1 a) $x^2 - 25 \geqslant 0 \Leftrightarrow x^2 \geqslant 25 \Leftrightarrow x \geqslant 5$

$D_f =]-\infty, -4] \cup [4, +\infty[$

b) $9 - x^2 \geqslant 0 \Leftrightarrow -x^2 \geqslant -9 \Leftrightarrow x^2 \leqslant 9 \Leftrightarrow x \leqslant 3$

$D_g = [-3, 3]$

2)

a) $\int x^2 \cdot e^{2x} \, dx = x^2 \cdot e^{2x} - \int 2x \cdot e^{2x} =$

$x^2 \cdot e^{2x} - 2 \cdot e^{2x} - \int e^{2x} = x^2 \cdot e^{2x} - 2e^{2x} - e^{2x} + C, C \in \mathbb{R}$

b) $\int x \cdot \ln(x) \, dx = \frac{x^2}{2} \cdot \ln(x) - \int \frac{x^2}{2} \cdot \frac{1}{x} \, dx =$

$= \frac{x^2}{2} \cdot \ln(x) - \frac{1}{2} \int x \, dx =$

$\frac{x^2}{2} \ln(x) - \frac{x^2}{4} + C, \; C \in \mathbb{R}$

c) $\int x^2 \cdot \cos(x) = x^2 \cdot \operatorname{sen}(x) - \int x^2 \cdot \cos(x) \, dx =$

$x^2 \cdot \operatorname{sen}(x) - \frac{x^3}{3} \cdot -\operatorname{sen}(x) + C, \; C \in \mathbb{R}$

3)

a) $\int_0^2 3x^2 + 2x - 1 \, dx = \left[\frac{3x^3}{3} + \frac{2x^2}{2} - x \right]_0^2 =$

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

$\frac{24}{3} + \frac{8}{2} - 2 = 8 + 4 - 2 = 10$

b) $\int_1^4 x - 2 \, dx = \left[\frac{x^2}{2} - 2x\right]_1^4 = \frac{4^2}{2} - 2(4) - \frac{1^2}{2} - 2(1)$

$\frac{16}{2} - 8 - \frac{1}{2} - 2 = 8 - 8 - \frac{1}{2} - \underset{(\times 2)}{\frac{2}{1}} = \frac{1}{2} - \frac{4}{2} = \frac{-3}{2}$

4)

$f(1) = x^2 + 2x - 3 = 1^2 + 2(1) - 3 = 0$

$f'(1) = 2x + 2 = 2(1) + 2 = 4$

$y = x_0 - (m - m x_0)$

$y = 0 - (4 - 4(0))$

$y = -4$