Bionomial Expansion

Qno.1

a. Expand $(x+h)^3$. [2]

b. Hence find the derivative of $f(x)=x^3$ from first principles. [3]

Qno.2

a. Factorize $z^3 + 1$ into a linear and quadratic factor. [2]

b. Let $\gamma = \frac{1+i\sqrt{3}}{2}$. [9]

(i) Show that γ is one of the cube roots of -1.

(ii) Show that $\gamma^2 = \gamma - 1$.

(iii) Hence find the value of $(1 - \gamma)^6$.

Qno.3

Expand $(2-3x)^5$ in ascending powers of x, simplifying coefficients.

Marks 4

Qno.4

Find the coefficient of x^8 in the expansion of $\left(x^2 - \frac{2}{x}\right)^7$.

Marks 4

Qno.5

Expand and simplify $\left(\frac{x}{y}-\frac{y}{x}\right)^4$.

Marks 4

Qno.6

Determine the first three terms in the expansion of $(1-2x)^5(1+x)^7$ in ascending powers of x.

5 marks