1. Let $P = \{1, 2, 3, \ldots, 10\}$ ordered by divides.
   (a) Draw the Hasse diagram for $P$.
   (b) Find $\chi(G)$, where $G$ is the Hasse diagram for $P$.
   (c) Find $P(G, t)$, where $G$ is the Hasse diagram for $P$.
   (d) Find a partition of $P$ into $n$ antichains, where $n$ is the length of $P$.
   (e) Find a partition of $P$ into $w$ chains, where $w$ is the width of $P$.

2. Repeat Problem 2 for $P = \{2, 4, 6, 8, 24, 30, 120\}$ ordered by divides.

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

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

5. Give an example of totally ordered sets $P$ and $Q$ such that $P \times Q$ is not totally ordered, where $P \times Q$ is the poset defined in CHW4#4.

6. Let $P$ denote the poset with the Hasse diagram given below.

![Hasse diagram]

   (a) Use the Topological Sorting Algorithm to find a totally ordered refinement $\leq'$.
   (b) Find $\downarrow(c)$.
   (c) Find all maximal elements of $P$.
   (d) Find all minimal elements of $P$.
   (e) Find a partition of $P$ into $n$ antichains, where $n$ is as small as possible.
   (f) Find a partition of $P$ into $w$ chains, where $w$ is as small as possible.