the ENTER key
4. Enter 24 for the “End (payment #)” parameter
5. Press the ENTER key
6. Press the “Calc” button