

Exercice (1):

(1)

$$\begin{aligned}
 1) A(x) &= (3x+6)^2 - (2x-1)^2 \\
 &= 9x^2 + 2 \times 3x \times 6 + 36 - (4x^2 - 2 \times 2x \times 1 + 1) \\
 &= 9x^2 + 36x + 36 - 4x^2 + 4x - 1 \\
 &= \underline{5x^2 + 40x + 35}
 \end{aligned}$$

$$\begin{aligned}
 2) (9x-2)(3x+7) &= 0 \\
 \text{Si } A \times B &= 0, \text{ alors } A = 0 \text{ ou } B = 0 \quad \left\{ \begin{array}{l} 9x-2=0 \text{ ou } 3x+7=0 \\ x = \frac{2}{9} \text{ ou } x = -\frac{7}{3} \end{array} \right. \\
 \text{Donc: } S &= \left\{ \frac{2}{9}; -\frac{7}{3} \right\}
 \end{aligned}$$

$$\begin{aligned}
 3) B(x) &= (3x+6)^2 - (2x-1)^2 \\
 &= (3x+6+2x-1)(3x+6-2x+1) \quad (\text{on utilise: } A^2 - B^2 = (A+B)(A-B)) \\
 &= (5x+5)(x+7) \\
 &= \underline{5(x+1)(x+7)}
 \end{aligned}$$

$$\begin{aligned}
 4) C &= \left(4 - \frac{4}{5} + \frac{1}{15}\right) \div \left(4 + \frac{4}{5} - \frac{1}{15}\right) \\
 &= \left(\frac{60-12+1}{15}\right) \div \left(\frac{60+12-1}{15}\right) \\
 &= \frac{49}{15} \div \frac{71}{15} \\
 &= \frac{49}{15} \times \frac{15}{71} = \boxed{\frac{49}{71}}
 \end{aligned}$$

$$\begin{aligned}
 5) D(x) &= (3\sqrt{2} - \sqrt{3})^2 \\
 &= (3\sqrt{2})^2 - 2 \times 3\sqrt{2} \times \sqrt{3} + 3 \\
 &= 9 \times 2 - 6\sqrt{6} + 3 \\
 &= \underline{21 - 6\sqrt{6}}
 \end{aligned}$$

Exercice (2):

$$\begin{aligned}
 1) a) & 3(x+2)\left(x - \frac{1}{3}\right) = (x+2)(3x-1) \\
 &= 3x^2 - x + 6x - 2 \\
 &= 3x^2 + 5x - 2 = f(x) \\
 b) & 3\left(x + \frac{5}{6}\right)^2 - \frac{49}{12} = 3\left(x^2 + 2 \times x \times \frac{5}{6} + \frac{25}{36}\right) - \frac{49}{12} \\
 &= 3x^2 + 5x + \frac{25}{12} - \frac{49}{12} \\
 &= 3x^2 + 5x - \frac{24}{12} \\
 &= 3x^2 + 5x - 2 = f(x)
 \end{aligned}$$

$$\begin{aligned}
 2) a) f(-2) &= 3(-2+2)(-2 - \frac{1}{3}) \\
 &= \boxed{0}
 \end{aligned}$$

$$\begin{aligned}
 b) f(-\frac{5}{6}) &= 3\left(-\frac{5}{6} + \frac{5}{6}\right)^2 - \frac{49}{12} \\
 &= \boxed{-\frac{49}{12}}
 \end{aligned}$$

$$\begin{aligned}
 c) f(0) &= 3 \times 0^2 + 5 \times 0 - 2 \\
 &= \boxed{-2}
 \end{aligned}$$

$$\begin{aligned}
 d) f(\sqrt{3}-2) &= 3(\sqrt{3}-2+2)(\sqrt{3}-2-\frac{1}{3}) \\
 &= 3\sqrt{3}(\sqrt{3}-\frac{6}{3}-\frac{1}{3}) \\
 &= 3\sqrt{3}(\sqrt{3}-\frac{7}{3}) \\
 &= 3 \times 3 - 7\sqrt{3} \\
 &= \underline{9 - 7\sqrt{3}}
 \end{aligned}$$

(2)

3) a) x antécédent de 0 par f , $f(x) = 0$

$$f(x) = 0 \quad 3(x+2)(x-\frac{1}{3}) = 0$$

Si $A \times B = 0$, alors $A = 0$ ou $B = 0$

$$x+2=0 \text{ ou } x-\frac{1}{3}=0$$

$$x = -2 \text{ ou } x = \frac{1}{3}$$

$$\text{Donc } S = \left\{ -2; \frac{1}{3} \right\}$$

$$b) f(x) = -2 : 3x^2 + 5x - x = -x$$

$$\text{d'où } 3x^2 + 5x = 0$$

$$x(3x+5) = 0$$

Si $A \times B = 0$, alors $A = 0$ ou $B = 0$

$$x = 0 \text{ ou } 3x+5 = 0$$

$$x = 0 \text{ ou } x = -\frac{5}{3}$$

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

$$c) f(x) = -\frac{49}{12} : 3\left(x+\frac{5}{6}\right)^2 - \frac{49}{12} = -\frac{49}{12}$$

$$3\left(x+\frac{5}{6}\right)^2 = 0$$

$$\left(x+\frac{5}{6}\right)^2 = 0 \quad \text{d'où } x + \frac{5}{6} = 0$$

$$x = -\frac{5}{6}$$

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