1. Let \( P = \{1, 2, 3, 5, 30\} \) ordered by divides.
   (a) Draw the Hasse diagram for \( P \).
   (b) Find the chromatic number \( \chi(G) \), where \( G \) is the Hasse diagram for \( P \).
   (c) Use a counting argument to find the chromatic polynomial \( P(G, t) \), where \( G \) is the Hasse diagram for \( P \).
   (d) Use the Edge Theorem to find \( P(G, t) \), where \( G \) is the Hasse diagram for \( P \).

2. Let \( P = \{3, 6, 15, 12, 30, 60\} \) ordered by divides.
   (a) Draw the Hasse diagram for \( P \).
   (b) Find \( \chi(G) \), where \( G \) is the Hasse diagram for \( P \).
   (c) Use the Union Theorem to find \( P(G, t) \), where \( G \) is the Hasse diagram for \( P \).

3. Show that \( K_n \) has an Eulerian Circuit \( \iff n \) is odd.

4. Draw a Hasse diagram for each isomorphism class of posets with 4 elements.
   Hint: There are 16 isomorphism classes.

5. Let \( P = \{2, 3, 4, \ldots, 100\} \) ordered by divides. Find \( \text{Max}(P) \) and \( \text{Min}(P) \).

6. Let \( \mathbb{Z} \) denote the set of integers, and define
   \[ a \sqsubseteq b \iff b - a \text{ is a nonnegative even integer} \]
   (a) Show that \( \sqsubseteq \) is a partial order of \( \mathbb{Z} \).
   (b) Draw a Hasse diagram for the poset \( (\mathbb{Z}, \sqsubseteq) \).

7. Given posets \( P \) and \( Q \), let \( P \times Q \) be the poset defined in Graded Homework 4.
   Prove: \((x', y') \) covers \((x, y) \) \( \iff (x' = x \text{ and } y' \text{ covers } y) \) or \((x' \text{ covers } x \text{ and } y' = y) \).