

Question 1

Given that:

$$\frac{6x^4 - 4x^2 + x + 1}{x^2 - 1} \equiv (ax^2 + bx + c) + \frac{dx + e}{x^2 - 1}$$

Find the values of the constants a , b , c , d and e .

Question 2

Express the algebraic fraction $\frac{6x^2}{(x+2)(x-4)}$ in the form $A + \frac{Bx+C}{(x+2)(x-4)}$, where A , B and C are integers.

Question 3

The polynomial $f(x)$ is defined by $f(x) = 5x^3 + 3x^2 - 32x + 12$.

- (a) Use the Factor Theorem to show that $(5x - 2)$ is a factor of $f(x)$.
 (b) Write $f(x)$ in the form $(5x - 2)(x^2 + px + q)$, where p and q are integers.

Question 4

When $x^4 - 5x^3 - 4x^2 + 6x + a$ is divided by $x^2 + 3x - 1$, the quotient is $x^2 + bx + 21$ and the remainder is $cx + 6$. Find the values of the constants a , b and c .

Question 5

(a) Simplify $\frac{(6x^2 - 39x - 21)(x + 5)}{(3x^2 + 7x - 40)(x - 7)}$

(b) Find the quotient and remainder when $x^3 + 3x^2 - 4x - 8$ is divided by $x^2 + 2x + 2$