

ex1) b) $A(x) = 3x^2 + 6x + 12$
 $= 3(x+1)^2 + 9$

$B(x) = 5x^2 - 20x + 8$
 $= 5(x-2)^2 - 12$

$C(x) = -2x^2 + 16x + 7$
 $= -2(x-4)^2 + 39$

ex2) a) $3x^2 - 4x + 1 = 0$

$x_1 = 1$ est une racine évidente

ou $x_1 x_2 = \frac{c}{a} \Leftrightarrow 1 \times x_2 = \frac{1}{3} \Leftrightarrow x_2 = \frac{1}{3}$

$S = \left\{ 1; \frac{1}{3} \right\}$

(note: on a $\Delta = (-4)^2 - 4 \times 3 \times 1 = 16 - 12 = 4$)

b) $-x^2 + 5x - 3 = 0$

$\Delta = 5^2 - 4 \times (-1) \times (-3) = 25 - 12 = 13 > 0$

$x_1 = \frac{-5 - \sqrt{13}}{-2} = \frac{5 + \sqrt{13}}{2}$ $x_2 = \frac{-5 + \sqrt{13}}{-2} = \frac{5 - \sqrt{13}}{2}$

$S = \left\{ \frac{5 + \sqrt{13}}{2}; \frac{5 - \sqrt{13}}{2} \right\}$

c) $x^2 + x + 9 = 0$

$\Delta = 1^2 - 4 \times 1 \times 9 = 1 - 36 = -35 < 0$

$S = \emptyset$

d) $(2x+7)(2x^2-4x+2) = 0$

$\Leftrightarrow 2x+7=0$ ou $2x^2-4x+2=0$

$\Leftrightarrow 2x = -7$

$\Leftrightarrow x = -\frac{7}{2}$

$\Delta = (-4)^2 - 4 \times 2 \times 2 = 0$

$x_0 = \frac{-b}{2a} = \frac{-(-4)}{2 \times 2} = \frac{4}{4} = 1$

$S = \left\{ -\frac{7}{2}; 1 \right\}$

e) $2x^2 + x = 1$

$\Leftrightarrow 2x^2 + x - 1 = 0$

$\Delta = 1^2 - 4 \times 2 \times (-1) = 1 + 8 = 9 > 0$

$x_1 = \frac{-1 - \sqrt{9}}{2 \times 2} = \frac{-1 - 3}{4} = \frac{-4}{4} = -1$

$x_2 = \frac{-1 + \sqrt{9}}{2 \times 2} = \frac{-1 + 3}{4} = \frac{2}{4} = \frac{1}{2}$

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

f) $3x^2 - 5x = 0$

$\Leftrightarrow x(3x - 5) = 0$

$\Leftrightarrow x = 0$ ou $3x - 5 = 0$

$\Leftrightarrow x = \frac{5}{3}$

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

(note: pour $3x^2 - 5x$, $a=3$, $b=-5$ et $c=0$)
 d'où $\Delta = (-5)^2 - 4 \times 3 \times 0 = 25 > 0$

ex3

$f(x) = 3x^2 - 7x + 2$

$\Delta = (-7)^2 - 4 \times 3 \times 2 = 25 > 0$

$x_1 = \frac{-(-7) - \sqrt{25}}{2 \times 3} = \frac{7 - 5}{6} = \frac{2}{6} = \frac{1}{3}$

$x_2 = \frac{-(-7) + \sqrt{25}}{2 \times 3} = \frac{7 + 5}{6} = \frac{12}{6} = 2$

ainsi $f(x) = 3(x - \frac{1}{3})(x - 2)$

$g(x) = 2x^2 + 6x + 7$

$\Delta = 6^2 - 4 \times 2 \times 7 = -20 < 0$

$g(x)$ n'est pas factorisable

$h(x) = -9x^2 + 6x + 1$

$\Delta = 6^2 - 4 \times (-9) \times 1 = 0$

$x_0 = \frac{-b}{2a} = \frac{-6}{2 \times (-9)} = \frac{-6}{-18} = \frac{1}{3}$

$h(x) = -9(x - \frac{1}{3})^2$

ex4) a) $x_1 = 1$

ou $x_1 x_2 = \frac{c}{a} \Leftrightarrow 1 \times x_2 = \frac{2}{1} \Leftrightarrow x_2 = 2$

b) $x_1 = -1$

ou $x_1 x_2 = \frac{c}{a} \Leftrightarrow -1 \times x_2 = \frac{-4}{1} \Leftrightarrow x_2 = 4$

c) $x_1 = \frac{7}{2}$ et $x_1 x_2 = \frac{28}{2} \Leftrightarrow x_2 = 4$