

TAYLOR EXPANSION of $f(x)$ about x_0

$$f(x) = f(x_0) + f'(x_0)(x-x_0) + f''(x_0) \frac{(x-x_0)^2}{2!} + \dots$$

useful when x is close to $x_0 \Rightarrow x-x_0$ is small

\Rightarrow ignore higher order terms

apply to $(1+x)^n$ n + or -
expand about $x=0$

(BINOMIAL EXPANSION)

$$(1+x)^n = 1 + n(1)x + n(n-1)(1) \frac{x^2}{2} + \dots$$

$$\Rightarrow (1+x)^n \approx 1 + nx$$

apply to $\sin \theta$ about $\theta=0$.

$$\sin \theta = \theta - \frac{\theta^3}{6} + \dots \Rightarrow \sin \theta \approx \theta$$

$$\cos \theta = 1 - \frac{\theta^2}{2} + \frac{\theta^4}{24} - \dots \Rightarrow \cos \theta \approx 1 - \frac{\theta^2}{2}$$