Mathematical Equations and Expressions

Avinash More

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PI: π

Area of a circle:

$$A = \pi r^2$$

Trigonometric functions:

Sin:

$$y = \sin x$$

Cosine:

$$y = \cos x$$

Tan:

$$y = \tan x$$

Log functions:

Log:

$$\log x$$

Natural Log:

$$\ln x$$

Roots:

Square root:

$$\sqrt{x}$$

Cube root:

$$\sqrt[3]{x}$$

Nested root:

$$\sqrt{1 + \sqrt{x}}$$

Fractions:

$$\frac{2}{3}$$

$$1$$

$$\frac{\sqrt[3]{x+1}}{\sqrt[4]{x-1}}$$

$$\sqrt{\frac{x}{x^2+2x+1}}$$

Equations That Changed the World

1: Pythagorean Theorem:
If a and b are non-hypotenuse sides of a right angle triangle and c is a hypotenuse of the same triangle then,

$$c^2 = a^2 + b^2$$

2: The logarithm and its identities:

$$\log xy = \log x + \log y$$

3: The fundamental theorem of calculus:

$$\frac{df}{dt} = \lim_{h \to 0} \frac{f(t+h) - f(t)}{h}$$

4: Newton's universal law of gravitation:

$$F = G\frac{m_1 m_2}{d^2}$$

5: The origin of complex numbers:

$$i^2 = -1$$

6: The normal distribution:

$$\Phi(x) = \frac{1}{\sqrt{2\pi\sigma}} e^{\frac{(x-\mu)^2}{2\sigma^2}}$$

7: The wave equation:

$$\frac{\delta^2 u}{\delta t^2} = c^2 \frac{\delta^2 u}{\delta x^2}$$

8: The Fourier transform:

$$f(\zeta) = \int_{-\infty}^{\infty} f(x) e^{-2\pi i x \zeta} dx$$

9: Einstein's theory of relativity:

$$E = mc^2$$

10. Summation:

$$\sum_{n=1}^{\infty} 2^{-n} = 1$$

11. Matrix:

$$M = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 & 7 \end{bmatrix}$$

12. Recursive:

$$n = \cfrac{1}{\frac{2n-1}{n} + \cfrac{1}{\frac{2n-3}{n} + \ddots + \cfrac{1}{\frac{2n-n}{n}}}}$$

Integration:

$$\int_0^1 x^2 + y^2 \, dx$$