

# Series 1

Q1.

(i) Find the terms in  $x^2$  and  $x^3$  in the expansion of  $(1 - \frac{3}{2}x)^6$ . [3]

(ii) Given that there is no term in  $x^3$  in the expansion of  $(k + 2x)(1 - \frac{3}{2}x)^6$ , find the value of the constant  $k$ . [2]

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Q2.

The coefficient of  $x^3$  in the expansion of  $(a + x)^5 + (1 - 2x)^6$ , where  $a$  is positive, is 90. Find the value of  $a$ . [5]

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Q3.

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

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Q4.

(i) Find the first 3 terms in the expansion of  $(2 - y)^5$  in ascending powers of  $y$ . [2]

(ii) Use the result in part (i) to find the coefficient of  $x^2$  in the expansion of  $(2 - (2x - x^2))^5$ . [3]

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Q5.

The coefficient of  $x^2$  in the expansion of  $(k + \frac{1}{3}x)^5$  is 30. Find the value of the constant  $k$ . [3]

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Q6.

Find the coefficient of  $x^6$  in the expansion of  $(2x^3 - \frac{1}{x^2})^7$ . [4]

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Q7.

The coefficient of  $x^3$  in the expansion of  $(a + x)^5 + (2 - x)^6$  is 90. Find the value of the positive constant  $a$ . [5]

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Q8.

The first three terms in the expansion of  $(1 - 2x)^2(1 + ax)^6$ , in ascending powers of  $x$ , are  $1 - x + bx^2$ . Find the values of the constants  $a$  and  $b$ . [6]

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Q9.

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

(ii) Hence find the coefficient of  $x^8$  in the expansion of  $(2 + x)(2x - x^2)^6$ . [2]

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Q10.

In the expansion of  $\left(x^2 - \frac{a}{x}\right)^7$ , the coefficient of  $x^5$  is  $-280$ . Find the value of the constant  $a$ . [3]

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Q11.

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

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Q12.

(i) In the expression  $(1 - px)^6$ ,  $p$  is a non-zero constant. Find the first three terms when  $(1 - px)^6$  is expanded in ascending powers of  $x$ . [2]

(ii) It is given that the coefficient of  $x^2$  in the expansion of  $(1 - x)(1 - px)^6$  is zero. Find the value of  $p$ . [3]

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