Let $G$ be the above graph. $\mathcal{M}$ is the graphical matroid consisting of the forests of $G$. $E(\mathcal{M})$ is the edges of $G$. $I(\mathcal{M})$ is the forests of $G$ (the subsets of $E(\mathcal{M})$ which induce forests).

1. Find the rank of $\mathcal{M}$ (strictly speaking, this would be $r(E(\mathcal{M}))$).

2. Find a base of $\mathcal{M}$.

3. Find $|\mathcal{B}(\mathcal{M})|$ (there’s no way to list them all!).
4. Let $X$ be the set of edges forming the left cycle. Find $r(X)$.

5. Let $Y$ be the set of edges forming the right cycle. Find $r(Y)$.

6. Find $X \cap Y$ and $r(X \cap Y)$.

7. Find $X \cup Y$ and $r(X \cup Y)$.

8. Check the submodularity property: $r(X \cap Y) + r(X \cup Y) \leq r(X) + r(Y)$. 