

# Dictating mathematics into LyX using Caster

Mike Roberts

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## 1 Introduction

- All of these bindings can be easily changed by modifying `mathfly/config/lyx.toml` in any text editor or saying "configure LyX mathematics" while the module is enabled.
- (option a | option b) means that both commands will do the same thing.

- Square brackets means that the word(s) inside are optional, the command will work with or without them.

## 2 Miscellaneous

math mode	Begins a new mathematical dictation environment, necessary for all maths dictation.
check	Begins a new mathematical dictation line.
fraction	Creates a fraction. anything highlighted will form the numerator.
over	Creates a fraction with the previous element as the numerator (e.g. "five over three")
(super [script]   to the power)	Superscript
sub [script]	Subscript
squared	Superscript 2
cubed	Superscript 3
inverse	Superscript -1
(parens   parentheses)	Parentheses
square brackets	Square brackets
curly brackets	Curly brackets
absolute	Create two bars and moves inside them
summation	$\sum_b^a$
blank summation	$\sum$
(summation   sum) to N	$\sum_{?}^n$
product	$\prod_b^a$
blank product	$\prod$
product to N	$\prod_{?}^n$
limit	$\lim_{?}$
blank limit	$\lim$
label above	Add a label above the selected text
label below	Add a label below the selected text

## 3 Letters

### 3.1 Greek

By default, all of these commands must be prefixed with "greek" for lowercase or "greek big" for uppercase. This behaviour can be changed by modifying `greek_prefix` and `capitals_prefix`. Where relevant I have provided pronunciation tips for best results.

alpha	$\alpha$		
beta	$\beta$		beater
gamma	$\gamma$	$\Gamma$	
delta	$\delta$	$\Delta$	
epsilon	$\varepsilon$		
zeta	$\zeta$		
eta	$\eta$		eater
theta	$\theta$	$\Theta$	they-tah
iota	$\iota$		
kappa	$\kappa$		
lambda	$\lambda$	$\Lambda$	
mu	$\mu$		moo
nu	$\nu$		new
xi	$\xi$	$\Xi$	zee
pi	$\pi$	$\Pi$	
rho	$\rho$		
sigma	$\sigma$	$\Sigma$	
tau	$\tau$		
upsilon	$\upsilon$	$\Upsilon$	
phi	$\phi$	$\Phi$	
chi	$\chi$		kie
psi	$\psi$	$\Psi$	sigh
omega	$\omega$	$\Omega$	

### 3.2 Accents

These commands add accents above the highlighted text, or create an empty accent if nothing is highlighted.

accent hat	$\hat{a}$
accent tilde	$\tilde{a}$
accent dot	$\dot{a}$
accent double dot	$\ddot{a}$
accent bar	$\bar{a}$
accent vector	$\vec{a}$

## 4 Symbols

In order to avoid clutter and misrecognition, mathematical symbols are split up into two distinct groups: common and uncommon. By default, common symbols (e.g. integral) need no prefix, while uncommon symbols (e.g. up arrow) are prefixed with "symbol". The prefixes are defined by `symbol1_prefix` and `symbol2_prefix`. It is expected that you will want to move symbols which you happen to use frequently or infrequently between the two groups, or change/remove the prefixes to your liking. There is a trade-off to be made between recognition accuracy and speed of dictation.

### 4.1 Common symbols

[generic] root	$\sqrt[n]{x}$
square root	$\sqrt{x}$
integral	$\int$
double integral	$\iint$
triple integral	$\iiint$
degrees	$^{\circ}$
times	$\times$
divide	$\div$
stop	$\cdot$
plus or minus	$\pm$
partial	$\partial$
nice fraction	$a/b$
binomial	$\binom{a}{b}$
infinity	$\infty$
dot dot dot	$\dots$

vector nabla	$\nabla$
greater [than] [or] equal [to]	$\geq$
less [than] [or] equal [to]	$\leq$
not equal [to]	$\neq$
approximately [equal] [to]	$\approx$
proportional [to]	$\propto$
preference less [than]	$\prec$
preference less equal	$\preceq$
preference greater [than]	$\succ$
preference greater equal	$\succeq$
sine	$\sin$
cosine	$\cos$
tangent	$\tan$
secant	$\sec$
cosecant	$\csc$
cotangent	$\cot$
arc sine	$\arcsin$
arc cosine	$\arccos$
arc tan	$\arctan$
hyperbolic sine	$\sinh$
hyperbolic cosine	$\cosh$
hyperbolic tangent	$\tanh$
hyperbolic cotangent	$\coth$
degree	$\deg$
determinant	$\det$
dimension	$\dim$
exponential	$\exp$
(natural (log   logarithm)   log natural)	$\ln$
logarithm	$\log$
argument	$\arg$
maximum	$\max$
minimum	$\min$
(modulo   modulus)	$\text{mod}$
supremum	$\sup$
infimum	$\inf$
probability	$\text{Pr}$
there exists	$\exists$
member [of]	$\in$

for all	$\forall$
empty set	$\emptyset$
subset	$\subset$
superset	$\supset$
strict subset	$\subsetneq$
strict superset	$\supsetneq$
intersection	$\cap$
union	$\cup$
real numbers	$\mathbb{R}$
complex numbers	$\mathbb{C}$
integer numbers	$\mathbb{Z}$
rational numbers	$\mathbb{Q}$
natural numbers	$\mathbb{N}$
logic and	$\wedge$
logic or	$\vee$
logic not	$\neg$
left arrow	$\leftarrow$
right arrow	$\rightarrow$
up arrow	$\uparrow$
down arrow	$\downarrow$
left right arrow	$\leftrightarrow$
maps to	$\mapsto$
oh plus	$\oplus$
oh times	$\otimes$
big oh plus	$\bigoplus$
big oh times	$\bigotimes$
diagonal dots	$\ddots$
horizontal dots	$\dots$
vertical dots	$\vdots$

## 4.2 Less common symbols

Prefix with "symbol"

GCD	gcd
cat hom	hom
kernel	ker

## 5 Text modes

These commands allow you to insert various forms of regular text into a mathematical environment. They should all be prefixed with "text".

(beebee blackboard bold   blackboard)	$\mathbb{RNZ}$
roman	Sampletext
bold	<b>Sampletext</b>
sans serif	Sampletext
italic	<i>Sampletext</i>
typewriter	Sampletext

## 6 Fractions

There are a few ways of easily inserting fractions:

- Use the "fraction" command, and navigate through it using directions.
- Use the "over" command, which will build a fraction with the previous element as the numerator. e.g. "x-ray squared over five".
- For denominators up to 10, use their natural names, providing a number for the numerator, e.g. "five thirds".

## 7 Matrices

- To insert a matrix of a particular size, use the matrix command, e.g. "matrix three by one".
- To add or remove columns and rows, Use the command "add/remove matrix column/row".
- Matrices can be encased in brackets as expected, E.g. "parens matrix three by three".