$$\left(x^2 < 1\right);(n > 0)$$

$$(1 \pm x)^n = \sum_{k=0}^{n} \frac{n!}{k!\left(n-k\right)!}\left(\pm x\right)^k$$

$$= 1 \pm nx + \frac{n(n-1)}{2!}x^2 \pm \frac{n(n-1)(n-2)}{3!}x^3 + \ldots \text{ etc.}$$

$(x^2 < 1);(n > 0)$ note negative sign in formula!

$$(1 \pm x)^{-n} = \sum_{k=0}^{\infty}(-1)^k \frac{(n+k-1)!}{k!\left(n-1\right)!}(\pm x)^k$$

$$= 1 \mp nx + \frac{n(n+1)}{2!}x^2 \mp \frac{n(n+1)(n+2)}{3!}x^3 + \ \ldots \text{ etc.}$$

Since $x^2 < 1$, the terms diminish in value rapidly and the series converges to a reasonable approximation after only a few terms.