1 Sums and Limits

mathclap & friends

$$X = \sum_{1 \le i \le j \le n} X_{ij}$$

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Cramped

$$x^2 \leftrightarrow x^2 \quad x^2 \leftrightarrow x^2$$

Smashoperator

$$V = \sum_{1 \le i \le j \le n}^{\infty} V_{ij} \quad X = \sum_{1 \le i \le j \le n}^{3456} X_{ij} \quad Y = \sum_{1 \le i \le j \le n} Y_{ij} \quad Z = \underset{1 \le i \le j \le n}{T} Z_{ij}$$

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Adjustlimits

$$\text{a) } \lim_{n \to \infty} \max_{p \ge n} \quad \text{b) } \lim_{n \to \infty} \max_{p^2 \ge n} \quad \text{c) } \lim_{n \to \infty} \sup_{p^2 \ge nK} \quad \text{d) } \limsup_{n \to \infty} \max_{p \ge n}$$

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2 Tags

$$a = b \hspace{6cm} \text{Q\&A}$$

See Q&A or is it better with Q&A?

$$a = b \hspace{6cm} \text{Q\&A}$$

$$a = b \hspace{6cm} \mathbf{[Q\&A]}$$

Normal tags.

$$a = a \hspace{6cm} (1)$$

That was equation (1).

OK tags.
$$a = a \tag{2}$$

That was equation [**2**], but recall [**1**]

odd tag.
$$a = a \tag{3}$$

That was equation {3}, but recall {1} and {2}.

weird tag.
$$b = b \tag{((4))}$$

That was equation ((4)), but recall ((1)), ((2)) and ((3)).

Normal tags again.
$$c = c \tag{5}$$

That was equation (5), but recall (1), (2), (3) and (4).

$$a = a \tag{6}$$
$$b = b \tag{**}$$

This should refer to the equation containing $a = a$: (6). Then a switch of tag forms.

$$c = c \tag{7}$$
$$d = d \tag{8}$$

This should refer to the equation containing $d = d$: (8) (but recall (6)).

$$e = e \tag{9}$$

$$f = f \tag{10}$$

$$1 + 1 = 2$$

$$2 + 2 = 4$$

Blabla (2).

3   Arrows

$$A \xleftarrow[under]{over} B \xrightarrow[under]{over} C$$

$$x \xrightarrow[under]{overlooooooong} y \xleftarrow[underlooooooong]{over} z$$

$$x \xleftarrow[bar]{foo} y \xrightarrow[bluuuuuuuuub]{baz} t \xmapsto{heeereee} k$$

2

$$k \xleftarrow{\cdot} l \xleftarrow{\cdot\cdot} m \xrightarrow[\cdots]{} n \xRightarrow{\cdots\cdots} o$$

$$x \xRightarrow{bluuuuub} y \xLeftarrow[blaaaaaab]{} z$$

$$z = \overbrace{\underbrace{x}_{real} + i \underbrace{y}_{imaginary}}^{complex\ number} \quad \underbrace{1+1}_{=2}$$

4 Matrices

$$\begin{array}{cc} c & cocococococo \\ c & c \end{array}$$

$$\begin{array}{cc} lalalalalala & l \\ l & l \end{array}$$

$$\begin{array}{cc} rerererere & r \\ & r \quad r \end{array}$$

$$\begin{pmatrix} ppppppp & foo \\ l & pppppppppppppppp \end{pmatrix}$$

$$\begin{bmatrix} b & b \\ b & b \end{bmatrix}$$

$$\begin{Bmatrix} B & & B \\ B & BBBBBBBrBBBBBB \end{Bmatrix}$$

$$\begin{vmatrix} v & v \\ v & v \end{vmatrix}$$

$$\begin{Vmatrix} V & V \\ VVVVVVcVVVVVV & bar \end{Vmatrix}$$

$$\begin{vmatrix} a & blblblbllbblblblblblblbl \\ c & d \end{vmatrix}$$

$$\begin{bmatrix} a & -b \\ -c & d \end{bmatrix} \begin{bmatrix} a & -b \\ -c & d \end{bmatrix}$$

$$\begin{Vmatrix} e & -f \\ -g & h \end{Vmatrix} \begin{Vmatrix} e & -f \\ -g & h \end{Vmatrix}$$

$$\begin{bmatrix} a & -bbbbb \\ -c & d \end{bmatrix} \begin{bmatrix} a & -bbbbb \\ -c & d \end{bmatrix}$$

$$\begin{Vmatrix} e & -fffff \\ -g & h \end{Vmatrix} \begin{Vmatrix} e & -fffff \\ -g & h \end{Vmatrix}$$

$$\begin{bmatrix} a & -bbbbb \\ -c & d \end{bmatrix} \begin{bmatrix} a & -bbbbb \\ -c & d \end{bmatrix}$$

$$\left\| \begin{matrix} e & -fffff \\ -g & h \end{matrix} \right\| \left\| \begin{matrix} e & -fffff \\ -g & h \end{matrix} \right\|$$

5   Cases

$$\begin{cases} E = mc^2 & \text{Nothing to see here} \\ \int x - 3\,dx & \text{Integral is text style} \end{cases}$$

$$\begin{cases} E = mc^2 & c \approx 3.00 \times 10^8\,\text{m/s} \\ \displaystyle\int x - 3\,dx & \text{Integral is display style} \end{cases}$$

$$a = \begin{cases} E = mc^2 & \text{Nothing to see here (text in math)} \\ \displaystyle\int x - 3\,dx & \text{Integral is display style (text in math)} \end{cases}$$

$$\left. \begin{matrix} E = mc^2 & 5^6 & andsoon \\ \int x - 3\,dx & \int x\,dx \end{matrix} \right\} = b$$

$$\left. \begin{matrix} x^2 & \text{for } \int x\,dx > 0 \\ x^3 & \text{else} \end{matrix} \right\} \Rightarrow \cdots$$

$$\left. \begin{matrix} E = mc^2 & 5^6 & andsoon \\ \displaystyle\int x - 3\,dx & \displaystyle\int x\,dx \end{matrix} \right\} = b$$

$$\left. \begin{matrix} x^2 & \text{for } \int x\,dx > 0 \\ \displaystyle\int x^3\,x & \text{else} \end{matrix} \right\} \Rightarrow \cdots$$

$$\text{foo} = \begin{cases} \pi & \text{if something} \\ \int \Omega^{\underline{\underline{\Xi}}}\Omega & \text{otherwise} \end{cases}$$

6   Gathered

$$A = \boxed{\text{first}} B$$
$$\boxed{\text{last}}$$

$$a = b + c$$
$$b = c + d$$
$$\cdots$$

$$\boxed{hello}$$

$$\boxed{f(x) = \int h(x)\,dx}$$
$$= g(x)$$

$$a = b \tag{11}$$

Some text

$$c = d \tag{12}$$

Some short text

$$e = f \tag{13}$$

7 Delimiters

$$|\frac{a}{c}| \quad \left|\frac{a}{c}\right| \quad \left|\frac{a}{b}\right|$$

$$|\frac{a}{b}| \quad \left|\frac{a}{b}\right| \quad |\frac{a}{b}| \quad \left|\frac{a}{b}\right|$$

$$|@\pi@| \quad |_-\phi_-|$$

$$\left\langle A, \frac{1}{2} \right\rangle \quad \left\langle B \,\middle|\, \sum_k f_k \,\middle|\, C \right\rangle$$

$$\left\{ x \in X \,\middle|\, \frac{\sqrt{x}}{x^2 + 1} > 1 \right\}$$

$$\langle 1 \,|\, \tfrac{8}{4}{}_{1} \,|\, 3 \rangle \; \left\langle 1 \,\middle|\, \tfrac{8}{4}{}_{1} \,\middle|\, 3 \right\rangle \; \langle 1 \,|\, \tfrac{8}{4}{}_{1} \,|\, 3 \rangle$$

$$\left(\frac{\pi}{\omega}\right) \cdot \left[\int x\,dx\right] \cdots [\sqrt{\frac{\sin x}{\cos z}}] \cdots (\frac{\frac{foo}{bar}}{\frac{baz}{qux}})$$

Operators

$$a := b \quad a := b \quad a := b$$

$$a := b \quad c ::\approx d \quad e :: f$$

$$\bigtimes \times \ddagger \otimes \bigotimes$$

8 Prescripts

$$^{4}_{12}\mathbf{C}^{5+}_{2} \qquad ^{14}_{2}\mathbf{C}^{5+}_{2} \qquad ^{4}_{12}\mathbf{C}^{5+}_{2} \qquad ^{14}\mathbf{C}^{5+}_{2} \qquad _{2}\mathbf{C}^{5+}_{2}$$

$$^{A}_{\mathbf{Z}}\mathrm{X} \to ^{A-4}_{\mathbf{Z-2}}\mathrm{Y} + ^{4}_{\mathbf{2}}\alpha$$

$$a = \frac{xy + xy + \int xy\,\mathrm{dx} + xy + xy \atop + xy + xy + xy + xy}{z} = \frac{xy + xy + \int xy\,\mathrm{dx} + xy + xy \atop + xy + xy + xy + xy}{z}$$

9 Multlines

$$p(x) = 3x^6 + 14x^5 y + 590x^4 y^2 + 19x^3 y^3$$
$$- 12x^2 y^4 - 12xy^5 + 2y^6 - a^3 b^3$$

$$A = \boxed{first} \quad B$$
$$\boxed{last}$$

$$A = \frac{\boxed{first}}{\boxed{last}} B$$

$$A = \frac{\boxed{first}}{\boxed{last}} B$$

$$A = \frac{\boxed{first}}{\boxed{last}} B$$

$$A = \boxed{first}$$
$$B$$
$$\boxed{last}$$

$$A = \boxed{first}$$

$$A = \boxed{first} \qquad B$$
$$\boxed{last}$$

$$A = \boxed{first} \qquad\qquad \boxed{last}\,B$$

$$A = \frac{\boxed{first}}{\boxed{last}}B$$

$$foo ::= \begin{array}{cc} x = 1, & x + 1 = 2 \\ & y = 2 \end{array} \qquad (14)$$

$$bar ::= \begin{array}{cc} x = 1, & x + 1 = 2 \\ & y = 2 \end{array} \qquad (15)$$

10 Spread-lines

Spread it

$$\begin{array}{ccc} a & b & c \\ d & e & f \\ g & h & i \end{array}$$

$$\begin{pmatrix} a_{1,1} & a_{1,2} & \cdots & a_{1,n} \\ a_{2,1} & a_{2,2} & \cdots & a_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m,1} & a_{m,2} & \cdots & a_{m,n} \end{pmatrix}$$

$$\begin{array}{cc} a & b \\ c & d \end{array}$$

$$\begin{cases} n/2 & \text{if } n \text{ is even} \\ -(n+1)/2 & \text{if } n \text{ is odd} \end{cases}$$

$$a = b + c - d$$

$$+ e - f$$

$$(16)$$

$$= g + h$$

$$= i$$

$$a + b + c + d + e + f$$

$$+ i + j + k + l + m + n \tag{17}$$

$$a = b \tag{18}$$

$$c = d \tag{19}$$

$$a_1 = b_1 + c_1 \tag{20}$$

$$a_2 = b_2 + c_2 - d_2 + e_2 \tag{21}$$

$$a_{11} = b_{11} \qquad\qquad a_{12} = b_{12}$$

$$a_{21} = b_{21} \qquad\qquad a_{22} = b_{22} + c_{22}$$

$$x = y_1 - y_2 + y_3 - y_5 + y_8 - \dots \quad \text{by foo} \tag{22}$$

$$= y' \circ y^* \qquad\qquad \text{by baz} \tag{23}$$

$$= y(0)y' \qquad\qquad \text{by Axiom 1.} \tag{24}$$

$$\left. \begin{aligned} B' &= -\partial \times E, \\ \\ E' &= \partial \times B - 4\pi j, \end{aligned} \right\} \quad \text{Maxwell's equations}$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

$$\sum_{\substack{i \in \Lambda \\ 0 < j < n}} P(i,j)$$

$$y \quad = \quad ax^2 + bx + c \tag{25}$$

$$f(x) \quad = \quad x^2 + 2xy + y^2 \tag{26}$$

$\boxed{Firstline}$

$\boxed{Secondline}$

$L + E + F + T$

$R + I + G + H + T$

$L + E + F + T$

$R + I + G + H + T$

$\boxed{WupWup}$

$\boxed{Lastline}$

11 Stepped lines

$$1* \quad x = 1, \quad x + 1 = 2 \quad \textbf{over}$$
$$2* \qquad\qquad\quad y = 2 \quad \textbf{over}$$

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$$\text{See:}s = 2.8, \quad s + 0.2 = 3\text{the end}$$
$$\text{See:}t \quad = \quad 4.5\text{the} \quad \text{end}$$

1337

12 Shifting equations

$$\boxed{\qquad\qquad\qquad\quad \text{Part 1} \qquad\qquad\qquad\quad}$$
$$= \boxed{\qquad\qquad\quad \text{2nd line} \qquad\qquad\quad}$$
$$19 + \boxed{\qquad \text{last part} \qquad}$$

$$\boxed{\quad 1 \quad} = \boxed{\qquad\quad 2 \qquad\quad} \qquad (27)$$

$$\updownarrow$$

$$\boxed{\quad 3 \quad} = \boxed{\quad\ 4\ \quad} \qquad (28)$$

$$
\begin{aligned}
a &= b \\
&\ \vdots \\
&= c \\
&\ \vdots \\
&= d
\end{aligned}
$$