

Algebra 2



Q1.

Expand $\sqrt[3]{(1 - 6x)}$ in ascending powers of x up to and including the term in x^3 , simplifying the coefficients. [4]

9709/31/M/J/11 Q1

Q2.

The polynomial $f(x)$ is defined by

$$f(x) = 12x^3 + 25x^2 - 4x - 12.$$

(i) Show that $f(-2) = 0$ and factorise $f(x)$ completely. [4]

(ii) Given that

$$12 \times 27^y + 25 \times 9^y - 4 \times 3^y - 12 = 0,$$

state the value of 3^y and hence find y correct to 3 significant figures. [3]

9709/31/M/J/11 Q4

Q3.

Solve the inequality $|x| < |5 + 2x|$. [3]

9709/32/M/J/11 Q1

Q4.

(i) Express $\frac{5x - x^2}{(1 + x)(2 + x^2)}$ in partial fractions. [5]

(ii) Hence obtain the expansion of $\frac{5x - x^2}{(1 + x)(2 + x^2)}$ in ascending powers of x , up to and including the term in x^3 . [5]

9709/32/M/J/11 Q8

Q5.

The polynomial $ax^3 + bx^2 + 5x - 2$, where a and b are constants, is denoted by $p(x)$. It is given that $(2x - 1)$ is a factor of $p(x)$ and that when $p(x)$ is divided by $(x - 2)$ the remainder is 12.

(i) Find the values of a and b . [5]

(ii) When a and b have these values, find the quadratic factor of $p(x)$. [2]

9709/33/M/J/11 Q5

Q6.

The polynomial $x^4 + 3x^3 + ax + 3$ is denoted by $p(x)$. It is given that $p(x)$ is divisible by $x^2 - x + 1$.

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

(ii) When a has this value, find the real roots of the equation $p(x) = 0$. [2]

9709/31/O/N/11 Q3

Q7.

Let $f(x) = \frac{12 + 8x - x^2}{(2 - x)(4 + x^2)}$.

(i) Express $f(x)$ in the form $\frac{A}{2 - x} + \frac{Bx + C}{4 + x^2}$. [4]

9709/31/O/N/11 Q8

Q8.

Expand $\frac{16}{(2 + x)^2}$ in ascending powers of x , up to and including the term in x^2 , simplifying the coefficients. [4]

9709/33/O/N/11

Q9.

The polynomial $p(x)$ is defined by

$$p(x) = ax^3 - x^2 + 4x - a,$$

where a is a constant. It is given that $(2x - 1)$ is a factor of $p(x)$.

(i) Find the value of a and hence factorise $p(x)$. [4]

(ii) When a has the value found in part (i), express $\frac{8x - 13}{p(x)}$ in partial fractions. [5]

9709/33/O/N/11 Q7

Q10.

(i) Expand $\frac{1}{\sqrt{1 - 4x}}$ in ascending powers of x , up to and including the term in x^2 , simplifying the coefficients. [3]

(ii) Hence find the coefficient of x^2 in the expansion of $\frac{1 + 2x}{\sqrt{4 - 16x}}$. [2]

9709/31/M/J/12 Q2