Serie of T.D N ° 3 (S1)

Exercice 1

For each of the following cases, find the values of m that make the root α of many Polynomes P:

① $P(x) = mx^2 - 2mx - 4m - 2$ ، $\alpha = 4$

② $P(x) = 2m^2x^2 + mx - m$ ، $\alpha = -1$

③ $P(x) = -m^2x^3 + m(2m-3)x^2 + 3x$ ، $\alpha = 2$

Exercice 2

In each of the following cases, indicate whether α is a root of the polynomial Then analyze P(x) , then deduce the other roots

① $\alpha = -3$ ، $P(x) = x^3 + x^2 - 7x - 3$

② $\alpha = -1$ ، $P(x) = 4x^3 + 4x^2 - 9x - 9$

③ $\alpha = 2$ ، $P(x) = \frac{1}{2}x^3 - \frac{1}{4}x^2 + x - 5$

④ $\alpha = 1$ ، $P(x) = x^4 - 3x^2 + 2x$

Exercice 3

Express the following as a sum of partial fractions

a) $\dfrac{5x^2+17x+15}{(x+2)^2(x+1)}$ b) $\dfrac{x}{(x-3)^2(2x+1)}$

c) $\dfrac{3x+1}{(x-1)^2(x+2)}$ d) $\dfrac{x^2+1}{(x-1)^2(x+1)}$

Exercice 4

Express the following as a sum of partial fractions

a) $\dfrac{x^2-3x-7}{(x^2+x+2)(2x-1)}$ b) $\dfrac{13}{(2x+3)(x^2+1)}$

c) $\dfrac{x}{(x^2-x+1)(3x-2)}$

Exercice 5

Express the following as a sum of powers of x and partial fractions

a) $\dfrac{x^3+1}{x^2+1}$ b) $\dfrac{2x^4+3x^2+1}{x^2+3x+2}$ c) $\dfrac{7x^2-1}{x+3}$