



Air maths tuition

Interact, engage and perform

Binomial Expansion | Past Paper Question | C4 January 2009 Q3(b)

$$(1+a)^n \equiv 1 + na + \frac{n(n-1)a^2}{2!} + \frac{n(n-1)(n-2)a^3}{3!} + \dots$$
$$f(x) \equiv \frac{4}{(3x+2)^2} + \frac{3}{1-x}$$
$$\equiv 4(3x+2)^{-2} + 3(1-x)^{-1}$$
$$\equiv \frac{4}{4} \left(1 + \frac{3x}{2}\right)^{-2} + 3(1-x)^{-1}$$
$$\equiv \left[1 + (-2)\left(\frac{3x}{2}\right) + \frac{(-2)(-3)}{(2)(1)}\left(\frac{3x}{2}\right)^2 + \dots\right] + 3\left[1 + (-1)(-x) + \frac{(-1)(-2)}{(2)(1)}(-x)^2 + \dots\right]$$
$$\equiv 1 - 3x + \frac{27}{4}x^2 + \dots + 3 + 3x + 3x^2 + \dots$$
$$\equiv 4 + \frac{39}{4}x^2 + \dots$$
$$(3x+2)^{-2} \equiv (2+3x)^{-2}$$
$$\equiv \left[2\left(1 + \frac{3x}{2}\right)\right]^{-2}$$
$$\equiv 2^{-2}(1 + \frac{3x}{2})^{-2}$$

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