Q5: We will identify all the subgroups of $\mathcal{Q}_8$:

$$\begin{aligned}
\langle 1\rangle &= \{1\} \\
\langle -1\rangle &= \{\pm 1\} \\
\langle i\rangle &= \{1, i, -1, -i\} \\
\langle j\rangle &= \{1, j, -1, -j\} \\
\langle k\rangle &= \{1, k, -1, -k\} \\
\langle i, j\rangle &= \{1, i, j, -1, -i, -j, k, -k\} = \mathcal{Q}_8
\end{aligned}$$

There are no other subgroups of $\mathcal{Q}_8$, since if we took any 2 of $\{i, j, k\}$ we could generate the entire group.