1. Express $\dfrac{5x^2 + 17x + 17}{(x+2)(x+1)^2}$ as a sum of partial fractions.

2. If $(x-1)$ and $(x+2)$ are factors of the expression $4x^4 - 6x^3 + ax^2 + bx - 12$, determine a and b. Hence, factorize the expression completely.

3. The remainder $x^3 - 2x^2 + kx + 5$ is divided by x+1 is half the remainder when the same expression is divided by x-3. Find the value of k.

4. If $x-1$ and $x+2$ are factors of the expression $2x^4 + ax^3 - 12x^2 + bx + 6$, determine the value of a and b.

5. Express $\dfrac{2x^2 + 7x + 23}{(x-1)(x+3)^2}$ as a sum of partial fractions.

ANSWER :

1.
$$\frac{3}{x+2} + \frac{2}{x+1} + \frac{5}{(x+1)^2}$$

2. $a = -12$, $b = 26$; $2(x-1)^2(x+2)(2x-3)$

3. k = -2

4.
   $a = -3$, $b = 7$

5. $\dfrac{2x^2 + 7x + 23}{(x-1)(x+3)^2} = \dfrac{2}{x-1} - \dfrac{5}{(x+3)^2}$