## Name:

1. Let $x=\left(x_{1}, x_{2}, x_{3}\right)$. The vector $y$ is determined from $x$ according to

$$
\begin{aligned}
& y_{1}=x_{1}-x_{2} \\
& y_{2}=x_{2}-x_{3} \\
& y_{3}=x_{3}-x_{1}
\end{aligned}
$$

Determine a matrix $A$ (where all entries of $A$ are numbers) such that $y=A x$.
2. Suppose the 4 -vector $c$ gives the coefficients of a cubic polynomial $p(t)=c_{1}+c_{2} t+$ $c_{3} t^{2}+c_{4} t^{3}$. Express the conditions

$$
\begin{aligned}
p(0)+p^{\prime}(0) & =0 \\
p(1)+p^{\prime}(1) & =0
\end{aligned}
$$

as a set of linear equations of the form $A c=b$. Give the sizes of $A$ and $b$, as well as their entries.

