Maths

This is $x^2 = \frac{1}{4}$ in inline mode. Here it is in display mode:

$$x^2 = \frac{1}{4}$$

More maths

Fraction: $\frac{dy}{dx} = \dfrac{dy}{dx}$

Sum: $\sum_{n=1}^{\infty} = \displaystyle\sum_{n=1}^{\infty}$

Limit: $\lim_{n \to \infty} = \displaystyle\lim_{n \to \infty}$

Integral: $\int_a^b = \displaystyle\int_a^b$

Matrices

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}, \quad B = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}, \quad |A| = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$$

More frightening equations

$$\begin{aligned} f(x) &= e^{x-1} \\ \int_1^2 f(x)\,dx &= e^{x-1} \Big|_1^2 \\ &= e - 1 \end{aligned}$$

$$\begin{align} 2x - 4y - 7z + 8w &= \pi \tag{1} \\ 3x + 5y + 9z &= 213 \tag{2} \end{align}$$

Math symbols

A projection defines a function (f) that transforms data in $\mathbb{R}^{\eta}$ to $\mathbb{R}^{\kappa}$ (where $\eta \geq \kappa$)... f transforms the point set $\mathcal{V}$ to another set $\mathcal{P}$ can be denoted as a mapping of a data point (χ) in $\mathbb{R}^\eta$ to another point (ρ) in $\mathbb{R}^\kappa$ that is subject to:

$$f_\chi = \rho \begin{cases} \mathcal{V} = (\chi_0, \chi_1, \ldots, \chi_i) & \forall \chi_i \in \mathbb{R}^\eta \quad 0 \leq i < N \\ \mathcal{P} = (\rho_0, \rho_1, \ldots, \rho_j) & \forall \rho_j \in \mathbb{R}^\kappa \quad 0 \leq j < n \\ \eta \geq \kappa \\ N \geq n \end{cases} \tag{3}$$