(1) (20 pt) Lesson 13, problem 3
(2) (20 pt) Lesson 14, problem 1
(3) (20 pt) (Adapted from Lesson 15 problem 2) Solve the following diffusion-convection type problem on $-\infty < x < \infty, 0 < t < \infty$ by making a transformation as in Lesson 8:
\[
\begin{cases}
  u_t = u_{xx} - 2u_x \\
  u(x, 0) = e^x \sin x
\end{cases}
\]
(4) (20 pt) Solve the problem above by using the coordinate transformation as in Lesson 15.
(5) (20 pt) Lesson 16, problem 4