

1. **[AI 17 S3 SA2]**

(a) In the expansion of $\left(x^3 - \frac{1}{5x^2}\right)^{10}$, find the term independent of x and show that the term in x^{10} is $\frac{42}{125}x^{10}$. [5]

(b) Hence find the coefficient of the term in x^{10} in the expansion of $(2 + 9x^{10})\left(x^3 - \frac{1}{5x^2}\right)^{10}$. [2]

2. **[AI 17 S3 SA2]**

Given that the expansion of $(h + x)(1 - 3x)^n$ in ascending powers of x is $3 - 44x + qx^2 + \dots$, find the values of the constant h, n and q . [6]

3. **[ACS(B) 17 S3 SA1]**

(a) Write down the first three terms in the expansion, in ascending powers of x , of $\left(1 - \frac{x}{2}\right)^8$. [2]

(b) Given that the coefficient of x^2 is 2 in the expansion $(2 + kx)\left(1 - \frac{x}{2}\right)^8$, find the value of k . [2]

4. **[Beatty 17 S3 SA1]**

(a) Find the values of k for which the coefficient of x^2 in the expansion of $(3 + kx)^5 + (1 - 2x)^6$ is 90. [4]

(b) i. Calculate the coefficient of x^2 in the expansion of $\left(\frac{2}{x} + 3x\right)^8$. [3]

ii. Explain why there is no term in x^3 in the expansion of $\left(\frac{2}{x} + 3x\right)^8$. [1]

5. **[Junyuan 17 S3 SA2]**

(a) Use the general term to find the coefficient of $\frac{1}{x^{14}}$ in the expansion of $\left(2x - \frac{1}{x^3}\right)^{10}$. [4]

(b) i. Write down and simplify the first three terms in the expansion of $\left(1 + \frac{x}{3}\right)^n$ in ascending powers of x . [2]

ii. The coefficients of x and x^2 in the expansion of $(1 + ax^2)\left(1 + \frac{x}{3}\right)^n$ are 4 and 7 respectively. Find the value of a and of n . [4]

6. **[Mayflower 17 S3 SA2]**

(a) Given that the term independent of x in the binomial expansion of $\left(2x + \frac{k}{x}\right)^8$ is 90 720, find the value of the positive constant k . [4]

(b) Using the value of k found in part (a), determine the term in x in the expansion of $\left(6x - \frac{1}{x}\right)\left(2x + \frac{k}{x}\right)^8$. [4]

7. [New Town 17 S3 SA2]

(a) Expand $(1 - 3x)^5$ in ascending powers of x , up to and including the term in x^3 . [3]

(b) Hence determine the coefficient of x^3 in the expansion of $(2 + x)(1 - 3x)^5$. [3]

8. [SST 17 S3 SA1]

(a) Write down the first four terms of the expansion $\left(x^2 - \frac{2}{x}\right)^{10}$ in descending powers of x . [4]

(b) Hence find the first two terms in the expansion of $(x^2 + 1)^2 \left(x^2 - \frac{2}{x}\right)^{10}$ with powers of x in descending order. [3]

Answers

1. (a) $\frac{42}{3125}$.

(b) $\frac{2479}{3125}$.

2. $h = 3, n = 5, q = 255$.

3. (a) $1 - 4x + 7x^2 + \dots$

(b) $k = 3$.

4. (a) $k = \pm\frac{1}{3}$.

(b) i. 108 864

5. (a) 3360.

(b) i. $1 + \frac{nx}{3} + \frac{n(n-1)x^2}{18} + \dots$

ii. $n = 12, a = -\frac{1}{3}$.

6. (a) $k = 3$.

(b) $495\,936x$.

7. (a) $1 - 15x + 90x^2 - 270x^3 + \dots$

(b) -450 .

8. (a) $x^{20} - 20x^{17} + 180x^{14} - 960x^{11} + \dots$

(b) $x^{24} + 2x^{22} + \dots$