The examples in this document show how you can typeset different complicated expressions in math mode.

$$d_i e_i \equiv 1 \pmod{\phi(n_i)}$$

$$\psi(p_1^{t_1}), \psi(p_2^{t_2}), \ldots, \psi(p_m^{t_m})$$

$$2^{170} \not\equiv \left[\frac{2}{341}\right] \pmod{341}$$

$$b^N\alpha = (a_n a_{n-1} \ldots a_2 a_1 \cdot \overline{c_1 c_2 \ldots c_r})_b$$

$$\left|\frac{f(z) - f(z_j)}{z - z_j} - f'(z_j)\right| < \varepsilon \quad (j = 1, 2, \ldots, n)$$

$$E\varphi = -\frac{h^2}{2m}\frac{d^2\psi}{dx^2} + \frac{1}{2}kx^2\varphi$$

$$\mu_{i,\mathrm{soln}} = \mu_i^* + RT\ln x_i$$

$$P(c_2|c_1) = \frac{P(c_1 \cap c_2)}{P(c_1)}$$

$$\Pr(\mu c_2\sigma < X < \mu + 2\sigma) = \sum_{x=1}^{5}\binom{9}{x}\left(\frac{1}{3}\right)^x\left(\frac{2}{3}\right)^{9-x}$$

$$F(x) = \frac{1}{\Gamma(\alpha)\beta^\alpha}x^{\alpha-1}e^{-x/\beta}, \quad 0 < x < \infty$$

$$\Pr(R = 2k) = \frac{2\binom{m-1}{k-1}\binom{n-1}{k-1}}{\binom{m+n}{n}}$$

$$I_2 = \int_{c_2} z^2\,dz = \int_{OA} z^2\,dz + \int_{AB} z^2\,dz$$

$$F(z + \Delta z) - F(z) = \int_{z_0}^{z+\Delta z} f(s)\,ds - \int_{z_0}^{z} f(s)\,ds$$

$$G(y) = \int_0^{\sqrt{y}} \int_0^{2\pi} \int_0^{\pi} \frac{1}{(2\pi)^{3/2}} e^{-\rho^2/2} \rho^2 \sin\varphi \, d\varphi \, d\theta \, d\rho$$

$$\begin{aligned} M(t;n) &= E\left[\exp\left(t \frac{\Sigma_i X_i - n\mu}{\sigma\sqrt{n}}\right)\right] \\ &= \left[m\left(\frac{t}{\sigma\sqrt{n}}\right)\right]^n, \qquad -h < \frac{t}{\sigma\sqrt{n}} < h \end{aligned}$$

$$f(x) = \begin{cases} \frac{m^x e^{-m}}{x!}, & x = 0,\, 1,\, 2,\, \ldots; \\ 0 \qquad\quad, & \text{elsewhere.} \end{cases}$$

$$J = \begin{vmatrix} \frac{\partial x_1}{\partial y_1} & \frac{\partial x_1}{\partial y_2} \\ \frac{\partial x_2}{\partial y_1} & \frac{\partial x_2}{\partial y_2} \end{vmatrix} = \begin{vmatrix} \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & -\frac{1}{2} \end{vmatrix} = -\frac{1}{2}$$

$$\nabla \times F = \frac{1}{r^2 \sin\varphi} \begin{vmatrix} u_r & r u_\varphi & r u_\theta \sin\varphi \\ \frac{\partial}{\partial r} & \frac{\partial}{\partial \varphi} & \frac{\partial}{\partial \theta} \\ F_r & r F_\varphi & r F_\theta \sin\varphi \end{vmatrix}$$

$$Q = \iiint_{\mathcal{R}} \kappa \nabla^2 \tau \, d\tau$$

$$\mathrm{H_2SeO_3 + 6I^- + 4H^+ = Se}(s)\mathrm{ + 2I^- + 3H_2O}$$

$$\mathrm{Zn|Zn^{2+}\|Cu^{2+}|Cu}$$

$$\begin{array}{c} \mathrm{N_2O_3} \longrightarrow \mathrm{N_2O_4 + O_2} \\ \Updownarrow \\ \mathrm{2NO_2} \end{array}$$

$$\begin{array}{ccccc} & A & \xrightarrow[T_1]{\triangle H_2} & B & \\ \int_{T_2}^{T_1} \overline{C}_{P,A} \, dT & \downarrow & & \uparrow & \int_{T_1}^{T_2} \overline{C}_{P,B} \, dT \\ & A & \xrightarrow[T_2]{\triangle H_1} & B & \end{array}$$

$$P = \sqrt[3]{-q/2 + \sqrt{\underline{p}^3/27 + q^2/4}}$$

$$nG = \Sigma(n_i G_i^\circ) + RT\Sigma(n_i \ln \frac{\hat{f}_i}{f_i^\circ})$$

. . . .

$$G_c(s) = K_c \left(1 + \frac{1}{T_{i^s}}\right)(1 + T_{d^s})$$

. . . .

$$f_c = 0.08 N_{Re}^{-0.25} + 0.01 \frac{D}{D_c}^{0.5}$$

. . . .

$$\frac{(d_p^\circ)^3 \rho_c^2 g}{\mu_c^2} = 29.0 \left(\frac{p^3 g_c^3}{v^3 \rho_c^2 \mu_c g^4}\right)^{-0.32} \left(\frac{\rho_c \sigma^3 g_c^3}{\mu_c^4 g}\right)^{0.14}$$

. . . .

$$G(j\omega) = z \frac{\int_0^\infty e^{-j\omega t} y(t)\, dt}{\int_0^\infty e^{-j\omega t} x y(t)\, dt}$$

. . . .

$$\left[\frac{1}{a} \ln \frac{\Delta t}{a + b\Delta t}\right]_{\Delta t_1}^{\Delta t_2} = \frac{1}{a} \ln \frac{U_{\circ 1} \Delta t_2}{U_{\circ 2} \Delta t_1}$$