6. Consider the PDE $u_x + u_t = u$.
   (a) Apply the geometric method to obtain an idea how the general solution looks like.
   (b) Find the general solution.
   (c) Find the solution u with $u(0,t) = 0$.
   (d) Find the solution u with $u(0,t) = e^t$.
   (e) Find the solution u with $u(0,t) = g(t)$, where g is an arbitrary differentiable function.
   (f) Find the solution u with $u(x,0) = g(x)$, where g is an arbitrary differentiable function.

7. Consider the PDE $u_x + u_t = u + e^{x-t}$.
   (a) Apply the geometric method to obtain an idea how the general solution looks like.
   (b) Find the general solution.
   (c) Find the solution u with $u(x,0) = g(x)$, where g is an arbitrary differentiable function.
   (d) Find the solution u with $u(x,1) = g(x)$, where g is an arbitrary differentiable function.

8. Find the solution of $u_x + u_t + u = e^{x+2t}$ that satisfies $u(x,0) = 0$.

9. Find the solution of $2u_x + 3u_t = 4u + x$ that satisfies $u(x,0) = 9x^2$.

10. Find the general solutions of the following equations. Where are they defined?
    (a) $xu_x + tu_t = 0$;
    (b) $xu_x + tu_t = t.$;
    (c) $xu_x + tu_t = t^2 + x^3$;
    (d) $(1+x^2)u_x + u_t = 0$.

11. Find the solution of $\sqrt{1-x^2}u_x + u_t = 0$ that satisfies $u(0,t) = t$.

12. Find the solution of $tu_x + xu_t = 0$ that satisfies $u(0,t) = e^{-t^2}$.