05.12.24

2.5.2 Résoudre l'équation $2x^2+7x-15=0$. Puis factoriser le polynôme $2x^2+7x-15$.
Factoriser les polynômes ci-dessous d'une manière analogue.

a) $2x^2-7x-4$

b) $6x^2+11x+4$

c) $6x^2-25x-25$

d) $6x^2-20x+25$

e) $12x^2+23x-24$

f) $5x^2+\frac{29}{3}x-\frac{14}{3}$

$2x^2+7x-15=0$

$a=2,\ b=7,\ c=-15$

$\Delta = 49-4\cdot 2\cdot(-15) = 169 = 13^2$

Les solutions :

$x_1 = \frac{-7+13}{4} = \frac{6}{4} = \frac{3}{2}$

$x_2 = \frac{-7-13}{4} = \frac{-20}{4} = -5$

$S = \left\{-5;\ \frac{3}{2}\right\}$

$P(x) = 2x^2+7x-15$

$= 2\left(x-\frac{3}{2}\right)(x+5)$

$= (2x-3)(x+5)$

d) $6x^2-20x+25 = 0$

$a=6,\ b=-20,\ c=25$

$\Delta = (-20)^2-4\cdot 6\cdot 25 = 400-600 = -200$

pas de solution $\Rightarrow$ pas factorisable

2.5.2

f) $5x^2 + \frac{29}{3}x - \frac{14}{3} = \frac{1}{3}\left(15x^2 + 29x - 14\right) = \frac{1}{3}(5x - 2)(3x + 7)$

ses zéros : $a = 15,\ b = 29,\ c = -14$

$\Delta = 29^2 - 4 \cdot 15 \cdot (-14) = 1681 = 41^2$

$x_1 = \frac{-29 + 41}{30} = \frac{12}{30} = \frac{2}{5}$

$x_2 = \frac{-29 - 41}{30} = \frac{-70}{30} = \frac{-7}{3}$

$15x^2 + 29x - 14 = \overset{5 \cdot 3}{\sim} 15\left(x - \frac{2}{5}\right)\left(x + \frac{7}{3}\right)$

$= (5x - 2)(3x + 7)$

2.5.3 Résoudre les équations.

d) $(x^2 - x - 6)(x + 5) = 0$

e) $x^4 - 5\,x^2 + 4 = 0$

i) $(x + 6)^2 - 3\,(x + 6) + 2 = 0$

j) $x^3 + 2\,x^2 - x - 2 = 0$

d) $(x^2 - x - 6)\cdot(x + 5) = 0$

$(x - 3)(x + 2)(x + 5)$

$3 \quad -2 \quad x = -5$

$S = \{-5 ; 3 ; -2\}$

e) $x^4 - 5x^2 + 4 = 0$

équation bicarrée

$(x^2)^2 - 5(x^2) + 4 = 0$

Posons $X^2 = Y$, on a fait un changement de variables

$Y^2 - 5Y + 4 = 0$

$(Y - 4)(Y - 1) = 0$

$\begin{cases} Y = 4 \Rightarrow X^2 = 4 \Rightarrow X = \pm 2 \\ \text{ou} \\ Y = 1 \Rightarrow X^2 = 1 \Rightarrow X = \pm 1 \end{cases}$

$S = \{-2 ; -1 ; 1 ; 2\}$

i) $(x+6)^2 - 3(x+6) + 2 = 0$

Changement de variable : $X + 6 = Y \Rightarrow x = Y - 6$

$Y^2 - 3Y + 2 = 0$

$(Y-2)(Y-1) = 0$

$\begin{cases} Y = 1 \Rightarrow X = 1 - 6 = -5 \\ \text{ou} \\ Y = 2 \Rightarrow x = 2 - 6 = -4 \end{cases}$

$S = \{-4; -5\}$

j) $x^3 + 2x^2 - x - 2 = 0$

$x^2(x+2) - 1(x+2) = 0$

$(x+2)(x^2 - 1) = 0$

$(x+2)(x-1)(x+1)$

$S = \{-2; -1; 1\}$