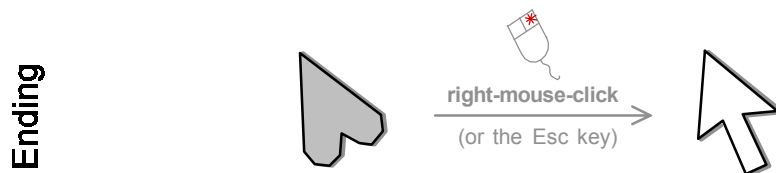
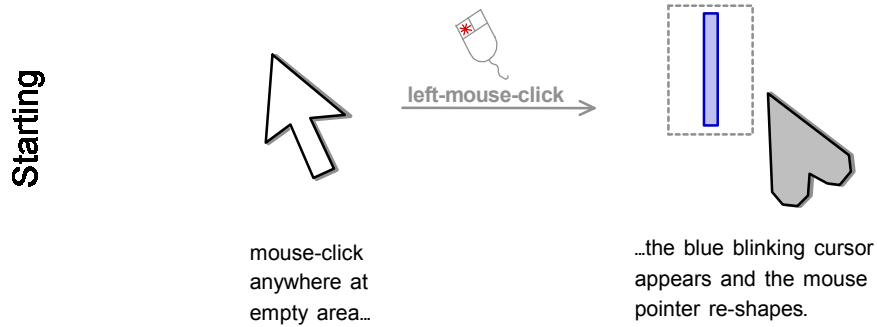


# MoM's ridiculously complex math-typing tutorial

Keyboard typing lessons for **Math-o-mir v2.0**

## Lesson 1 Starting and ending the Typing mode



Note: The Typing mode will also start if you click at any **insertion point** inside any existing equation. That way you start editing this particular equation.

$$a + b + c = 2d$$

## Lesson 2 Typing numbers



- Do not separate thousands, millions... write the number all compact
- Use the dot as the decimal separator
- If you insist to use comma as the decimal separator, check the following menu option: **Options** → **Keyboard** → **Allow comma as decimal separator**

64371

64371.37

64371,37

## Lesson 3 Typing variables

- To generate Greek symbols, quickly stroke letters twice

aa + bb GG  $\longrightarrow$   $\alpha + \beta \Gamma$

Alternatively, to generate Greek symbols you may also cast commands like `\alpha`, `\beta`, `\gamma`... (see Lesson 11)

- To enter multi-letter variables, start them with the apostrophe key

'size  $\xrightarrow{\text{any math operator or the Spacebar or the Enter key}}$  size

Note: If you are using multi-letter variables really often, then you may enable '*Prefer Multi-Letter variables*' option. You won't need to use the apostrophe key any more, but you will have to use the space-bar key to separate adjacent variables (invisible times) if you placed no other explicit operator between them. To enable this option, check: **Options**  $\rightarrow$  **Keyboard**  $\rightarrow$  **Prefer Multi-Letter variables**

## Lesson 4 Typing Parentheses

- hit the '(' or '[' or '{' or '|' to create parentheses

( | ) [ | ] { | } | | |

- after you filled the content, hit the Enter key, or ')', ']', '}', '|' keys, to exit parentheses

Note: Create double bar parentheses by stroking the '|' key twice: | |

In fact, you can also type the following sequences to create various parentheses: ( | , [ | ) , < > , < | , [ > , | >

## Lesson 5 Typing math operators and symbols

- Hit appropriate keys on your keyboard

$<$   $>$   $=$   $+$   $-$   $/$   
 $,$   $;$   $:$   $?$   $\%$   $!$   $\sim$

- However, hitting the @ and \* keys will generate alternative symbols

$*$  generates  $\cdot$   
 $@$  generates  $\infty$

- Arrows can be produced by ALT+arrow\_key (hit the arrow key twice to create double arrows)

$\leftarrow$   $\downarrow$   $\uparrow$   $\rightarrow$   $\Leftrightarrow$   $\Downarrow$   $\Uparrow$   $\Rightarrow$   $\mapsto$

- You can also use following two-stroke or three-stroke sequences:

$<=$ to create $\leq$	$+ -$ to create $\pm$	$->$ to create $\rightarrow$
$>=$ to create $\geq$	$-+$ to create $\mp$	$+>$ to create $\mapsto$
$/=$ to create $\neq$	$:=$ to create $\therefore$	$=>$ to create $\Rightarrow$
$<<$ to create $\ll$	$=:$ to create $\equiv$	$\#$ to create $\#$
$>>$ to create $\gg$	$\dots$ to create $\dots$	$\backslash @$ to create $@$
$\sim \sim$ to create $\approx$	$***$ to create $\dots$	$\backslash *$ to create $*$
$\sim =$ to create $\cong$	$- =$ to create $\equiv$	$\backslash \{$ to create $\{$

- Finally, using the Ctrl+X you can generate the multiplying cross:  $\times$

Note: There are symbols that you cannot type any other way than by defining a **toolbox accelerator** or by casting a **command**. Check Lesson #11 to read about commands.

## Lesson 6   Typing indexes

**General way** - using *Underline*

- hit the underline key ' \_ '
- type the index
- hit any math operator (+, -, /, \*, ... )  
or the Spacebar key or the Enter key  
to resume typing on the main line

$$a_k$$

Note: Because any math operator exits the index entry, you might have hard time to actually enter math operators into indexes. No problem, after you typed the math operator, just hit the underline key once more and the operator will be pushed back into the index.

**Fast way** - using *Spacebar*

- press and **hold** the spacebar key
- type the index (still holding the spacebar key)
- release the spacebar key

$$a_k$$

Note: If you keep holding the Spacebar+Letter combination for about 0.5 seconds, the uppercase letter will be generated and placed into the index . That is how you can avoid theunhandy Spacebar+Shift+Letter combinatons.

## Lesson 7   Typing exponents

**General way** - using ^ or using "

- hit the 'hat' key (^) or the double-quotation key (")
- type the exponent
- hit the Enter key to resume  
typing on the main line.

$$R^{2y + \frac{1}{z}}$$

**Fast way** - using *ALT*

- press and **hold** the ALT key
- type the exponent (still holding the ALT key)
- release the ALT key

$$R^2$$

Note: If you keep holding the ALT+Letter combination for about 0.5 seconds, the uppercase letter will be generated and placed into the exponent. That is how you can avoid theunhandy ALT+Shift+Letter combinatons.

Advanced: When you use the ALT key to type into exponent, then any hit to the = key, will surprisingly generate the + operator. This way you don't need to reach for the Shift key to type the + operator on some keyboards.

## Lesson 7b   Typing exponents of base *e*

- type the letter 'e', then hit the period key



$$e. \longrightarrow e^{\quad}$$




## Lesson 8 Typing functions

Command-casting method

- type the **backslash** `\` key to start the command entry
- type the function name
- hit the Enter key, or Spacebar key , or the `'` key

This is the command-casting method. See lesson #11



`\ress`   $\xrightarrow[\text{or the Enter}]{\text{the Spacebar}}$  `ress` 



`\ress`   $\xrightarrow{\text{the ' key}}$  `ress(`  `)` 

Conversion method

- type the function name
- hit the **dot** key `.` to convert the name into function

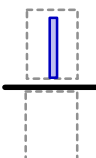
This is the conversion method, aka the "mighty dot" method. See lessons #7b, #12 and #13.

`f`   $\xrightarrow{\text{the dot key}}$  `f(`  `)`


`sin`   $\xrightarrow{\text{the dot key}}$  `sin` 

## Lesson 9 Typing fractions

- First insert the fraction line by **stroking the slash key** `/` twice:

`//`  $\longrightarrow$  

- Type the numerator, then hit the Enter key to move the cursor into the denominator

$\frac{\omega + 2\pi}{}$  

- Finally, hit the Enter key to resume at the main line

## Lesson 10 Typing simple fractions

- You can start by typing the numerator

1|

- Type the **# key** (or the **grave accent ` key**) to insert the fraction bar

$\frac{1}{|}$

Note: You can put more than one element into the numerator. Just type all the elements that make the numerator, and then hit the # key (or ` key) as many times as needed. For every # hit, a single element will be sucked in.

## Lesson 11 Casting commands

- start with the **backslash** key `\`
- type the command name
- hit the Enter key or Spacebar key or any math-symbol key to execute it

`\aleph` |  $\xrightarrow{\text{spacebar}}$   $\aleph$  |

- There are commands that will create symbols (examples: `\infty`, `\aleph`, `\bullet`, `\oplus`, ...)

$\infty$   $\aleph$   $\bullet$   $\oplus$

- there are commands that will change text properties (examples: `\red`, `\blue`, `\big`, `\small`, `\bbig`, `\h1`)

`\red` `\blue` `\big` `\small` `\bbig` `\h1`

- All Greek symbols can also be created (examples: `\gamma`, `\Gamma`, `\epsilon`, `\ep`)

$\gamma$   $\Gamma$   $\epsilon$   $\epsilon$

- Some more complex objects can be inserted (examples: `\sqrt`, `\sum`, `\int`, `\oiint`)

$\sqrt{\quad}$   $\sum$   $\int$   $\oiint$

- units of measurement can be inserted - this is case-sensitive. (examples: `\kg` `\GW` `\ft` `\mps`)

`\kg` `\GW` `\ft` `\mps`

- any 'unknown' command that you may enter will be converted into a function (see lesson #8)

## Lesson 12 Typing differentials

Conversion method

- hit 'd' key , and then hit the dot '.' key

$$d \quad \xrightarrow{\text{the dot key}} \quad d$$

- type 'par', and then hit the dot '.' key

$$par \quad \xrightarrow{\text{the dot key}} \quad \partial$$

Command-casting method

- type \d or \par command and then hit the Spacebar (or Enter) key

$$\backslash d \quad \xrightarrow{\text{the spacebar}} \quad d$$

$$\backslash par \quad \xrightarrow{\text{the spacebar}} \quad \partial$$

- you can also use \dx , \dy , \dz , \dt commands to gain some speed

$$\backslash dx \quad \xrightarrow{\text{the spacebar}} \quad dx$$

- you can also use more complex \dd , \ddx , \ddy , \ddz , \ddt , \parpar commands

$$\backslash ddx \quad \xrightarrow{\text{the spacebar}} \quad \frac{d}{dx} \quad ( \quad )$$

$$\backslash parpar \quad \xrightarrow{\text{the spacebar}} \quad \frac{\partial}{\partial} \quad ( \quad )$$

## Lesson 13   Typing Summation, Product and Integral signs

- cast a command ( `\sum` , `\prod` , `\int` , `\iint` , `\iiint` , `\oint` , `\oiint` or `\oiiint` )

Command-casting method

`\sum` |  $\xrightarrow{\text{the spacebar}}$   $\Sigma$  |

- if you immediately hit the underline '\_' key, the cursor will jump into the lower-limit box

`\sum` |  $\xrightarrow{\text{the underline}}$   $\Sigma$   
|

- There are two quick ways, `sum` and `int` to create summation and integration signs

Conversion method

`s u m`  $\xrightarrow{\text{the dot key}}$   $\Sigma$  |

`i n t`  $\xrightarrow{\text{the dot key}}$   $\int$  |

Note: This method generates signs without limit boxes, but you can create them if you hit the underline key immediately.

## Lesson 14   Typing a plain text

- Start a new box (see Lesson #1).
- While the box is still **entirely empty** hit the **spacebar** key - this activates the text-typing mode

|  $\xrightarrow{\text{spacebar or ALT+spacebar}}$  |

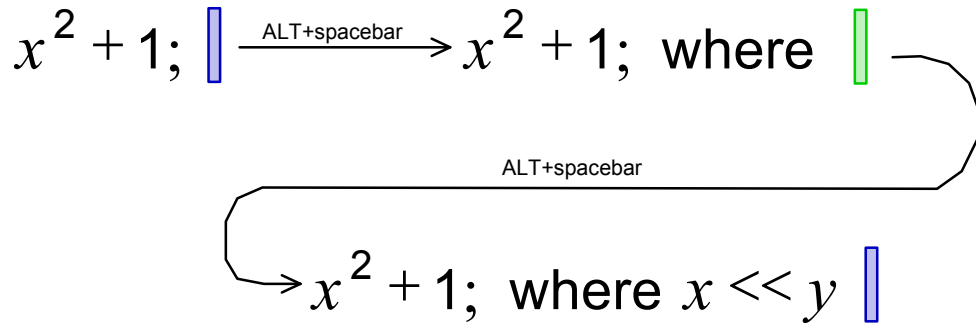
- When text-typing mode is active, the cursor will be of **green\_color**

Note: When typing a plain text, the Enter key will normally wrap the text line



## Lesson 15 Mixing math and text

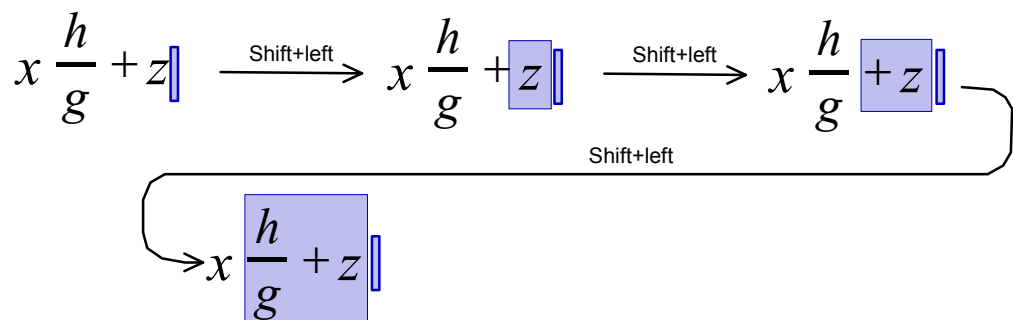
- You can anytime toggle between text-typing mode and math-typing mode by using **ALT+Spacebar** combination.



Note to Linux users : Instead of ALT+spacebar, you can use Spacebar+ALT. In fact, it is also possible to toggle between math and text by hitting the comma key twice or by hitting the CapsLock key if the 'Options->Keyboard->Use CapsLock to toggle typing mode' option is enabled.

## Lesson 16 Keyboard selections

- Use **Shift+left\_arrow** or **Shift+right\_arrow** to make selections

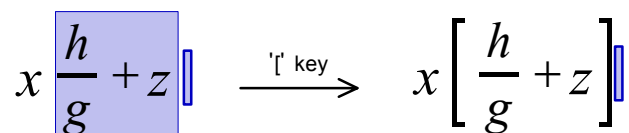


- Selected objects become blue-colored.
- Once you made the selection, you can hit:

- **CTRL+X** (cut), **CTRL+C** (copy)
- **Del** (delete), **Backspace** (delete)
- **R** (red), **G** (green)
- **B** (bold), **I** (italic)
- **U** (underline), **O** (overline), **S** (strikeout)
- / or # or ` (puts fraction line below the selection)
- ( or [ or { (puts parentheses around the selection)
- \ (puts the selection in function argument)
- **0..9** (puts the selection to the power)
- **C** (puts constraint (restriction) line:  $a \left|_c^b$  )
- **Enter** (opens the context menu)

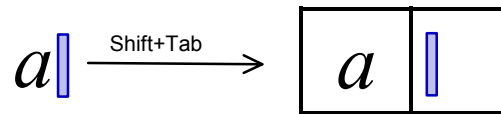
Note: You can also use **Shift+End** and **Shift+Home** to make selections to the end/beginning of a line.

Example:

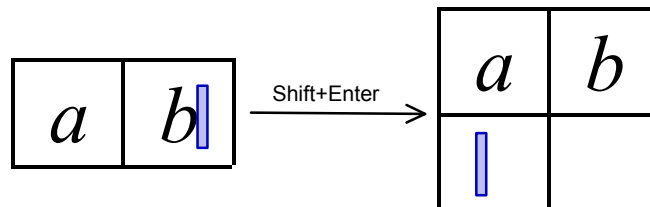


## Lesson 17    Creating matrices and tables

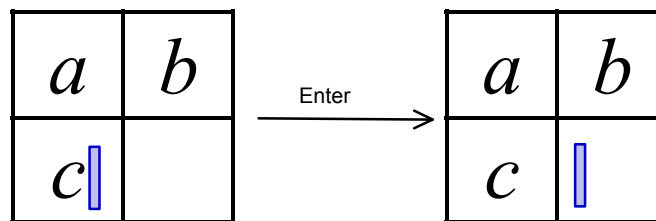
- Hit the **Shift+Tab** to add columns



- Hit the **Shift+Enter** to add rows



- You can use Enter key to move to the next cell



## Lesson 18    Using accelerators

- Right mouse-click on any toolbox item - a popup menu will open
- Choose any accelerator you like
- Use the accelerator when you are typing your equations

Note - there are three types of accelerators :

**CTRL+** accelerators - these can be used even with hand-drawings

**double-stroke** accelerators - these are timed, double-stroke them quickly

**Easycast** accelerators - these enable you to define "any" key-sequence you like

Note: If you define certain double-stroke accelerators, you will not be able to type certain Greek letters easily (see lesson #3). Therefore you will have to use commands to cast Greek letters (see lesson #11).

# Appendix - Math-o-mir crib notes (v1.92)

[Listed keystrokes are valid for math-typing mode.  
To toggle between the math-typing mode and the  
text-typing mode, use Alt+SpaceBar.]

Keystrokes and  
commands to  
enter simple  
symbols

	keystroke	command		keystroke	command		keystroke	command		keystroke	command
	.	*	\cdot	≈	~ ~	\approx	→	-> Alt+right	\to	⊂	\subset
	±	+ -	\pm	ℵ		\aleph	←	Alt+left		⊃	\supset
	∓	- +	\mp	∅		\emptyset	↑	Alt+up		⊆	\subseteq
	∞	@	\infty	*	\*	\ast	↓	Alt+down		⊇	\supseteq
	<<	<<		∇	HH	\nabla	⇒ =>	Alt+right (x2)		∥	\parallel
	>>	>>		×	Ctrl+X	\times	⇐	Alt+left (x2)		⊥	\perp
	≠	/=	\neq	•	BB	\bullet	⇑	Alt+up (x2)		∞	\propto
	≤	<=	\leq	÷		\div	⇓	Alt+down (x2)		#	\#
	≥	>=	\geq	⊕		\oplus	→ +>	Alt+right (x3)	\mapsto	@	\@
	:=	:=		⊗		\otimes	∈		\in	≡	\cong
	=:	=:		∪	UU	\cup	∋		\owns	≡	\equiv
	...	...		∩		\cap	∉		\notin	∘	\circ
		Tab	\space	~	~	\sim	∃	EE	\exists	∘	\deg
	...	***		≐		\doteq	∀	AA	\forall	∴	\therefore
		MM	\mid	\		\setminus	%	%%		∴	\because

Keystrokes and  
commands to  
enter greek  
symbols

	keystroke	command		keystroke	command		keystroke	command
α A	aa	\alpha \Alpha	ι I	ii	\iota \iotaota	ρ P	rr	\rho \Rho
β B	bb, BB	\beta \Beta	φ ϑ	jj, JJ	\varphi \Varphi	σ Σ	ss, SS	\sigma \Sigma
χ X	cc	\chi \Chi	κ K	kk	\kappa \Kappa	τ T	tt	\tau \Tau
δ Δ	dd, DD	\delta \Delta	λ Λ	ll, LL	\lambda \Lambda	υ Υ		\upsilon \Upsilon \ups \Upsilon
ε E	ee	\epsilon \Epsilon	μ M	mm, uu	\mu	ω Ω	ww, WW	\omega \Omega
φ Φ	ff, FF	\phi \Phi	ν N	nn	\nu	ξ Ξ	xx, XX	\xi \Xi
γ Γ	gg, GG	\gamma \Gamma	π Π ϖ	pp, PP	\pi \varpi	ψ Ψ	yy, YY	\psi \Psi
η H	hh	\eta \Eta	θ Θ	qq, QQ	\theta \Theta	ζ Z	zz	\zeta \Zeta

Keystrokes and  
commands to  
enter complex  
symbols

	keystrokes	command
parentheses: ( ), [ ], { },	(, [, {,	
fraction: —	// (slash twice)	\frac
fraction (simple numerator): —	# (or `)	
square root, root: √, √		\sqrt \root
binom: ( )		\binom
summation, product: ∑, ∏		\sum \prod
Integrals: ∫, ∬, ∭		\int \iint \iiint
circular integrals: ∮, ∯, ∰		\oint \oiint \oiint
differential: d, dx, dy, dz, dt, ∂		\d \dx \dy \dz \dt \par
derivation: $\frac{d}{d}$ ( ), $\frac{d}{dx}$ ( ), $\frac{d}{dy}$ ( ), $\frac{d}{dz}$ ( ), $\frac{d}{dt}$ ( ), $\frac{\partial}{\partial}$ ( )		\dd \dddx \ddy \dddz \dddt \parpar
case:		\case
module:	(v. bar twice)	
limes: lim		\lim
various functions: sin, cos, ln, f ...		\sin \cos \ln \f ...
functions with reserved names: sum, case, frac ...		\funcsum \funccase \funcfrac ...
function with greek symbol names: α, Ω ...		\funalpha \funOmega ...
other brackets: <, >, [ ], ( ),   }, <	<>, [], (), [>, <	... \ket \bra
right-only and left-only brackets: }, {	\}, \{, \}, \{, \}, \{	

## General keyboard gymnastics

Key stroking (you can stroke keys in various ways)

Key-stroking method	Effect (a letter key)	Effect (a math symbol key)
single stroke	produces the letter	produces the symbol
double stroke (hit the key twice within 500ms)	produces Greek symbol	various depends on the symbol
long stroke (hold down the key for 500ms)	produces uppercase letter (= shift + key)	produces key's upper symbol (= shift + key)
double long stroke (press the key again within 500ms and keep it pressed for 500ms)	produces uppercase Greek symbol (= shift + double stroke)	not used

} one-finger  
shifting

Modifiers key (when held, modify the effect of a keyboard stroke)

Modifier key	Effect
Shift	Generates uppercase letters or key's upper symbol (only used with single strokes and double strokes)
Spacebar	Typing indexes (subscripts)
ALT	Typing exponents (superscripts)
CTRL	activates programmable keyboard accelerator (only used with single stroke)

Special keys used to start various typing actions

Starter key	Effect
\ (backslash)	To enter a command
' (apostrophe)	To enter a multi-letter variable
. (dot)	To enter a measurement unit
_ (underline)	To enter an index
^ (hat)	To enter an exponent

Other:

- the dot key is used as conversion key to convert typed variable(s) into a function
- the Alt+Spacebar is used to toggle between math-typing and text-typing modes (the Caps-Lock key can also be programmed for this function)

Function keys

key	function	key	function	key	function
F1	displays help (or, if configured, sets zoom to 1:1)	F5	toggles between the edit mode and the presentation mode	F9	generates bitmap image of the selected/touched object and copies it into the windows clipboard
F2	increases zoom	F6	generates LaTeX code of touched/selected object and copies it into the windows clipboard	F10	activates the main menu
F3	decreases zoom	F7	not used	F11	toggles 'snap to grid'
F4	starts the hand-drawing mode and displays the handy toolbox	F8	stores the bitmap image of the selected/touched object to disk (opens the file save dialog box)	F12	toggles automatic guidelines

