Mathematics in R Markdown: : **CHEAT SHEET**

Basics

Thank you for reading the new cheatsheets about mathematics for R! These cheatsheets have an important job:

```
equation: $e^{i\pi} + 1 = 0$

equation block:
$$E = mc^{2}$$
```

equation: $e^{i\pi} + 1 = 0$

equation block:

$$E = mc^2$$

Vector

\vec{a}	$\vec{a}$
f(\mathbf{x})	$f(\mathbf{x})$

Mod

a \equiv b \pmod n

$$a \equiv b \pmod n$$

Calculus

x\prime	$x\prime$
\int f(x) dx	$\int f(x)dx$
\iint f(x)f(y)dxdy	$\iint f(x)f(y)dxdy$
\oint f(x) dx	$\oint f(x)dx$
\int_0^1 x dx	$\int_0^1 xdx$
\nabla J	∇J
\frac{\part f}{\part x}	$\frac{\partial f}{\partial x}$

Limit

\lim_{n\rightarrow+\infty} a_n

$$\lim_{n\rightarrow+\infty} a_n$$

Arrows

\uparrow	$\uparrow$	\rightarrow	$\rightarrow$
\downarrow	$\downarrow$	\leftarrow	$\leftarrow$
\updownarrow	$\updownarrow$	\leftrightarrow	$\leftrightarrow$
\Uparrow	$\Uparrow$	\Rightarrow	$\Rightarrow$
\Downarrow	$\Downarrow$	\Leftarrow	$\Leftarrow$
\Updownarrow	$\Updownarrow$	\Leftrightarrow	$\Leftrightarrow$

\longrightarrow	$\longrightarrow$
\longleftarrow	$\longleftarrow$
\longleftrightarrow	$\longleftrightarrow$
\Longrightarrow	$\Longrightarrow$
\Longleftarrow	$\Longleftarrow$
\Longleftrightarrow	$\Longleftrightarrow$
\mapsto	$\mapsto$
\longmapsto	$\longmapsto$
\hookleftarrow	$\hookleftarrow$
\hookrightarrow	$\hookrightarrow$
\rightharpoonup	$\rightharpoonup$
\leftharpoondown	$\leftharpoondown$
\rightleftharpoons	$\rightleftharpoons$
\leftharpoonup	$\leftharpoonup$
\rightharpoondown	$\rightharpoondown$
\leadsto	$\leadsto$
\nearrow	$\nearrow$
\searrow	$\searrow$
\swarrow	$\swarrow$
\nwarrow	$\nwarrow$

Space

a\! b	ab
ab	ab
a\, b	$a\,b$
a\: b	$a\:b$
a\; b	$a\;b$
a\quad b	$a\quad b$
a\qquad\ b	$a\qquad b$

Logistics

\because \therefore \forall \exist

$\because$ $\therefore$ $\forall$ $\exists$

\vee \wedge \bigvee \bigwedge

$\vee$ $\wedge$ $\bigvee$ $\bigwedge$

Trigonometric

\sin	$\sin$
\cos	$\cos$
\tan	$\tan$
\cot	$\cot$
\sec	$\sec$
\csc	$\csc$
\bot	$\bot$
\angle	$\angle$
45^\circ	45°

Log

\ln{a + b}	$\ln a + b$
\log_{a}{b}	$\log_a b$
\lg{a + b}	$\lg a + b$

Set

\emptyset	$\emptyset$
\varnothing	$\varnothing$
\in	$\in$
\ni	$\ni$
\notin	$\notin$
\subset	$\subset$
\supset	$\supset$
\not\subset	$\not\subset$
\subseteq	$\subseteq$
\subsetneq	$\subsetneq$
\supseteq	$\supseteq$
\cup	$\cup$
\bigcup	$\bigcup$
\cap	$\cap$
\bigcap	$\bigcap$
\uplus	$\uplus$
\biguplus	$\biguplus$
\sqsubset	$\sqsubset$
\sqsupset	$\sqsupset$
\sqcap	$\sqcap$
\sqsubseteq	$\sqsubseteq$
\sqsupseteq	$\sqsupseteq$
\vee	$\vee$
\wedge	$\wedge$
\setminus	$\setminus$
\neg	$\neg$

Relation

\leq	$\leq$
\geq	$\geq$
\equiv	$\equiv$
\models	$\models$
\prec	$\prec$
\succ	$\succ$
\sim	$\sim$
\perp	$\perp$
\preceq	$\preceq$
\succeq	$\succeq$
\simeq	$\simeq$
\mid	$\mid$
\ll	$\ll$
\gg	$\gg$
\asymp	$\asymp$
\parallel	$\parallel$
\approx	$\approx$
\cong	$\cong$
\neq	$\neq$
\doteq	$\doteq$
\propto	$\propto$
\bowtie	$\bowtie$
\Join	$\Join$
\smile	$\smile$
\frown	$\frown$
\vdash	$\vdash$
\dashv	$\dashv$

Operator

\pm	$\pm$
\mp	$\mp$
\times	$\times$
\div	$\div$
\ast	$\ast$
\star	$\star$
\mid	$\mid$
\nmid	$\nmid$
\circ	$\circ$
\bullet	$\bullet$
\cdot	$\cdot$
\wr	$\wr$
\diamond	$\diamond$
\Diamond	$\Diamond$
\triangle	$\triangle$
\bigtriangleup	$\bigtriangleup$
\bigtriangledown	$\bigtriangledown$
\triangleleft	$\triangleleft$
\triangleright	$\triangleright$
\lhd	$\lhd$
\rhd	$\rhd$
\unlhd	$\unlhd$
\unrhd	$\unrhd$
\circ	$\circ$
\bigcirc	$\bigcirc$
\odot	$\odot$
\bigodot	$\bigodot$
\oslash	$\oslash$
\ominus	$\ominus$
\otimes	$\otimes$
\bigotimes	$\bigotimes$
\oplus	$\oplus$
\bigoplus	$\bigoplus$
\dagger	$\dagger$
\ddagger	$\ddagger$
\amalg	$\amalg$

Others

\aleph	$\aleph$
\hbar	$\hbar$
\imath	$\imath$
\jmath	$\jmath$
\ell	ℓ
\wp	$\wp$
\Re	$\Re$
\Im	$\Im$
\mho	$\mho$
\surd	$\surd$
\top	$\top$
\bot	$\bot$
\flat	$\flat$
\natural	$\natural$
\sharp	$\sharp$
\backslash	$\backslash$
\Box	$\Box$
\clubsuit	$\clubsuit$
\diamondsuit	$\diamondsuit$
\heartsuit	$\heartsuit$
\spadesuit	$\spadesuit$

Sum & Prod

\sum_{i = 0}^{n}x_i

$$\sum_{i=0}^{n} x_i$$

\prod_{i = 0}^{n}x_i

$$\prod_{i=0}^{n} x_i$$

Sqrt

\sqrt{a + b}	$\sqrt{a + b}$
\sqrt[n]{a + b}	$\sqrt[n]{a + b}$

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Multiple lines

```
y =
\begin{cases}
-x, \quad x\leq 0 \\
x, \quad x > 0
\end{cases}
```

$$y = \begin{cases} -x, & x \leq 0 \\ x, & x > 0 \end{cases}$$

```
\left\{
\begin{array}{c}
a_{11}x_{11} +a_{12}x_{12} +a_{13}x_{13} = b_1 \\
a_{21}x_{21} +a_{22}x_{22} +a_{23}x_{23} = b_2 \\
a_{31}x_{31} +a_{32}x_{32} +a_{33}x_{33} = b_3
\end{array}
\right.
```

$$\left\{ \begin{array}{c} a_{11}x_{11} + a_{12}x_{12} + a_{13}x_{13} = b_1 \\ a_{21}x_{21} + a_{22}x_{22} + a_{23}x_{23} = b_2 \\ a_{31}x_{31} + a_{32}x_{32} + a_{33}x_{33} = b_3 \end{array} \right.$$

```
\left\{
\begin{aligned}
2x+3y&=34\\
x+4y&=25
\end{aligned}
\right.
```

$$\left\{ \begin{aligned} 2x + 3y &= 34 \\ x + 4y &= 25 \end{aligned} \right.$$

```
\boxed{a^2+b^2 = c^2}
```

$$\boxed{a^2 + b^2 = c^2}$$

```
{\underset {x\in S\subseteq X}{\operatorname {arg\,max} }}\,
f(x):=\{x\mid x\in S\wedge \forall y\in S:f(y)\leq f(x)\}.
```

$$\underset{x \in S \subseteq X}{\operatorname{arg\,max}} f(x) := \{x \mid x \in S \wedge \forall y \in S : f(y) \leq f(x)\}.$$

Matrix

```
\begin{matrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{matrix}
```

$$\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix}$$

```
\left(
\begin{matrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{matrix}
\right)
```

$$\left(\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix} \right)$$

```
\left[
\begin{matrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{matrix}
\right]
```

$$\left[\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix} \right]$$

```
\left\{
\begin{matrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{matrix}
\right\}
```

$$\left\{ \begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix} \right\}$$

```
\left(
\begin{array}{c|cc}
1 & 2 & 3 \\ \hline
4 & 5 & 6 \\
7 & 8 & 9
\end{array}
\right)
```

$$\left(\begin{array}{c|cc} 1 & 2 & 3 \\ \hline 4 & 5 & 6 \\ 7 & 8 & 9 \end{array} \right)$$

Parenthese

```
(\frac{1}{x}) [\frac{1}{x}] \left(\frac{1}{x} \right)
\left[\frac{1}{x} \right] \lang , \rang \lvert, \rvert
\lVert, \rVert  \lbrace, \rbrace
```

$$(\frac{1}{x})\,[\frac{1}{x}]\,\left(\frac{1}{x}\right)\,\left[\frac{1}{x}\right]\,\langle , \rangle |, |||, \|\{, \}$$

```
\Bigg(\bigg(\Big(\big((x)\big)\Big)\bigg)\Bigg)
```

$$\Bigg(\bigg(\Big(\big((x)\big)\Big)\bigg)\Bigg)$$

Frac

```
\frac{a}{b}
```

$$\frac{a}{b}$$

```
x = a_0 + \cfrac{1^2}{a_1 + \cfrac{2^2}{a_2 +
\cfrac{3^2}{a_3 + \cdots}}}
```

$$x = a_0 + \cfrac{1^2}{a_1 + \cfrac{2^2}{a_2 + \cfrac{3^2}{a_3 + \cdots}}}$$

Matrix

```
\left(
\begin{matrix}
a_{11} & a_{12} & \cdots & a_{1n}\\
a_{21} & a_{22} & \cdots & a_{2n}\\
\vdots & \vdots & \ddots & \vdots \\
a_{n1} & a_{n2} & \cdots & a_{nn}\\
\end{matrix}
\right)
```

$$\left(\begin{matrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \\ \end{matrix} \right)$$

Greek

\Alpha	A	\alpha	α
\Beta	B	\beta	β
\Gamma	Γ	\gamma	γ
\Delta	Δ	\delta	δ
\Epsilon	E	\epsilon	ϵ
		\varepsilon	ε
\Zeta	Z	\zeta	ζ
\Eta	H	\eta	η
\Theta	Θ	\theta	θ
\Iota	I	\iota	ι
\Kappa	K	\kappa	κ
\Lambda	Λ	\lambda	λ
\Mu	M	\mu	μ
\Nu	N	\nu	ν
\Xi	Ξ	\xi	ξ
\Omicron	O	\omicron	o
\Pi	Π	\pi	π
\Rho	P	\rho	ρ
\Sigma	Σ	\sigma	σ
\Tau	T	\tau	τ
\Upsilon	Υ	\upsilon	υ
\Phi	Φ	\phi	ϕ
		\varphi	φ
\Chi	X	\Chi	X
\Psi	Ψ	\Psi	Ψ
\Omega	Ω	\Omega	Ω

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a_{i}	a_i	\check{a}	$\check{a}$
a^{i}	a^i	\breve{a}	$\breve{a}$
\bar{a}	$\bar{a}$	\tilde{a}	$\tilde{a}$
\acute{a}	$\acute{a}$	\vec{a}	$\vec{a}$
\breve{a}	$\breve{a}$	\overrightarrow{x}	$\overrightarrow{x}$
\grave{a}	$\grave{a}$	\overline{x+y}	$\overline{x+y}$
\dot{a}	$\dot{a}$	\underline{x+y}	$\underline{x+y}$
\ddot{a}	$\ddot{a}$		
\dot {\dot x}	$\dot{\dot{x}}$	\overbrace{x+y}	$\overbrace{x+y}$
\hat{a}	$\hat{a}$	\underbrace{x+y}	$\underbrace{x+y}$
\widehat{xy}	$\widehat{xy}$		

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