

Binomial:

$n \rightarrow$  can't use  $({}^n C_r)$ .  
 -ve      fractional

$(1+x)^n \rightarrow$  limitation (1 should be present).

$$1 + nx + \frac{n(n-1)}{2!} (x)^2 + \frac{n(n-1)(n-2)}{3!} (x)^3$$

Validity of expansion:

take common to make (1).  
 $(a+x)^n$   
 $a^n \left(1 + \frac{x}{a}\right)^n$

$$\left|\frac{x}{a}\right| < 1$$

thus expression is valid for  $|x| < a$ .

eg:  $(1-2x^2)^{-2} + (1+6x^2)^{2/3}$ .

$$1 + 4x^2 + \frac{(-2)(-3)}{2!} (-2x^2)^2 + \dots + 1 + \frac{2}{3} (6x^2) + \frac{(2/3)(-1/3)}{2!} (6x^2)^2 + \dots$$

$$(1 + 4x^2 + 12x^4) - (1 + 4x^2 - 4x^4)$$

$$12x^4 + 4x^4$$

$$= 16x^4$$

$$\rightarrow k = 16$$



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