We define $X(t)$ as the solution to the initial value problem, which means for any $a$, $y(t) = X(t)a$ solves
\[
\frac{d}{dt}y(t) = Ay(t), \\
y(0) = a.
\]

(1) Consider the differential equation with the initial condition at $s > 0$.
\[
\frac{d}{dt}z(t) = Az(t), \\
z(s) = b.
\]
What is the solution at time $t > s$ in terms of $X$, $t$, $s$, and $b$?

(2) What is the relation of $X(s)$ and $X(t)$? (Give a mathematical formula.)

(3) Let $q(t) = W(t)c$ be the solution to
\[
\frac{d}{dt}y(t) = By(t), \\
y(0) = c.
\]
Assume $AW(t) = W(t)A$. What differential equation does $v(t) = W(t)X(t)a$ solve?