

Newton's law of cooling

$$T - T_S = (T_0 - T_S)e^{-kt}$$

Volumes and surface areas

$$S_{\text{sphere}} = 4\pi r^2 \quad V_{\text{sphere}} = \frac{4}{3}\pi r^3 \quad S_{\text{cone}} = \pi r\sqrt{r^2 + h^2} \quad V_{\text{cone}} = \frac{\pi}{3}hr^2$$

Sum of angles

$$\sin(A + B) = \sin A \cos B + \cos A \sin B \quad \cos(A + B) = \cos A \cos B - \sin A \sin B$$

Double angle relations and law of cosines

$$\sin^2 x = \frac{1 - \cos(2x)}{2} \quad \cos^2 x = \frac{1 + \cos(2x)}{2} \quad c^2 = a^2 + b^2 - 2ab \cos \theta$$

Integrals

$$\int \frac{du}{\sqrt{a^2 - u^2}} = \sin^{-1} \left(\frac{u}{a} \right) + C \quad (\text{valid for } u^2 < a^2)$$

$$\int \frac{du}{a^2 + u^2} = \frac{1}{a} \tan^{-1} \left(\frac{u}{a} \right) + C$$

$$\int \frac{du}{u\sqrt{u^2 - a^2}} = \frac{1}{|a|} \sec^{-1} \left| \frac{u}{a} \right| + C \quad (\text{valid for } u^2 > a^2)$$