1. If $C$ is a constant, find the derivative:

(a) $y = -3x + \frac{C}{x}$
   Solution: $y' = -3 - \frac{C}{x^2}$

(b) $y = \frac{x}{2} - 1 + \frac{C}{x}$
   Solution: $y' = \frac{1}{2} - \frac{C}{x^2}$

(c) $y = -1 + Cx$
   Solution: $y' = C$
Lecture Problems

2. Draw the slope field for the differential equations

(a) \( y' = y + 1 \)

Solution:

\[
y' = y + 1
\]
(b) $\frac{dy}{dx} = x + 1$

Solution: $y' = x + 1$
3. Verify that the given solutions are really solutions to the given differential equations.

   (a) \( xy' + 1 = x - y \)
   \[
y = \frac{x}{2} - 1 + \frac{C}{x}.
   \]

   (b) \( xy' = y + 1 \)
   \[
y = -1 + Cx
   \]

4. Given the general solutions, solve the initial value problem.

   (a) \( xy' + 1 = x - y, \ y(1) = 2 \)
   \[
y = \frac{x}{2} - 1 + \frac{(5/2)}{x}
   \]
   Solution:

   (b) \( xy' = y + 1, \ y(2) = 5 \)
   \[
y = -1 + Cx
   \]
   Solution:

   \[
y = -1 + 3x
   \]