1. Which of the following diagrams says " $g$ is a right inverse of $f$ "?

2. If we let $e$ be the identity permutation, $f=\left(\begin{array}{ll}123)\end{array}\right.$ and $g=(12)$ then the group $S_{3}$ can be presented as

$$
S_{3}=\left\langle f, g \mid f^{3}=g^{2}=e, g f=f^{2} g\right\rangle
$$

By choosing the right matrices for $e, f$, and $g$, the group $G L(2,2)$ can also be presented as

$$
G L(2,2)=\left\langle f, g \mid f^{3}=g^{2}=e, g f=f^{2} g\right\rangle .
$$

Choose the right matrices for $e, f$, and $g$ :

$$
\left(\begin{array}{ll}
1 & 1 \\
1 & 0
\end{array}\right) \quad\left(\begin{array}{ll}
1 & 0 \\
0 & 1
\end{array}\right) \quad\left(\begin{array}{ll}
0 & 1 \\
1 & 0
\end{array}\right)
$$

3. Solve the equations, or explain why no solution exists:
(a) Solve $5 x+6=10$ for $x \in \mathbb{Z} / 11 \mathbb{Z}$
(b) Solve $5 x+6=10$ for $x \in \mathbb{Z} / 12 \mathbb{Z}$
