Recap solution by characteristics of \( u_t + c_0 u_x = 0 \) [linearized traffic flow] and \( u_t + c_0 u_x = a^* u \).

Examples: Linear problems with constant or simple variable coefficients, where all the calculations can be done exactly. In each example:
- Write characteristics in parametric form.
- Solve and draw the characteristics.
- Eliminate the characteristic variables and find the solution.
- Show where the solution is defined.

Example 1: \( u_t + c_0 u_x = a^* u \). IVP problem on \(-\infty < x < \infty, t > 0\).
Example 2: \( x^* u_x + y^* u_y = y \), \( u(x, 1) = g(x) \) for \(-\infty < x < \infty, y > 0\).
Example 3: \( u_x + x^2 u_y = y \), with \( u(x, 0) = g(x) \) for \( x > 0 \).
Show that this defines the solution to the right of \( y = x^3/3 \).