A Brief LaTeX Example

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September 3, 2007

We have examined a few topologies on the real line. Next, let's look at the plane, $\mathbb{R}^2$. For $x = (x_1, x_2)$ and $y = (y_1, y_2)$, two points in $\mathbb{R}^2$, we previously introduced the Euclidean distance formula

$$d(x, y) = \sqrt{(x_1 - y_1)^2 + (x_2 - y_2)^2}.$$

For each x in $\mathbb{R}^2$, define $B(x, \epsilon) = \{y \mid d(x, y) < \epsilon\}$. Each $B(x, \epsilon)$ is the open ball of radius ϵ centered at x. Define

$$\mathcal{B} = \{B(x, \epsilon) | x \in \mathbb{R}^2, \epsilon > 0\};$$

that is the collection of open balls associated with d.

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1. Summations may be displayed either in text mode or display mode. Here is a summation in text mode: $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$. And here is the same thing in display mode:

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}.$$

2. Likewise for unions, intersections, and other things: $\bigcup_{x \in \mathbb{Z}} \{x^2\}$ or

$$\bigcup_{x \in \mathbb{Z}} \{x^2\}.$$

3. Did you notice how the curly braces were not quite large enough above? If you have exponents or other large terms in an expression, you will want to make your delimiters grow to match with `\left` and `\right` like

$$\left\{x \in \mathbb{R} : x^2 = x\right\}$$

and

$$(n-1)\left(1 - \left(\frac{n-1}{n}\right)^{2n}\right).$$

4. Some functions like min, max, log, and lim have their own commands to display them correctly. For example:

$$y = \min_{x \in \mathbb{R}} f(x)$$

and

$$y = \lim_{x \to \infty} f(x)$$