1. Find the chromatic number of each of the following graphs.
   Justify your answer by giving a coloring with that number of colors and showing that the graph cannot be colored using one fewer color.

(a)

(b)

2. Consider the graph $\mathcal{G}$

   (a) Find $P(\mathcal{G}, t)$ using a counting argument.
   (b) Find $P(\mathcal{G}, t)$ using the Union Theorem.
   (c) Find $P(\mathcal{G}, t)$ using the Edge Theorem.
   (d) Verify that your answers agree.

3. Use induction and the Edge Theorem to prove that
   $P(C_n, t) = (t - 1)^n + (-1)^n(t - 1)$, for all $n \geq 3$.

4. Use the Union Theorem to find the chromatic polynomial of the graph