*

1 point

$(A \cup B) \cup ((A \cup B) \cap C)$ is equal to

(A) U (B) $A \cup B$ (C) $A \cap B$ (D) C

- A
- B
- C
- D

*

1 point

$A - (B \cup C)$ is equal to

(A) $(A - B) \cup (A - C)$ (B) $(A \cap B') \cup (A \cap C')$

✓(C) $A \cap (B' \cap C')$ (D) $A \cup (B \cap C)'$

- A
- ~~B~~
- C ✓
- D

*

1 point

The dual of $(A \cup B) \cap (A \cup \phi) = A$ is

(A) $(A \cap B) \cup (A \cap U) = A$ (B) $(A \cap B) \cap (A \cap U) = A$

(C) $(A \cup B) \cup (A \cap B) = A$ (D) $(A \cup B) - (A \cap B) = A$

- (selected) A
- B
- C
- D

*

1 point

$A - B = B - A$ if and only if

(A) $A \subset B$ (B) $B \subset C$ (C) A or $B = \phi$ (D) $A = B$

- A
- B
- C
- (selected) D

* 1 point

If A=$\{1, 4, 9, 16, 25, 36\}$ then cardinality of A is

(A) 8 (B) 7 (C) 6 (D) 5

- ○ A
- ○ B
- ◉ C
- ○ D

* 1 point

Let $A = \{\phi\}$ and $B = P(A)$, then $A \cap B$ is

(A) 0 (B) $\{\phi\}$ (C) $\{\phi, \{\phi\}\}$ (D) $\{0\}$

- ○ A
- ◉ B
- ○ C
- ○ D

* 1 point

Let $A = \{a, b, c\}$, then the number of subsets of A is

(A) 8 (B) 7 (C) 6 (D) 5

- (selected) A
- B
- C
- D

* 1 point

If a relation R is not symmetric then R is

(A) anti-symmetric (B) need not be anti-symmetric

(C) equivalence (D) partial order

- A
- (selected) B
- C
- D

* 1 point

If $|A| = m$ and $|B| = n$ then the total number of relation from A to B is
(A) m (B) n (C) mn (D) 2^{mn}

- A
- B
- C
- D

* 1 point

Let $R = \{(1,1), (2,2), (3,3), (4,4)\}$ be a relation on $A = \{1,2,3,4\}$ then R is
(A) reflexive only (B) reflexive and symmetry only
(C) anti-symmetric only (D) equivalence

- ~~A~~
- B
- C
- D

* 1 point

If R is a relation from $A = \{1,2,3\}$ to $B = \{4,5\}$ defined by $R = \{(1,4),(2,4),(1,5),(3,5)\}$ then matric representation of the complement of R

(A) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 0 & 0 \\ 0 & 1 \\ 1 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

- [ ] A
- [ ] B
- [x] C
- [ ] D

* 1 point

Let $R = \{(6,2),(8,2),(10,2)\}$ be a relation from $B = \{6,8,10\}$ to $A = \{2,3,5\}$. Then R^{-1} is

(A) $\{(2,6),(3,8),(5,10)\}$ (B) $\{(2,8),(3,6),(5,10)\}$

(C) $\{(10,2),(8,3),(6,5)\}$ (D) $\{(2,6),(2,8),(2,10)\}$

- [ ] A
- [ ] B
- [ ] C
- [x] D

*

1 point

The partition of a set $A = \{1, 2, 3, 4, 5\}$ is

(A) $\{\{\ \}, \{1,2\}, \{3,4\}, \{5\}\}$ (B) $\{\{1,2,3\}, \{3,4,5\}\}$

(C) $\{\{1\}, \{2,3\}, \{5\}\}$ (D) $\{\{1,2\}, \{3\}, \{4,5\}\}$

- ○ A
- ○ B
- ○ C
- ◉ D

*

1 point

Let R be a relation on $A = \{1, 2, 3, 4\}$. Then by using warshall's algorithm how many iterations to be performed?

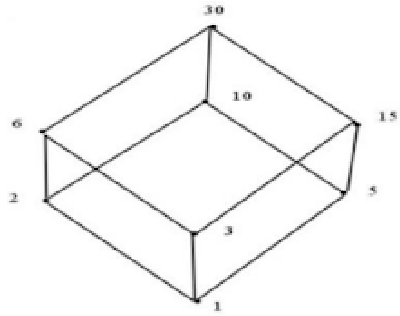
(A) 2 (B) 3 (C) 4 (D) 5

- ○ A
- ○ B
- ◉ C
- ○ D

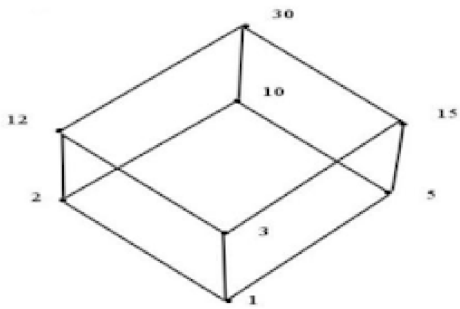
* 1 point

Let D_{30} be the divisors of 30. Find the Hasse diagram for $(D_{30}, /)$ from the following, where " / " represents divisibility relation

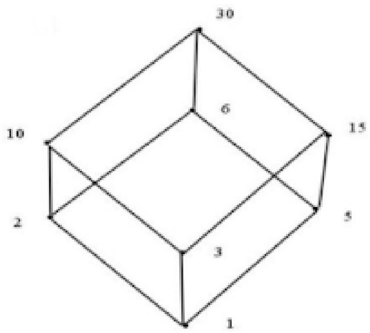
(A)



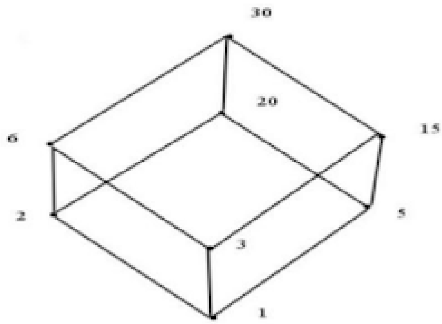
(B)



(C)



(D)



- (selected) A
- B
- C
- D

* 1 point

Let $f, g : R \to R$ defined by $f(x) = x^2$ and $g(x) = \sqrt{x^2 + 2}$ then $f[g(x)]$ is
(A) $x^2 + 2$ (B) $x^4 + 2$ (C) $\sqrt{x^4 + 2}$ (D) $x^2 + 4$

- (•) A
- ( ) B
- ( ) C
- ( ) D

* 1 point

Let $f : A \to B$, $g : B \to C$ and $h : C \to A$. Then which of the following composition is not defined
(A) $g[f(x)]$ (B) $f[g(x)]$ (C) $h[g(x)]$ (D) $f[h(x)]$

- ( ) A
- (•) B
- ( ) C
- ( ) D

* 1 point

Let $f = \{(1,2), (2,4), (3,1), (4,3)\}$ be a function on $A = \{1, 2, 3, 4\}$. Then f is
(A) injective only (B) surjective only (C) many to one (D) invertible

- [ ] A
- [ ] B
- [ ] C
- [x] D

* 1 point

Let $A = \{1,2,3\}$ and $f, g : A \to A$ defined by $f = \{(1,2), (2,1), (3,3)\}$ and $g = \{(1,3), (2,2), (3,1)\}$. Then $f[g(x)]$ is
(A) $\{(1,2), (2,3), (3,1)\}$ (B) $\{(1,3), (2,1), (3,3)\}$
(C) $\{(1,3), (2,2), (2,3)\}$ (D) $\{(1,3), (2,1), (3,2)\}$

- [ ] A
- [ ] B
- [ ] C
- [x] D

* 1 point

Let $R = \{(a,1),(b,1),(b,2)\}$ be a relation from $A = \{a,b,c\}$ to $B = \{1,2,3\}$. Then the domain of R is

(A) $\{1,2\}$ (B) $\{1,2,3\}$ (C) $\{a,b\}$ (D) $\{a,b,c\}$

- ○ A
- ○ B
- ◉ C
- ○ D

* 1 point

The function $f: Z \to Z$ defined by $f(x) = x^2 + 2$ is

(A) One-to-one but not onto (B) One-to-one & onto

(C) Onto but not one-to-one ✓(D) Neither one-to-one nor onto

- ◉ A ✗
- ○ B
- ○ C
- ● D ✓

* 1 point

If $f: R \to R$ given by $f(x) = 3x - 7$ then f^{-1} is

(A) $7y - 3$ (B) $3y + 7$ (C) $\frac{y+7}{3}$ (D) $\frac{y-7}{3}$

- A
- B
- C
- D

* 1 point

If R and S be relations on a set A whose matrix representations are M_R and M_S.

✓(A) $M_{R \oplus S} = M_{R \cup S} - M_{R \cap S}$ (B) $M_{R \oplus S} = M_R \wedge M_S$

(C) $M_{R \oplus S} = M_R \vee M_S$ (D) $M_{R \oplus S} = M_{R \cup S} + M_{R \cap S}$

- A ✓
- ~~B~~
- C
- D

* 1 point

If $f = \{(1,2),(2,1),(3,4),(4,5),(5,3)\}$, $g = \{(1,3),(2,5),(3,1),(4,2),(5,4)\}$.
Then $f[g^{-1}(1)] = ?$

(A) 2 (B) 3 (C) 4 (D) 5

- ( ) A
- ( ) B
- (x) C
- ( ) D

* 1 point

Warshall's algorithm is applied to construct

(A) Symmetric closure (B) Transitive closure
(C) Reflexive closure (D) Anti-symmetric closure

- ( ) A
- (x) B
- ( ) C
- ( ) D