Binomial Expansion Exam Questions (from OCR 4724)

Q1 (Jun 2015, Q4)

(i) Find the first three terms in the binomial expansion of $(8-9x)^{\frac{2}{3}}$ in ascending powers of x. [4]

(ii) State the set of values of x for which this expansion is valid. [1]

Q2, (Jun 2016, Q7)

Given that the binomial expansion of $(1+kx)^n$ is $1-6x+30x^2+\dots$, find the values of n and k. State the set of values of x for which this expansion is valid. [6]

Q3 (Jun 2014, Q3)

(i) Find the first three terms in the expansion of $(1-2x)^{-\frac{1}{2}}$ in ascending powers of x, where $|x| < \frac{1}{2}$. [3]

(ii) Hence find the coefficient of x^2 in the expansion of $\dfrac{x+3}{\sqrt{1-2x}}$. [2]

Q4 (Jun 2013, Q10)

(i) Show that $\dfrac{x}{(1-x)^3} \approx x + 3x^2 + 6x^3$ for small values of x. [2]

(ii) Use this result, together with a suitable value of x, to obtain a decimal estimate of the value of $\dfrac{100}{729}$. [2]

(iii) Show that $\dfrac{x}{(1-x)^3} = -\dfrac{1}{x^2}\left(1-\dfrac{1}{x}\right)^{-3}$. Hence find the first three terms of the binomial expansion

of $\dfrac{x}{(1-x)^3}$ in powers of $\dfrac{1}{x}$. [4]

(iv) Comment on the suitability of substituting the same value of x as used in part **(ii)** in the expansion in part **(iii)** to estimate the value of $\dfrac{100}{729}$. [1]

Q5 (Jan 2013, Q2)

Find the first three terms in the expansion of $(9-16x)^{\frac{3}{2}}$ in ascending powers of x, and state the set of values for which this expansion is valid. [5]

Q6 (Jun 2012, Q3)

(i) Expand $\dfrac{1+x^2}{\sqrt{1+4x}}$ in ascending powers of x, up to and including the term in x^3. [6]

(ii) State the set of values of x for which this expansion is valid. [1]

Q7, (Jan 2012, Q4)

(i) Expand $\left(1-4x\right)^{\frac{1}{4}}$ in ascending powers of x, up to and including the term in x^3. [5]

(ii) The term of lowest degree in the expansion of

$$\left(1+ax\right)\left(1+bx^2\right)^7 - \left(1-4x\right)^{\frac{1}{4}}$$

in ascending powers of x is the term in x^3. Find the values of the constants a and b. [4]