Binomial Expansion Exam Questions (from OCR 4722)

Q1, (Jan 2011, Q1)

(i) Find and simplify the first three terms, in ascending powers of x, in the binomial expansion of $(1 + 2x)^7$. **[3]**

(ii) Hence find the coefficient of x^2 in the expansion of $(2 - 5x)(1 + 2x)^7$. **[3]**

Q2, (Jan 2010, Q3)

(i) Find and simplify the first four terms in the expansion of $(2 - x)^7$ in ascending powers of x. **[4]**

(ii) Hence find the coefficient of w^6 in the expansion of $\left(2 - \frac{1}{4}w^2\right)^7$. **[2]**

Q3, (Jun 2010, Q3)

(i) Find and simplify the first four terms in the binomial expansion of $(1 + \frac{1}{2}x)^{10}$ in ascending powers of x. **[4]**

(ii) Hence find the coefficient of x^3 in the expansion of $(3 + 4x + 2x^2)(1 + \frac{1}{2}x)^{10}$. **[3]**

Q4 (Jan 2009, Q7)

In the binomial expansion of $(k + ax)^4$ the coefficient of x^2 is 24.

(i) Given that a and k are both positive, show that $ak = 2$. **[3]**

(ii) Given also that the coefficient of x in the expansion is 128, find the values of a and k. **[4]**

(iii) Hence find the coefficient of x^3 in the expansion. **[2]**

Q5, (Jan 2013, Q4)

(i) Find the binomial expansion of $(2 + x)^5$, simplifying the terms. **[4]**

(ii) Hence find the coefficient of y^3 in the expansion of $(2 + 3y + y^2)^5$. **[3]**

Q6, (Jun 2013, Q3)

(i) Find and simplify the first three terms in the expansion of $(2 + 5x)^6$ in ascending powers of x. **[4]**

(ii) In the expansion of $(3 + cx)^2(2 + 5x)^6$, the coefficient of x is 4416. Find the value of c. **[3]**

Q7, (Jun 2014, Q6)

(i) Find the binomial expansion of $\left(x^3+\frac{2}{x^2}\right)^4$, simplifying the terms. **[5]**

(ii) Hence find $\int\left(x^3+\frac{2}{x^2}\right)^4 dx$. **[4]**

Q8 (Jun 2015, Q4)

(i) Find and simplify the first three terms in the binomial expansion of $(2+ax)^6$ in ascending powers of x. **[4]**

(ii) In the expansion of $(3-5x)(2+ax)^6$, the coefficient of x is 64. Find the value of a. **[3]**

Q9, (Jun 2016, Q3)

(i) Find the binomial expansion of $(3+kx)^3$, simplifying the terms. **[4]**

(ii) It is given that, in the expansion of $(3+kx)^3$, the coefficient of x^2 is equal to the constant term. Find the possible values of k, giving your answers in an exact form. **[2]**

Q10, (Jan 2008, Q10)

(i) Find the binomial expansion of $(2x+5)^4$, simplifying the terms. [4]

(ii) Hence show that $(2x+5)^4-(2x-5)^4$ can be written as

$$320x^3+kx,$$

where the value of the constant k is to be stated. [2]

(iii) Verify that $x=2$ is a root of the equation

$$(2x+5)^4-(2x-5)^4=3680x-800,$$

and find the other possible values of x. [6]
