Problem 1

Consider the differential equation

$$y' = 2x.$$

a) Construct a direction field for the differential equation.

b) Describe the isoclines and plot an integral curve containing the point $(1, 1)$.

c) Solve the differential equation using the same method given in class (integrating both sides).

d) Identify any singular points.

Problem 2

Consider the differential equation

$$y' = \frac{2y}{x}.$$

a) Construct a direction field.

b) Describe the isoclines and plot an integral curve containing the point $(1, 1)$.

c) Solve the differential equation using the same method given in class (integrating both sides).

d) Identify any singular points.

Problem 3

Consider the differential equation

$$y' = \frac{x - y}{x + y}.$$

Using isoclines, construct a direction field. Identify any singular points.