Air maths tuition

Interact, engage and perform

Binomial Expansion | Past Paper Question | C4 Edexcel January 2013 Q1

Given $f(x) = (2 + 3x)^{-3}$, $|x| < \frac{2}{3}$ find the binomial expansion of $f(x)$, in ascending powers of x, up to and including the term in x^3. Give each coefficient as a simplified fraction.

$$(1+a)^n \equiv 1 + na + \frac{n(n-1)a^2}{2!} + \frac{n(n-1)(n-2)a^3}{3!} + \ldots$$

$$(2+3x)^{-3} \equiv \left[2\left(1+\tfrac{3}{2}x\right)\right]^{-3}$$

$$\equiv 2^{-3}\left(1+\tfrac{3}{2}x\right)^{-3}$$

$$\equiv \frac{1}{8}\left[1 + (-3)\left(\tfrac{3}{2}x\right) + \frac{(-3)(-4)}{(2)(1)}\left(\tfrac{3}{2}x\right)^2 + \frac{(-3)(-4)(-5)}{(3)(2)(1)}\left(\tfrac{3}{2}x\right)^3 + \ldots\right]$$

$$\equiv \frac{1}{8}\left[1 - \frac{9x}{2} + \frac{54}{16}x^2 - \frac{270}{48}x^3 + \ldots\right]$$

$$\equiv \frac{1}{8} - \frac{9x}{16} + \frac{27}{16}x^2 - \frac{135}{32}x^3 + \ldots$$

With the acknowledgement of Exam Solutions.

Find lots more revision sheets on Air Maths Tuition.

This Video

Exam Solutions

maths made easy