Correction Devoir Surveillé n°5A (40min)

1. $(4x-3)(x+7)=0$

$$\begin{aligned} & (4x-3)(x+7)=0 \\ \iff & 4x-3=0 \quad \text{ou} \quad x+7=0 \\ \iff & 4x=3 \quad \text{ou} \quad x=-7 \\ \iff & x=\frac{3}{4} \quad \text{ou} \quad x=-7 \end{aligned}$$

$$\mathscr{S}=\left\{-7;\frac{3}{4}\right\}$$

2. $3x^2+5x=0$

$$\begin{aligned} & 3x^2+5x=0 \\ \iff & x(3x+5)=0 \\ \iff & x=0 \quad \text{ou} \quad 3x+5=0 \\ \iff & x=0 \quad \text{ou} \quad 3x=-5 \\ \iff & x=0 \quad \text{ou} \quad x=-\frac{5}{3} \end{aligned}$$

$$\mathscr{S}=\left\{-\frac{5}{3};0\right\}$$

3. $9x^2-25=0$

$$\begin{aligned} & 9x^2-25=0 \\ \iff & (3x)^2-5^2=0 \\ \iff & (3x-5)(3x+5)=0 \\ \iff & 3x-5=0 \quad \text{ou} \quad 3x+5=0 \\ \iff & x=\frac{5}{3} \quad \text{ou} \quad x=-\frac{5}{3} \end{aligned}$$

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

4. $(x+7)(2x-1)+(x+7)(3x+4)=0$

$$\begin{aligned} & (x+7)(2x-1)+(x+7)(3x+4)=0 \\ \iff & (x+7)\left[(2x-1)+(3x+4)\right]=0 \\ \iff & (x+7)(5x+3)=0 \\ \iff & x+7=0 \quad \text{ou} \quad 5x+3=0 \\ \iff & x=-7 \quad \text{ou} \quad 5x=-3 \\ \iff & x=-7 \quad \text{ou} \quad x=-\frac{3}{5} \end{aligned}$$

$$\mathscr{S}=\left\{-7;-\frac{3}{5}\right\}$$

5. $(3x-1)^2-(x+4)^2=0$

$$\begin{aligned} & (3x-1)^2-(x+4)^2=0 \\ \iff & \left[(3x-1)-(x+4)\right]\left[(3x-1)+(x+4)\right]=0 \\ \iff & (3x-1-x-4)(3x-1+x+4)=0 \\ \iff & (2x-5)(4x+3)=0 \\ \iff & 2x-5=0 \quad \text{ou} \quad 4x+3=0 \\ \iff & 2x=5 \quad \text{ou} \quad 4x=-3 \\ \iff & x=\frac{5}{2} \quad \text{ou} \quad x=-\frac{3}{4} \end{aligned}$$

$$\mathscr{S}=\left\{-\frac{3}{4};\frac{5}{2}\right\}$$

6. $(2x+3)(x-5)-(2x+3)=0$

$$\begin{aligned}
& (2x+3)(x-5)-(2x+3)=0 \\
\iff\ & (2x+3)\left[(x-5)-1\right]=0 \\
\iff\ & (2x+3)(x-6)=0 \\
\iff\ & 2x+3=0 \quad \text{ou} \quad x-6=0 \\
\iff\ & 2x=-3 \quad \text{ou} \quad x=6 \\
\iff\ & x=-\frac{3}{2} \quad \text{ou} \quad x=6
\end{aligned}$$

$$\boxed{\mathscr{S}=\left\{-\frac{3}{2};6\right\}}$$

7. $(3x-4)^2+2(3x-4)(x+1)=0$

$$\begin{aligned}
& (3x-4)^2+2(3x-4)(x+1)=0 \\
\iff\ & (3x-4)\left[(3x-4)+2(x+1)\right]=0 \\
\iff\ & (3x-4)(3x-4+2x+2)=0 \\
\iff\ & (3x-4)(5x-2)=0 \\
\iff\ & 3x-4=0 \quad \text{ou} \quad 5x-2=0 \\
\iff\ & x=\frac{4}{3} \quad \text{ou} \quad x=\frac{2}{5}
\end{aligned}$$

$$\boxed{\mathscr{S}=\left\{\frac{2}{5};\frac{4}{3}\right\}}$$

8. $12x^2-5x+7=3x^2+7x+3$

$$\begin{aligned}
& 12x^2-5x+7=3x^2+7x+3 \\
\iff\ & 9x^2-12x+4=0 \\
\iff\ & (3x-2)^2=0 \\
\iff\ & 3x-2=0 \\
\iff\ & 3x=2 \\
\iff\ & x=\frac{2}{3}
\end{aligned}$$

$$\boxed{\mathscr{S}=\left\{\frac{2}{3}\right\}}$$

9. $16x^2-1=(4x+1)(x-7)$

$$\begin{aligned}
& 16x^2-1-(4x+1)(x-7)=0 \\
\iff\ & (4x-1)(4x+1)-(4x+1)(x-7)=0 \\
\iff\ & (4x+1)\left[(4x-1)-(x-7)\right]=0 \\
\iff\ & (4x+1)(3x+6)=0 \\
\iff\ & 4x+1=0 \quad \text{ou} \quad 3x+6=0 \\
\iff\ & x=-\frac{1}{4} \quad \text{ou} \quad x=-2
\end{aligned}$$

$$\boxed{\mathscr{S}=\left\{-2;-\frac{1}{4}\right\}}$$

10. **Bonus :** En utilisant la première identité remarquable puis la troisième identité remarquable, factoriser $x^2+10x-11$.

$$\begin{aligned}
x^2+10x-11 &= \boxed{x^2+10x+25}-25-11 && \text{on fait apparaître la } 1^{\text{ère}} \text{ identité remarquable} \\
&= (x+5)^2-36 && \text{car } x^2+10x+25=(x+5)^2 \\
&= (x+5)^2-6^2 \\
&= (x+5-6)(x+5+6) && \text{grâce à la } 3^{\text{ème}} \text{ identité remarquable} \\
&= (x-1)(x+11)
\end{aligned}$$

Correction Devoir Surveillé n°5B (40min)

1. $(3x-5)(x+4)=0$

$$\begin{aligned}
&(3x-5)(x+4)=0\\
\iff\ &3x-5=0 \quad \text{ou} \quad x+4=0\\
\iff\ &3x=5 \quad \text{ou} \quad x=-4\\
\iff\ &x=\frac{5}{3} \quad \text{ou} \quad x=-4
\end{aligned}$$

$$\mathscr{S}=\left\{-4;\frac{5}{3}\right\}$$

2. $4x^2-7x=0$

$$\begin{aligned}
&4x^2-7x=0\\
\iff\ &x(4x-7)=0\\
\iff\ &x=0 \quad \text{ou} \quad 4x-7=0\\
\iff\ &x=0 \quad \text{ou} \quad 4x=7\\
\iff\ &x=0 \quad \text{ou} \quad x=\frac{7}{4}
\end{aligned}$$

$$\mathscr{S}=\left\{0;\frac{7}{4}\right\}$$

3. $16x^2-81=0$

$$\begin{aligned}
&16x^2-81=0\\
\iff\ &(4x)^2-9^2=0\\
\iff\ &(4x-9)(4x+9)=0\\
\iff\ &4x-9=0 \quad \text{ou} \quad 4x+9=0\\
\iff\ &x=\frac{9}{4} \quad \text{ou} \quad x=-\frac{9}{4}
\end{aligned}$$

$$\mathscr{S}=\left\{-\frac{9}{4};\frac{9}{4}\right\}$$

4. $(x+6)(3x-2)+(x+6)(2x+5)=0$

$$\begin{aligned}
&(x+6)(3x-2)+(x+6)(2x+5)=0\\
\iff\ &(x+6)\left[(3x-2)+(2x+5)\right]=0\\
\iff\ &(x+6)(5x+3)=0\\
\iff\ &x+6=0 \quad \text{ou} \quad 5x+3=0\\
\iff\ &x=-6 \quad \text{ou} \quad 5x=-3\\
\iff\ &x=-6 \quad \text{ou} \quad x=-\frac{3}{5}
\end{aligned}$$

$$\mathscr{S}=\left\{-6;-\frac{3}{5}\right\}$$

5. $(2x-3)^2-(x+5)^2=0$

$$\begin{aligned}
&(2x-3)^2-(x+5)^2=0\\
\iff\ &\left[(2x-3)-(x+5)\right]\left[(2x-3)+(x+5)\right]=0\\
\iff\ &(2x-3-x-5)(2x-3+x+5)=0\\
\iff\ &(x-8)(3x+2)=0\\
\iff\ &x-8=0 \quad \text{ou} \quad 3x+2=0\\
\iff\ &x=8 \quad \text{ou} \quad 3x=-2\\
\iff\ &x=8 \quad \text{ou} \quad x=-\frac{2}{3}
\end{aligned}$$

$$\mathscr{S}=\left\{-\frac{2}{3};8\right\}$$

6. $(3x+2)(x-4)-(3x+2)=0$

$$\begin{aligned}
& (3x+2)(x-4)-(3x+2)=0 \\
\iff\ & (3x+2)\left[(x-4)-1\right]=0 \\
\iff\ & (3x+2)(x-5)=0 \\
\iff\ & 3x+2=0 \quad \text{ou} \quad x-5=0 \\
\iff\ & 3x=-2 \quad \text{ou} \quad x=5 \\
\iff\ & x=-\frac{2}{3} \quad \text{ou} \quad x=5
\end{aligned}$$

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

7. $(2x-5)^2+3(2x-5)(x+2)=0$

$$\begin{aligned}
& (2x-5)^2+3(2x-5)(x+2)=0 \\
\iff\ & (2x-5)\left[(2x-5)+3(x+2)\right]=0 \\
\iff\ & (2x-5)(2x-5+3x+6)=0 \\
\iff\ & (2x-5)(5x+1)=0 \\
\iff\ & 2x-5=0 \quad \text{ou} \quad 5x+1=0 \\
\iff\ & x=\frac{5}{2} \quad \text{ou} \quad x=-\frac{1}{5}
\end{aligned}$$

$$\boxed{\mathscr{S}=\left\{-\frac{1}{5};\frac{5}{2}\right\}}$$

8. $10x^2-8x+5=x^2+4x+1$

$$\begin{aligned}
& 10x^2-8x+5-x^2-4x-1=0 \\
\iff\ & 9x^2-12x+4=0 \\
\iff\ & (3x-2)^2=0 \\
\iff\ & 3x-2=0 \\
\iff\ & 3x=2 \\
\iff\ & x=\frac{2}{3}
\end{aligned}$$

$$\boxed{\mathscr{S}=\left\{\frac{2}{3}\right\}}$$

9. $25x^2-4=(5x+2)(x-8)$

$$\begin{aligned}
& 25x^2-4-(5x+2)(x-8)=0 \\
\iff\ & (5x-2)(5x+2)-(5x+2)(x-8)=0 \\
\iff\ & (5x+2)\left[(5x-2)-(x-8)\right]=0 \\
\iff\ & (5x+2)(4x+6)=0 \\
\iff\ & 5x+2=0 \quad \text{ou} \quad 4x+6=0 \\
\iff\ & x=-\frac{2}{5} \quad \text{ou} \quad x=-\frac{3}{2}
\end{aligned}$$

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

10. **Bonus :** En utilisant la première identité remarquable puis la troisième identité remarquable, factoriser x^2+6x-7.

$$\begin{aligned}
x^2+6x-7 &= \boxed{x^2+6x+9}-9-7 && \text{on fait apparaître la } 1^{\text{ère}} \text{ identité remarquable} \\
&= (x+3)^2-16 && \text{car } x^2+6x+9=(x+3)^2 \\
&= (x+3)^2-4^2 \\
&= (x+3-4)(x+3+4) && \text{grâce à la } 3^{\text{ème}} \text{ identité remarquable} \\
&= (x-1)(x+7)
\end{aligned}$$