1. Let $x^2 + 5y^3 = x + 7$. Find $\frac{dy}{dx}$ when $x = -1$ and $y = 1$. 
2. Find

\[ \int x(x^2 - 1)^{-2} \, dx \]
3. Find

$$\int \sqrt{1 + \sin x \cos x} \, dx$$
4. Consider the differential equation

\[ \frac{dy}{dx} = y^2 \]

(a) Find the general solution (involving constant C).
(b) Find the particular solution satisfying \( y = -1 \) at \( x = 1 \).