

# TEN EQUATIONS

That Changed The World

**ISAAC NEWTON'S LAW OF UNIVERSAL GRAVITATION**

Research has revealed why the planets have the same rate of acceleration as we do. From an orbital perspective, the planets that pulled Newton's theory in 1687, are also of similar composition with the same density as we are. In only 500 years, Isaac Newton's Theory of Gravity has been explained.

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

**ALBERT EINSTEIN'S THEORY OF RELATIVITY**

Einstein's most famous equation, the general theory of relativity, is a theory of gravity that describes how mass and energy affect the geometry of space and time. It is the most accurate theory of gravity we have, and it is the foundation of modern physics.

$$E = mc^2$$

**THE PYTHAGOREAN THEOREM**

The ancient Greek mathematician Pythagoras discovered that in a right-angled triangle, the square of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the other two sides.

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

**MAXWELL'S EQUATIONS**

James Clerk Maxwell's equations are a set of four partial differential equations that describe the behavior of electric and magnetic fields and their interactions with matter and radiation. They are the foundation of classical electrodynamics, optics, and quantum electrodynamics.

$$\begin{aligned} \nabla \cdot \mathbf{D} &= \rho \\ \nabla \cdot \mathbf{B} &= 0 \\ \nabla \times \mathbf{E} &= -\frac{\partial \mathbf{B}}{\partial t} \\ \nabla \times \mathbf{H} &= \mathbf{J} + \frac{\partial \mathbf{D}}{\partial t} \end{aligned}$$

**THE SECOND LAW OF THERMODYNAMICS**

Rudolf Clausius law states that energy always flows from higher concentration to lower concentrations. It also states that whenever energy changes or moves, it becomes less useful. Formulated in 1865, it has led to the development of technologies like internal combustion engines, refrigerators, and electricity generation.

$$dS \geq 0$$

**LOGARITHMS**

Logarithms were introduced by John Napier in the early 17th century as a way to simplify calculations. They answer the question, "How many of X number do we multiply to get Y number?". Logarithms were adopted by early navigators, scientists and engineers. Today, scientific calculators and digital computers do the work for us.

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

**CALCULUS**

The calculation shown is the definition of the derivative in differential calculus, one of calculus' two major branches. The derivative measures the rate at which a quantity is changing—if you are walking 2 km an hour, then you will change your position by 2 km every hour. In the 1680s, Newton used calculus to develop his laws of motion and gravitation.

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

**SCHRÖDINGER'S EQUATION**

This equation describes how the quantum state of a quantum system changes with time. Developed by Austrian physicist Erwin Schrödinger in 1926, it predicts the behavior of atoms and subatomic particles in quantum mechanics. Schrödinger's Equation paved the way for nuclear power, microchips, electron microscopes, and quantum computing.

$$i\hbar \frac{\partial}{\partial t} \times \Psi = \hat{H} \Psi$$

**INFORMATION THEORY**

Information theory is a branch of mathematics that studies the coding of information in the form of sequences of symbols, and the speed at which that information can be transmitted. Applications of topics within information theory include data compression and channel coding. Research in the field was also instrumental in the development of the internet and mobile phones.

$$H = -\sum p(x) \log p(x)$$

**CHAOS THEORY**

Chaos Theory is a branch of mathematics that studies complex systems whose behavior is extremely sensitive to slight changes in conditions. In essence, it shows how small alterations can lead to consequences of much greater scale. Chaos Theory has applications just about everywhere—meteorology, zoology, physics, computer science, engineering, economics, biology, and philosophy.

$$X_{t+1} = kx_t(1 - x_t)$$

**“EXCELLENCE IS  
NEVER AN ACCIDENT;  
IT IS THE RESULT OF  
HIGH INTENTION,  
SINCERE EFFORT,  
INTELLIGENT DIRECTION,  
SKILLFUL EXECUTION  
AND THE VISION TO SEE  
OBSTACLES AS  
OPPORTUNITIES**

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**ANONYMOUS**



***Wish You A  
Happy New Year***



SRMankapal



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