

Sample Halloween Math

A. U. Thor

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A reduction my students are likely to make:

$$\img{wiz} \frac{\sin x}{s} = x \text{ in}$$

The same reduction as an in-line formula: $\img{wiz} \frac{\sin x}{s} = x \text{ in.}$

Now with limits:

$$\img{wiz} \sum_{i=1}^n \frac{i\text{-th magic term}}{2^i\text{-th wizardry}}$$

And repeated in-line: $\img{wiz} \sum_{i=1}^n x_i y_i.$

The **bold** math version is honored:

$$\img{wiz} \left\langle \begin{array}{c} \text{something terribly} \\ \text{complicated} \end{array} \right\rangle = 0$$

Compare it with **normal** math:

$$\img{wiz} \left\langle \begin{array}{c} \text{something terribly} \\ \text{complicated} \end{array} \right\rangle = 0$$

In-line math comparison: $\img{wiz} f(\boldsymbol{x})$ versus $\img{wiz} f(x).$

There is also a left-facing witch:

$$\img{wiz} \frac{\sin x}{s} = x \text{ in}$$

And here is the in-line version: $\img{wiz} \frac{\sin x}{s} = x \text{ in.}$

Test for \dots:

$$\img{wiz} \sum_{i_1=1}^{n_1} \dots \img{wiz} \sum_{i_p=1}^{n_p} \frac{i_1\text{-th magic factor}}{2^{i_1}\text{-th wizardry}} \img{wiz} \dots \img{wiz} \frac{i_p\text{-th magic factor}}{2^{i_p}\text{-th wizardry}}$$

And repeated in-line: $\img{wiz} \dots \img{wiz} \sum_{i=1}^n x_i y_i.$

Now the pumpkins. First the **bold** math version::

$$\bigoplus_{h=1}^m \bigoplus_{k=1}^n P_{h,k}$$

Then the **normal** one:

$$\bigoplus_{h=1}^m \bigoplus_{k=1}^n P_{h,k}$$

In-line math comparison: $\bigoplus_{i=1}^n P_i \neq \bigoplus_{i=1}^n P_i$ versus $\bigoplus_{i=1}^n P_i \neq \bigoplus_{i=1}^n P_i$.

Close test: $\bigoplus \bigoplus$. And against the pumpkins: $\bigoplus \bigoplus \bigoplus \bigoplus$.

In-line, but with `\limits`: $\bigoplus_{h=1}^m \bigoplus_{k=1}^n P_{h,k}$.

Binary: $x \oplus y \neq x \oplus y$. And in display:

$$a \oplus \frac{x \oplus y}{x \oplus y} \otimes b$$

Close test: $\bigoplus \bigoplus$. And with the pumpkins too: $\bigoplus \bigoplus \bigoplus \bigoplus$.

In general,

$$\bigoplus_{i=1}^n P_i = P_1 \oplus \cdots \oplus P_n$$

The same in bold:

$$\bigoplus_{i=1}^n P_i = P_1 \oplus \cdots \oplus P_n$$

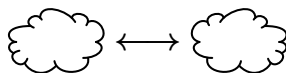
Other styles: $\frac{x \oplus y}{2}$, exponent Z^\oplus , subscript $W_{x \oplus y}$, double script $2^{t \oplus y}$.

Clouds. A hypothetical identity: $\frac{\sin^2 x + \cos^2 x}{\cos^2 x} = \text{cloud}$. Now the same identity set in display:

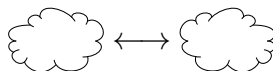
$$\frac{\sin^2 x + \cos^2 x}{\cos^2 x} = \text{cloud}$$

Now in smaller size: $\frac{\sin x + \cos x}{\text{cloud}} = 1$.

Specular clouds, **bold**...



...and in **normal** math.



In-line math comparison: $\text{cloud} \leftrightarrow \text{cloud}$ versus $\text{cloud} \leftrightarrow \text{cloud}$. Abutting: cloudcloud .

Ghosts: $\curvearrowright\curvearrowright\curvearrowright\curvearrowright\curvearrowright\curvearrowright$. Now with letters: $H\curvearrowright H\curvearrowright h\curvearrowright ab\curvearrowright f\curvearrowright wxy\curvearrowright$, and also $2\curvearrowright^3 + 5\curvearrowright^2 - 3\curvearrowright_i = 12\curvearrowright_j^4$. Then, what about $x^{2\curvearrowright}$ and $z_{\curvearrowright+1} = z_{\curvearrowright}^2 + z_{\curvearrowright}$?

In subscripts:

$$\begin{aligned} F_{\curvearrowright+2} &= F_{\curvearrowright+1} + F_{\curvearrowright} \\ F_{\curvearrowright+2} &= F_{\curvearrowright+1} + F_{\curvearrowright} \end{aligned}$$

Another test: $\curvearrowright\curvearrowright|\curvearrowright|\curvearrowright|\curvearrowright\curvearrowright|\curvearrowright|\curvearrowright|\curvearrowright$. We should also try this: $\curvearrowright\curvearrowright\curvearrowright\curvearrowright$.

Extensible arrows:

$$\begin{aligned} A &\curvearrowright \frac{x_1+\cdots+x_n}{a\star f(t)} B \curvearrowright \frac{x+z}{\curvearrowright} C \curvearrowright D \\ A &\curvearrowright \frac{x_1+\cdots+x_n}{a\star f(t)} B \curvearrowright \frac{x+z}{\curvearrowright} C \curvearrowright D \\ A &\curvearrowleft \frac{x_1+\cdots+x_n}{a\star f(t)} \in B \curvearrowleft \frac{x+z}{\curvearrowright} \in C \curvearrowleft \in D \\ A &\frac{x_1+\cdots+x_n}{a\star f(t)} \in B \frac{x+z}{\curvearrowright} \in C \curvearrowleft \in D \end{aligned}$$

And $\frac{x_1+\cdots+x_n}{\curvearrowright} \curvearrowleft = 0$ versus $\frac{x_1+\cdots+x_n}{\curvearrowright} = 0$; or $\frac{x_1+\cdots+x_n}{\curvearrowright} \in = 0$ versus $\frac{x_1+\cdots+x_n}{\curvearrowright} \in = 0$.

Hovering ghosts: $\frac{x_1+\cdots+x_n}{\curvearrowright} = 0$. You might wonder whether there is enough space left for the swishing ghost; let's try again: $\frac{(x_1+\cdots+x_n)y}{\curvearrowright} = 0$. As you can see, there is enough room. Lorem ipsum dolor sit amet consectetur adipiscing elit. And $\frac{\curvearrowright}{\curvearrowright}$ too.

$$\begin{aligned} A &\frac{x_1+\cdots+x_n}{a\star f(t)} \curvearrowright B \frac{x+z}{\curvearrowright} C \curvearrowright D \\ A &\frac{x_1+\cdots+x_n}{a\star f(t)} \curvearrowright B \frac{x+z}{\curvearrowright} C \curvearrowright D \end{aligned}$$

Another hovering ghost: $\frac{\curvearrowright}{\curvearrowright} \frac{x_1+\cdots+x_n}{\curvearrowright} = 0$. Lorem ipsum dolor sit amet consectetur adipiscing elit. Ulla rutrum, vel sivi sit anismus oret, rubi sitiunt silvae. Let's see how it looks like when the ghost hovers on a taller formula, as in $\frac{\curvearrowright}{\curvearrowright} H_1 \oplus \cdots \oplus H_k$. Mmmh, it's suboptimal, to say the least.¹

Under “arrow-like” symbols: $\frac{x_1+\cdots+x_n}{\curvearrowright} = 0$ and $\frac{x+y+z}{\curvearrowright}$. There are $\frac{x_1+\cdots+x_n}{\curvearrowright} = 0$ and $\frac{x+y+z}{\curvearrowright}$ as well.

¹We'd better try $\frac{y_1+\cdots+y_n}{\curvearrowright}$, too; well, this one looks good!

A comparison between the “standard” and the “script-style” over/under extensible arrows:

$$\begin{aligned}
\overrightarrow{f_1 + \cdots + f_n} &\neq \overrightarrow{f_1 + \cdots + f_n} \\
\overleftarrow{f_1 + \cdots + f_n} &\neq \overleftarrow{f_1 + \cdots + f_n} \\
\overleftrightarrow{f_1 + \cdots + f_n} &\neq \overleftrightarrow{f_1 + \cdots + f_n} \\
\overrightarrow{f_1 + \cdots + f_n} &\neq \overrightarrow{f_1 + \cdots + f_n} \\
\overleftarrow{f_1 + \cdots + f_n} &\neq \overleftarrow{f_1 + \cdots + f_n} \\
\overleftrightarrow{f_1 + \cdots + f_n} &\neq \overleftrightarrow{f_1 + \cdots + f_n}
\end{aligned}$$