instantaneous current & q is charge in coulombs

$$i = \frac{dq}{dt} \qquad\qquad q = \int i \, dt$$

instantaneous power & energy (or work) w

$$p = \frac{dw}{dt} \qquad\qquad w = \int p \, dt$$

instantaneous Capacitor current & voltage

$$i_C = C \frac{dv}{dt} \qquad\qquad v_C = \frac{1}{C} \int i \, dt$$

instantaneous induced voltage & flux

$$v_{ind} = -N \frac{d\emptyset}{dt} \qquad\qquad \emptyset = (-1/N) \int v_{ind} \, dt$$

instantaneous induced voltage & current

$$v_{ind} = -L \frac{di}{dt} \qquad\qquad i = (-1/L) \int v_{ind} \, dt$$

instantaneous mutual inductance

$$v_2 = -M \frac{di_1}{dt} \qquad\qquad i_1 = (-1/M) \int v_2 \, dt$$

Kirchhoff's Current Law

$$i_g = C\frac{dv}{dt} + \frac{v}{R} - (1/L)\int v_{ind}\, dt$$

Kirchhoff's Voltage Law

$$v_g = -L\frac{di}{dt} + Ri + (1/C)\int i\, dt$$

Acceleration due to gravity

$$a = -32ft/s^2 \qquad a = -9.8m/s^2$$

velocity

$$v = \int a\, dt$$

distance

$$s = \int v\, dt$$

Logarithms

$$\log N = X \qquad 10^X = N$$

Circles

$$(x - h)^2 + (y - k)^2 = r^2$$

Parabolas

$$(y - k)^2 = 4p(x - h) \qquad (x - h)^2 = 4p(y - k)$$

Area of a Circle

$$A = \pi r^2$$

Area & Circumference of a Circle

$$A = \pi r^2 \qquad C = 2\pi r$$

Volume of a Cylinder

$$V = \pi r^2 h$$

Trig Functions Formulas:
$$\theta = \frac{s}{r}$$

- angle θ is in radians, s is the distance along the arc and r is the radius of the arc.

$$\omega = \frac{d\theta}{dt}$$

- ω is angular speed

$$\alpha = \frac{d\omega}{dt} = \frac{d^2\theta}{dt^2}$$

- α is angular acceleration

$$S = \theta r$$

- S is the linear distance along an arc, θ is the angle in radians, and r is the radius of the arc.

$$v = \frac{ds}{dt} = r\frac{d\theta}{dt}, or \ v = r\omega$$

- v is linear speed

$$a = \frac{dv}{dt} = \frac{d^2s}{dt^2} = r\frac{dw}{dt} = r\frac{d^2\theta}{dt^2}, or \ a = r\alpha$$

- a is linear acceleration

$$v_x = \frac{dx}{dt} = r\omega \sin\theta$$

- v_x is the velocity or speed of the x or horizontal component

$$v_y = \frac{dy}{dt} = r\omega \cos\theta$$

- v_y is the velocity or speed of the y or vertical component

$$\frac{d}{dx}\sin u = \cos u \frac{du}{dx}$$

$$\frac{d}{dx}\cos u = -\sin u \frac{du}{dx}$$