3rd Radiation Physics

Force, Power, Work and Energy

The force is defined as an influence that leads to a change in the kinetic state of the body when there is no opposite force in the direction, and the kinetic state is changing the state of the body from rest to motion or vice versa, or acceleration or deceleration of the body, or changing the direction of its movement. It is determined by an amount and direction, and the amount of force is measured in Newton's. Power (P) is the rate of energy generation (or absorption) over time: P = E/t, where E - energy, t - time. Power's SI unit of measurement is the Watt, representing the generation or absorption of energy at the rate of 1 Joule/sec. The types of force are the following Attractive force, gravitational force, magnetic force, muscular force, frictional force, electrical force

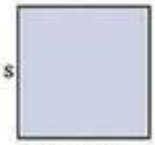
Work occurs when the force applied to the body moves the body for a certain distance in parallel, and the distance traveled must be in the same direction as the applied force, and the work can be negative or positive. Positive, this means that the direction of the force is in the same direction of motion, and work is measured in joules, $W = F \times d$, which is equal to Newton x meters. Work in our lives comes in many forms, including mechanical work, electrical work, magnetic work, work in thermodynamics

Energy is one of the properties of matter that has existed in nature since its inception. The universe contains two main elements: bodies and energy. Objects are what we all know, such as the human body, stones, soil, elements, atoms, and others. As for energy, it is the engine that drives these bodies in the universe. A person would not have been able to move without energy or form sunlight and heat without it. The energy of a moving object is called kinetic energy. For an object of mass m, moving with velocity of magnitude v, this energy can be calculated from the following formula $E= (1/2)\times mv^2$. There are two types of energy. The first is Kinetic Energy or Energy of Motion, the second is Potential Energy or Stored Energy**.** Energy is defined as the body's ability to Work is done, energy is measured in joules, and energy is conserved in the universe since its inception as well; Energy is neither created nor destroyed, but changes from one form to another. There are many types of energy. Energy, including mechanical energy, sound energy, chemical energy, electrical energy, magnetic energy, thermal energy, nuclear energy, ionization energy, elastic energy, gravitational energy, radiant energy.

English Grammer

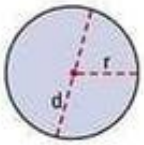
DERIVATIVES	INTEGRALS
$\frac{d}{dx}\left(\frac{x^{n+1}}{n+1}\right) = x^n$	$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq 1$
$\frac{d}{dx}(x) = 1$	$\int dx = x + C$
$\frac{d}{dx}(\sin x) = \cos x$	$\int \cos x\, dx = \sin x + C$
$\frac{d}{dx}(-\cos x) = \sin x$	$\int \sin x\, dx = -\cos x + C$
$\frac{d}{dx}(\tan x) = \sec^2 x$	$\int \sec^2 x\, dx = \tan x + C$
$\frac{d}{dx}(-\cot x) = \operatorname{cosec}^2 x$	$\int \operatorname{cosec}^2 x\, dx = -\cot x + C$
$\frac{d}{dx}(\sec x) = \sec x \tan x$	$\int \sec x \tan x\, dx = \sec x + C$
$\frac{d}{dx}(-\operatorname{cosec} x) = \operatorname{cosec} x \cot x$	$\int \operatorname{cosec} x \cot x\, dx = -\operatorname{cosec} x + C$
$\frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$	$\int \frac{dx}{\sqrt{1-x^2}} = \sin^{-1} x + C$
$\frac{d}{dx}(\cos^{-1} x) = -\frac{1}{\sqrt{1-x^2}}$	$\int -\frac{dx}{\sqrt{1-x^2}} = \cos^{-1} x + C$
$\frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$	$\int \frac{dx}{1+x^2} = \tan^{-1} x + C$
$\frac{d}{dx}(\cot^{-1} x) = -\frac{1}{1+x^2}$	$\int -\frac{dx}{1+x^2} = \cot^{-1} x + C$
$\frac{d}{dx}(\sec^{-1} x) = \frac{1}{\lvert x\rvert\sqrt{x^2-1}}$	$\int \frac{dx}{\lvert x\rvert\sqrt{x^2-1}} = \sec^{-1} x + C$
$\frac{d}{dx}(\operatorname{cosec}^{-1} x) = -\frac{1}{\lvert x\rvert\sqrt{x^2-1}}$	$\int \frac{dx}{-\lvert x\rvert\sqrt{x^2-1}} = \operatorname{cosec}^{-1} x + C$
$\frac{d}{dx}(e^x) = e^x$	$\int e^x dx = e^x + C$
$\frac{d}{dx}(\log \lvert x\rvert) = \frac{1}{x}$	$\int \frac{dx}{x} = \log \lvert x\rvert + C$
$\frac{d}{dx}\left(\frac{a^x}{\log a}\right) = a^x$	$\int a^x dx = \frac{a^x}{\log a} + C$

GEOMETRY FORMULAS

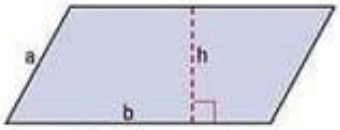


Square
Perimeter: $P = 4s$ or $s + s + s + s$
Area: $A = s^2$

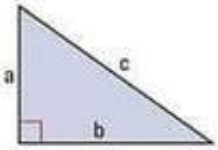
Rectangle
Perimeter: $P = 2a + 2b$
Area: $A = ab$



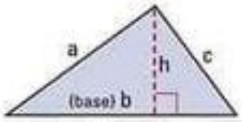
Circle
Circumference: $C = 2\pi r$ or πd
Area: $A = \pi r^2$



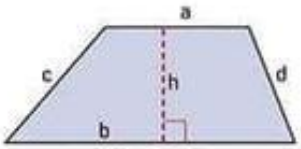
Parallelogram
Perimeter: $P = 2a + 2b$
Area: $A = bh$



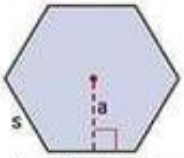
Pythagorean Theorem
$a^2 + b^2 = c^2$



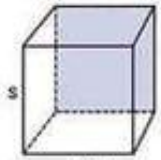
Triangle
Perimeter: $P = a + b + c$
Area: $A = \frac{1}{2}bh$



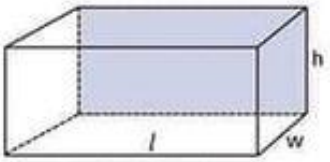
Trapezoid
Perimeter: $P = a + b + c + d$
Area: $A = \frac{1}{2}(a + b)h$



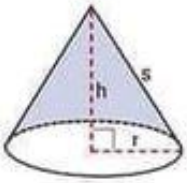
Regular Polygon
Perimeter: $P = Ns$ (N=number of sides)
Area: $A = \frac{1}{2}aP$



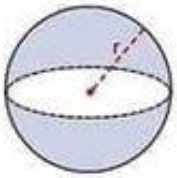
Cube
Volume: $V = s^3$ or $s \times s \times s$
Surface Area: $SA = 6s^2$



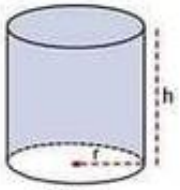
Rectangular Solid
Volume: $V = lwh$
Surface Area: $SA = 2lw + 2wh + 2lh$



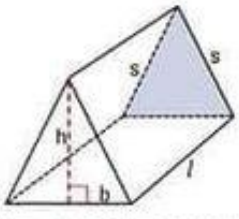
Cone
Volume: $V = \frac{1}{3}\pi r^2 h$
Surface Area: $SA = \pi rs + \pi r^2$



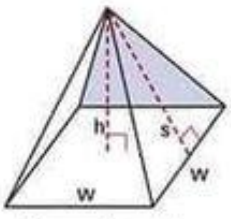
Sphere
Volume: $V = \frac{4}{3}\pi r^3$
Surface Area: $SA = 4\pi r^2$



Cylinder
Volume: $V = \pi r^2 h$
Surface Area: $SA = 2\pi r^2 + 2\pi rh$



Isosceles Triangular Prism
Volume: $V = \frac{1}{2}(bh)l$
Surface Area: $SA = bh + 2ls + lb$



Square Pyramid
Volume: $V = \frac{1}{3}w^2h$
Surface Area: $SA = 2ws + w^2$

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