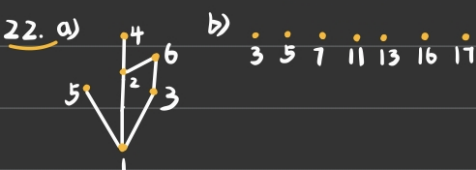


9.6

12. Because (S, R) is a poset, we know R is reflexive, so R^{-1} is reflexive. If $(a, b) \in R^{-1}$ and $a \neq b$, we know $(b, a) \in R$, because $(a, b) \in R^{-1}$, $(b, a) \notin R^{-1}$, $b \neq a$, so R^{-1} is antisymmetry. If $(a, b) \in R^{-1}$, $(b, c) \in R^{-1}$, then $(b, a) \in R$, $(c, b) \in R$, because R is transitive, we get $(c, a) \in R$, then $(a, c) \in R^{-1}$, we know R^{-1} is transitive. So (S, R^{-1}) is also a poset.



28. For example, $(2, 6) \in R$, $(6, 12) \in R$, $(2, 12)$ is not in the covering relation so we can know the covering relation has: $(1, 2)$, $(1, 3)$, $(2, 4)$, $(2, 6)$, $(3, 6)$, $(4, 12)$, $(6, 12)$

35. a) $\{1, 3, 4\}$, $\{2, 3, 4\}$, $\{1, 2\}$

b) $\{1\}$, $\{2\}$, $\{4\}$

c) No

d) No

e) $\{2, 4\}$, $\{2, 3, 4\}$

f) $\{2, 4\}$

g) $\{3, 4\}$, $\{4\}$

h) $\{3, 4\}$

44. a) The poset is not a lattice, because 6 and 9 don't have a upper bound.

b) The poset is a lattice. Because each element can divides the

next one. So every pair of elements has both a least upper bound and greatest lower bound.

c) The poset is a lattice, since it has a linear order. We can know the least upper bound of the two elements is the smaller. The greast lower bound is the lager number.

d) The poset is a lattice. If A and B are the power sets of set S , Then the least upper bound is $A \cup B$, the greast lower bound is $A \cap B$.

抽象代数

20. (a) No, it's not a commutative operation. Because

$a * b = c$, $b * a = d$, so $a * b \neq b * a$

(b) $a * (b * c) = a * c = b$

$(a * b) * c = c * c = b$

(c) No, It's not an associative operation

For example, $c * (b * a) = c * a = c$, $(c * b) * a = a * a = b$

So $c * (b * a) \neq (c * b) * a$

24. 2^{n^2}

26. (a)

$*$	a	b
a	a	a
b	a	a

①

$*$	a	b
a	b	a
b	a	a

②

$*$	a	b
a	a	b
b	a	a

③

$*$	a	b
a	a	a
b	b	a

④

$*$	a	b
a	a	a
b	a	b

⑤

$*$	a	b
a	b	b
b	a	a

⑥

$*$	a	b
a	b	a
b	b	a

⑦

$*$	a	b
a	b	a
b	a	b

⑧

$*$	a	b
a	a	b
b	b	a

⑨

x	a	b
a	a	b
b	a	b

⑩

x	a	b
a	a	a
b	b	b

⑪

x	a	b
a	b	b
b	b	a

⑫

x	a	b
a	b	b
b	a	b

⑬

x	a	b
a	a	b
b	b	b

⑭

x	a	b
a	b	a
b	b	b

⑮

x	a	b
a	b	b
b	b	b

⑯

c) ①, ②, ⑤, ⑧, ⑨, ⑫, ⑭, ⑯ are commutative.

28. Because $a \leq a$, then $a = a * a$, so \leq is reflexive. If $a \leq b$ and

$b \leq a$, then $b = a * b$, $a = b * a$, $a * b = b * a$, so \leq is antisymmetry.

If $a \leq b$ and $b \leq c$, then $a \leq c$. $a = a * b = a * (b * c) =$

$a * c$, so we know \leq is transitive. So (A, \leq) is a poset.

$a = a * b = a * (a * b) = a * (a * b)$, so $a \leq a * b$. Same, $b \leq a * b$.

So $a * b$ is the upper bound of a and b . If $c \geq a$ and $c \geq b$,

$a * b = a * (b * c) = (a * b) * c$, so $a * b \leq c$. Then we know

$LUB(a, b) = a * b$