Exercise 1 (15 points)
Find all solutions of the differential equation \( \frac{dy}{dx} = 2xy + 2x + y + 1 \)

Exercise 2 (10 points)
Find the critical points and classify them for the differential equation \( \frac{dy}{dx} = y^4 - 4y^2 \)
Exercise 3 (15 points)

Find the general solution of the differential equation \( x \frac{dy}{dx} + 2y - 3 = 0 \)
Exercise 4 (20 points)
Solve the differential equation $6xydx + (4y + 9x^2)dy = 0$
Exercise 5 (20 points)
Show that the differential equation \((y^2 + xy)dx + x^2 dy = 0\) is defined by homogeneous functions and solve it.
Exercise 6 (20 points)
1-Find the constants $A$, $B$ and $C$ such that $y_p = A + Bx + Cx^2$ is a particular solution of the differential equation $y'' + 3y' + 2y = 4x^2$.
2-Use the equation $r^2 + 3r + 2 = 0$ to find a complementary solution $y_c$ of the homogeneous equation, and then find the general solution.