6.1.1 Determine whether R is a partial order on A.

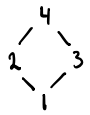
(a) $A = \mathbb{Z}$, and $aRb \iff a = 2b$.

Since $1 \not R 1$, then R is not reflexive, so R is not a partial order.

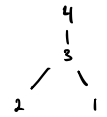
(b) $A = \mathbb{Z}$, and $aRb \iff b^2 | a$.

Since $2 \not R 2$, then R is not reflexive, so R is not a partial order.

6.1.9 Hasse diagram of R. $A = \{1,2,3,4\}$, $R = \{(1,1), (1,2), (2,2), (2,4), (1,3), (3,3), (3,4), (1,4), (4,4)\}$.



6.1.11 Describe R on $A = \{1,2,3,4\}$ from



$R = \{(2,2), (2,3), (2,4), (1,1), (1,3), (1,4), (3,3), (3,4), (4,4)\}$.

6.1.19 Let $A = \{\square, A, B, C, E, O, M, P, S\}$ have the usual alphabetical order, where $\square$ is a blank character and $\square \leq x$ for all $x \in A$. Arrange the following in lexicographic order.

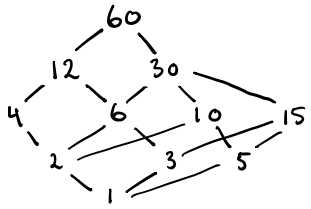
(a) MOP$\square$ (b) MOPE (c) CAP$\square$ (d) MAP$\square$ (e) BASE

(f) ACE$\square$ (g) MACE (h) CAPE

ACE$\square$ < BASE < CAP$\square$ < CAPE < MACE < MAP$\square$ < MOP$\square$ < MOPE.

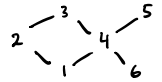
6.1.24 Partial order of divisibility on A. Draw the Hasse diagram of the poset and determine which posets are linearly ordered.

$A = \{1, 2, 3, 4, 5, 6, 10, 12, 15, 30, 60\}$.



Since $4 \nmid 6$ and $6 \nmid 4$, then $(A, |)$ is not linearly ordered.

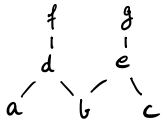
6.2.1 Determine maximal and minimal elements of the poset.



maximal: 3 and 5

minimal: 1 and 6

6.2.2 Determine maximal and minimal elements of the poset.



maximal: f and g.

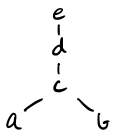
minimal: a, b and c.

6.2.9 Greatest and least elements.

greatest: f

least: a

6.2.10 Greatest and least elements.



greatest: e

least: no element is least, since both a and b are minimal.

Vegleiðandi Multiple Choice rognd 5

1. Which matrix defines a surjective function?

(f) $\begin{bmatrix} 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

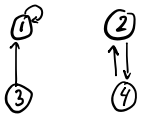
2. Which function $f: \mathbb{R} \to \mathbb{R}$ is not injective?

(f) $f(x) = 2$

3. Let $f = \{(1,1), (2,1), (3,5), (4,4), (5,1)\}$ be a function on $\{1,2,\dots,6\}$.
Which statement is true?

(d) $f(2) = 1 = f(5)$

4. F in $A = \{1,2,3,4\}$ given by



and G from A to $B = \{a,b,c,d,e\}$ given by $G = \{(1,c), (2,d), (3,e), (4,a)\}$.
What is $(G \circ F)(2)$?

(d) $(G \circ F)(2) = G(F(2)) = G(4) = a$

5. Which has the highest order of growth?

(b) $n^2 \cdot 3^n + \log_2(n)$.

6. Which has the same order as n^2?

(e) $4n^2 + n \cdot \log_2(n)$.

7. Arrange in order of growth: n, $n \cdot \log_2(n)$, n^3, 2^n correct order is given.