

DM. Fonction et factorisation.

Ex 1 $f(x) = -\frac{x^2}{2} + 3x$ pour $x \in \mathbb{R}$

1) $f(-2) = -\frac{(-2)^2}{2} + 3(-2) = -\frac{4}{2} - 6 = -2 - 6 = \boxed{-8}$

$f\left(\frac{3}{2}\right) = -\frac{\left(\frac{3}{2}\right)^2}{2} + 3 \times \frac{3}{2} = -\frac{\frac{9}{4}}{2} + \frac{9}{2}$
 $= -\frac{9}{4} \times \frac{1}{2} + \frac{9}{2} = -\frac{9}{8} + \frac{36}{8} = \boxed{\frac{27}{8}}$

2) Résoudre $f(x) = 0$

$$-\frac{x^2}{2} + 3x = 0$$

$$x \left(-\frac{x}{2} + 3 \right) = 0$$

$$\boxed{x = 0}$$

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

$$-\frac{x}{2} = -3$$

$$\frac{x}{2} = 3$$

$$\boxed{x = 6}$$

$$\boxed{S = \{0; 6\}}$$

Ex 2 Pour $x \in \mathbb{R}$ $f(x) = -2 \left(\frac{3}{2} - x \right)^2$

$f(-1) = -2 \left(\frac{3}{2} + 1 \right)^2 = -2 \left(\frac{5}{2} \right)^2 = -2 \times \frac{25}{4} = \boxed{-\frac{25}{2}}$

$f\left(\frac{1}{4}\right) = -2 \left(\frac{3}{2} - \frac{1}{4} \right)^2 = -2 \left(\frac{5}{4} \right)^2 = -2 \times \frac{25}{16} = \boxed{-\frac{25}{8}}$

Ex 3 Factoriser:

$$A = 5x^3 + \frac{3}{5}x^2 + x$$

$$\boxed{A = x \left(5x^2 + \frac{5}{3}x + 1 \right)}$$

$$B = (1-x)^2 - (3x-2)^2$$

$$B = (1-x+3x-2)(1-x-3x+2)$$

$$\boxed{B = (2x-1)(-4x+3)}$$

$$C = 36k^2 - (1-k)^2$$

$$C = (6k)^2 - (1-k)^2$$

$$C = (6k+1-k)(6k-1+k)$$

$$\boxed{C = (5k+1)(7k-1)}$$

$$D = 25 - 49t^2$$

$$D = 5^2 - (7t)^2$$

$$\boxed{D = (5+7t)(5-7t)}$$