

$$1) f(x) = \int (3x^2 - 4) dx = x^3 - 4x + C$$

$$f(3) = 3^3 - 4 \cdot 3 + C = 28$$

$$\Leftrightarrow 27 - 12 + C = 28 \quad \Leftrightarrow C = 1 + 12 = 13$$

Ans: $f(x) = x^3 - 4x + 13$

$$2) f(x) = \int (5 - x) dx = 5x - \frac{1}{2}x^2 + C$$

$$f(-2) = -f(2)$$

$$\Rightarrow 5(-2) - \frac{1}{2}(-2)^2 + C = -\left(5 \cdot 2 - \frac{1}{2}2^2 + C\right)$$

$$\Leftrightarrow -10 - 2 + C = -10 + 2 - C$$

$$\Leftrightarrow 2C = 4 \quad \Leftrightarrow C = 2$$

Ans 2: $f(x) = 5x - \frac{1}{2}x^2 + 2$

$$3) \quad f''(x) = 2x$$

$$f'(x) = \int 2x \, dx = 2 \cdot \frac{1}{2} x^2 + C = x^2 + C$$

$$f(x) = \int (x^2 + C) \, dx = \frac{1}{3} x^3 + C \cdot x + d$$

$$f'(2) = 8 \Rightarrow 2^2 + C = 8 \Leftrightarrow C = 8 - 4 = 4$$

$$\Rightarrow f(x) = \frac{1}{3} x^3 + 4x + d$$

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

$$\Leftrightarrow -\frac{8}{3} - 8 + d = -8 \Leftrightarrow d = \frac{8}{3}$$

$$\text{Finalement, } f(x) = \frac{1}{3} x^3 + 4x + \frac{8}{3}$$