1 Display Mode Equations

1.1 Basic Equation

$$f(x) = x^2 - 3x + 9$$
$$G(x) = sin^2(x)$$

1.2 Alignment of Equations

$$\begin{aligned} f(x) &= x^2 - 5x + 6 \\ &= (x-3) \cdot (x-2) \end{aligned} \tag{1}$$

$$\begin{array}{lll} 2x + 3y = 5 & 9x - 7y = 12 & 3x + 4y = 7 \\ x + 9y = 4 & -2x + 5y = 13 & -x - y = 1 \end{array}$$

$$\begin{aligned} F &= mass \times acceleration \\ &= m \times a \end{aligned} \tag{2}$$

2 Inline Mode Equations

The equation of force is given by $F = ma$. This equation was derived by Issac Newton. Here F is force, m is mass and a is acceleration. Again the equation is $F = ma$. Remember this equation!

3 Symbols

3.1 Basic Arithmetic

$$6 + 4$$
$$6 - 4$$
$$6 \times 4$$
$$6 \cdot 4$$
$$6 \div 4$$
$$\frac{6}{4}$$
$$\tfrac{6}{4}$$

4 Superscript and Subscripts

A Polynomial of Degree n is given by,

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \cdots + a_1 x^1 + a_0 \tag{3}$$

The equation of a dying signal is given by,

$$S(t) = Ae^{-kt} \tag{4}$$

$$t_{p_x}^2 \tag{5}$$

$$\sum_{i=0}^{n} i = \frac{n \cdot (n+1)}{2} \tag{6}$$

5 Parenthesis

$$(a + b)$$

Force is given by,

$$F = ma \text{ where } m \text{ is mass and } a \text{ is acceleration}$$

6 Greek Symbols

alpha α, beta β, gamma γ, theta θ, omega ω
Big Gamma Γ, Big Delta Δ, Big Theta Θ, Big Omega Ω
Insertion sort's time complexity is $O(n^2)$
Gamma Function of n is given by $\Gamma\left(n+1\right) = n \cdot \Gamma\left(n\right)$ and $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$

7 Recreating Some Famous Equations

Speed of Light

$$c = \frac{1}{\sqrt{\epsilon_0 \mu_0}} \tag{7}$$

$$T_s = 2\pi\sqrt{\frac{m}{k}} \tag{8}$$

$$\vec{F_s} = k|\vec{x}| \tag{9}$$

$$|\vec{F_g}| = G\frac{m_1 m_2}{r^2} \text{ where } G \text{ is the gravitational constant} \tag{10}$$

$$p\left(\theta\right) = \sum_{i=1}^{K} \phi_i N\left(\mu_i, \Sigma_i\right) \tag{11}$$