1. Consider the ODE

\[ \frac{dy}{dx} = \frac{4 - y^2}{4}. \]

(a) The equation is autonomous, i.e. there is no explicit dependence on \( x \) on the right side, so isoclines are horizontal lines. Sketch the direction field including isoclines, with direction arrows, corresponding to \( y = -3, -2, -1, 0, 1, 2, \) and 3. Sketch solution curves passing through \((0,0), (0,1), (0,3),\) and \((0,-3)\).

(b) The equation is separable, find the explicit general solution, i.e. find the explicit solution containing an arbitrary constant \( c \).

(c) Find the solution passing through \((0,0)\).
2. Consider the ODE
\[
\frac{dx}{dt} = \frac{x + 2}{t^2}.
\]

(a) The equation is separable, use those methods to find the explicit general solution.

(b) The equation is linear, use those methods to find the explicit general solution.

(c) Solve the IVP \( x(0) = 2 \).

(d) Solve the IVP \( x(2) = 0 \).