1

[Maximum mark: 4]

Expand $(2x - 3)^4$ in descending powers of x and simplify your answer.

2

[Maximum mark: 4]

The third term in the expansion of $(x + k)^8$ is $252x^6$. Find the possible values of k.

3

[Maximum mark: 5]

Consider the expansion of $\left(\dfrac{x^2}{2} + \dfrac{a}{x}\right)^6$. The constant term is 960. Find the possible values of a.

4

[Maximum mark: 5]

(a) Write down the quadratic expression $3x^2 + 5x - 2$ as the product of two linear factors.

(b) Hence or otherwise, find the coefficient of x^9 in the expansion of $(3x^2 + 5x - 2)^5$.

5

[Maximum mark: 5]

Consider the expansion of $x\left(2x^2 + \dfrac{k}{x}\right)^7$. The constant term is $20{,}412$. Find k.

6

[Maximum mark: 6]

(a) Find the term in x^2 in the expansion of $(2x + 1)^5$.

(b) Hence find the term in x^3 in the expansion of $(x + 3)(2x + 1)^5$.

7

[Maximum mark: 6]

(a) Write down and simplify the expansion of $(3 - y)^5$ in descending order of powers of y.

(b) Hence find the exact value of $(2.9)^5$.

8

[Maximum mark: 5]

In the expansion of $(2x + 1)^n$, the coefficient of the term in x^2 is $40n$, where $n \in \mathbb{Z}^+$. Find n.

9

[Maximum mark: 5]

In the expansion of $x(2x + 1)^n$, the coefficient of the term in x^3 is $20n$, where $n \in \mathbb{Z}^+$. Find n.

10

[Maximum mark: 6]

Find the coefficient of $\dfrac{1}{x}$ in the expansion of $\left(\dfrac{1}{2x} + 3x\right)^5 (x + 1)^4$.

11

[Maximum mark: 7]

Given that $(1 + x)^3(1 + px)^4 = 1 + qx + 93x^2 + \cdots + p^4x^7$, find the possible values of p and q.