

Exercice - Calcul de division euclidienne

Effectuer les divisions euclidiennes de :

1. $A(X) = X^4 - 3X^3 + 4X^2 - 6X + 8$, par $B(X) = X - 1$;

$$\begin{array}{c|l} X^4 - 3X^3 + 4X^2 - 6X + 8 & X - 1 \\ \hline - (X^4 - X^3) & X^3 - 2X^2 + 2X - 4 \\ \hline -2X^3 + 4X^2 - 6X + 8 & \\ - (-2X^3 + 2X^2) & \\ \hline 2X^2 - 6X + 8 & \\ - (2X^2 - 2X) & \\ \hline -4X + 8 & \\ -(-4X + 4) & 4 \end{array}$$

$$A(X) = X^4 - 3X^3 + 4X^2 - 6X + 8 = \underbrace{(X - 1)}_{B(X)} \cdot (X^3 - 2X^2 + 2X - 4) + 4$$

2. $C(X) = 3X^5 + 2X^4 - 2X^2 + 1$, par $D(X) = X^3 + X + 2$.

$$\begin{array}{c|l} 3X^5 + 2X^4 - 2X^2 + 1 & X^3 + X + 2 \\ \hline - (3X^5 + 3X^3 + 6X^2) & 3X^2 + 2X - 3 \\ \hline 2X^4 - 3X^3 - 8X^2 + 1 & \\ - (2X^4 + 2X^3 + 4X) & \\ \hline -3X^3 - 10X^2 - 4X + 1 & \\ - (-3X^3 - 3X - 6) & \\ \hline -10X^2 - X + 7 & \end{array}$$

$$C(X) = 3X^5 + 2X^4 - 2X^2 + 1 = \underbrace{(X^3 + X + 2)}_{D(X)} \cdot (3X^2 + 2X - 3) + (-10X^2 - X + 7)$$