Series

(Past Year Topical Questions 2012-2017)

May/June 2012 (11)

9.

Find the values of the positive constants p and q such that, in the binomial expansion of $(p + qx)^{10}$, the coefficient of x^5 is 252 and the coefficient of x^3 is 6 times the coefficient of x^2.

[8]

Oct/Nov 2012 (11)

6.

(i) Find the first 3 terms, in descending powers of x, in the expansion of $\left(x+\frac{2}{x^2}\right)^6$. [3]

(ii) Hence find the term independent of x in the expansion of $\left(2-\frac{4}{x^3}\right)\left(x+\frac{2}{x^2}\right)^6$. [2]

Oct/Nov 2012 (13)

6.

In the expansion of $(p + x)^6$, where p is a positive integer, the coefficient of x^2 is equal to 1.5 times the coefficient of x^3.

(i) Find the value of p. [4]

(ii) Use your value of p to find the term independent of x in the expansion of $(p + x)^6 \left(1 - \frac{1}{x}\right)^2$. [3]

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May/June 2013 (12)

9.

(i) Given that n is a positive integer, find the first 3 terms in the expansion of $\left(1+\frac{1}{2}x\right)^n$ in ascending powers of x. [2]

(ii) Given that the coefficient of x^2 in the expansion of $(1-x)\left(1+\frac{1}{2}x\right)^n$ is $\frac{25}{4}$, find the value of n. [5]

Oct/Nov 2013 (13)

1.

The coefficient of x^2 in the expansion of $(2 + px)^6$ is 60.

(i) Find the value of the positive constant p. [3]

(ii) Using your value of p, find the coefficient of x^2 in the expansion of $(3 - x)(2 + px)^6$. [3]

May/June 2014 (13)

5.

(i) The first three terms in the expansion of $(2-5x)^6$, in ascending powers of x, are $p+qx+rx^2$. Find the value of each of the integers p, q and r. [3]

(ii) In the expansion of $(2-5x)^6(a+bx)^3$, the constant term is equal to 512 and the coefficient of x is zero. Find the value of each of the constants a and b. [4]

Oct/Nov 2014 (11)

6.

(i) Given that the coefficient of x^2 in the expansion of $(2 + px)^6$ is 60, find the value of the positive constant p. [3]

(ii) Using your value of p, find the coefficient of x^2 in the expansion of $(3 - x)(2 + px)^6$. [3]

Oct/Nov 2014 (13)

9.

(a) Given that the first 3 terms in the expansion of $(5 - qx)^p$ are $625 - 1500x + rx^2$, find the value of each of the integers p, q and r. [5]

(b) Find the value of the term that is independent of x in the expansion of $\left(2x + \frac{1}{4x^3}\right)^{12}$. [3]

May/June 2015 (11)

3.

(i) Find the first 4 terms in the expansion of $(2+x^2)^6$ in ascending powers of x. [3]

(ii) Find the term independent of x in the expansion of $(2+x^2)^6\left(1-\frac{3}{x^2}\right)^2$. [3]

Oct/Nov 2015 (13)

8.

(a) Given that the first 4 terms in the expansion of $(2+kx)^8$ are $256+256x+px^2+qx^3$, find the value of k, of p and of q. [3]

(b) Find the term that is independent of x in the expansion of $\left(x-\frac{2}{x^2}\right)^9$. [3]

May/June 2016 (12)

2.

(i) The first 3 terms in the expansion of $\left(2-\frac{1}{4x}\right)^5$ are $a+\frac{b}{x}+\frac{c}{x^2}$. Find the value of each of the integers a, b and c. [3]

(ii) Hence find the term independent of x in the expansion of $\left(2-\frac{1}{4x}\right)^5(3+4x)$. [2]

Oct/Nov 2016 (12)

4.

(i) Find the first 3 terms in the expansion of $\left(2x^2 - \frac{1}{3x}\right)^5$, in descending powers of x. [3]

(ii) Hence find the coefficient of x^7 in the expansion of $\left(3 + \frac{1}{x^3}\right)\left(2x^2 - \frac{1}{3x}\right)^5$. [2]

Oct/Nov 2016 (13)

4.

(i) Find, in ascending powers of x, the first 3 terms in the expansion of $\left(2-\frac{x}{4}\right)^6$. [3]

(ii) Hence find the term independent of x in the expansion of $\left(4+\frac{2}{x}+\frac{3}{x^2}\right)\left(2-\frac{x}{4}\right)^6$. [3]

May/June 2017 (12)

4.

The first 3 terms in the expansion of $\left(3-\frac{x}{6}\right)^n$ are $81 + ax + bx^2$. Find the value of each of the constants n, a and b. [5]

Oct/Nov 2017 (12)
3.

(i) Find, in ascending powers of x, the first 3 terms in the expansion of $\left(2-\frac{x^2}{4}\right)^5$. [3]

(ii) Hence find the term independent of x in the expansion of $\left(2-\frac{x^2}{4}\right)^5\left(\frac{1}{x}-\frac{3}{x^2}\right)^2$. [3]

Oct/Nov 2017 (13)

7.

(i) Find, in ascending powers of x, the first 3 terms in the expansion of $\left(2-\frac{x^2}{4}\right)^6$. Give each term in its simplest form. [3]

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