*

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

(A) $\overline{A} \cup (\overline{B} \cap \overline{C})$

(B) $(\overline{A} \cap \overline{B}) \cup (\overline{A} \cap \overline{C})$

(C) $\overline{A} \cup (\overline{B} \cup \overline{C})$

(D) $\overline{A} \cap (\overline{B} \cup \overline{C})$

- ○ A
- ○ B
- ○ C
- ◉ D

*

$A - (B \cap C)$ is

(A) A

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

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

(D) C

- ○ A
- ○ B
- ◉ C
- ○ D

*

If $P = \{1, \{2\}, 4\}$ and $Q = \{1, 2, 4\}$, then

(A) $P = Q$

(B) $Q \subseteq P$

(C) $P \neq Q$

(D) $P \subseteq Q$

- ○ A
- ○ B
- ◉ C
- ○ D

*

Power set of $\{1, 3\}$ is

(A) $\{\phi, \{1\}, \{3\}, \{1, 3\}\}$

(B) $\{\phi, \{1\}, \{1, 3\}\}$

(C) $\{\phi, \{3\}, \{1, 3\}\}$

(D) $\{\phi, \{1\}, \{3\}\}$

- ◉ A
- ○ B
- ○ C
- ○ D

*

For any two sets A and B, $A-(A \cap B)=?$

(A) $A \subseteq B$
(B) $\overline{A} \subseteq \overline{B}$
(C) $A-B$
(D) $A \neq B$

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

*

If $A=\{2,3\}$, $B=\{1,3\}$, then the cartesian product $A \times B=?$

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

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

*

If A and B are any non-empty sets, then $A \cap (B - A)$ is

(A) ϕ

(B) A

(C) B

(D) $\overline{A} \cap B$

- (●) A
- ( ) B
- ( ) C
- ( ) D

*

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

(A) ϕ

(B) A

(C) B

(D) $A \cup B$

- ( ) A
- (●) B
- ( ) C
- ( ) D

*

If $A = \{3, 4, 5\}$ and R is a relation on A given by $R = \{(x, y) | x + y > 7 and x \neq y\}$, then R is

(A) $R = \{(3, 4), (4, 5), (3, 5)\}$
(B) ϕ
(C) $\{(3, 5), (4, 5)\}$
(D) $\{(3, 4), (4, 5)\}$

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

*

If $R = \{(1, 1), (1, 3), (3, 2), (3, 4), (4, 2)\}$ and $S = \{(2, 1), (3, 3), (3, 4), (4, 1)\}$ are two relations defined on the set $A = \{1, 2, 3, 4\}$, then $S \circ R$ is

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

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

*

R is a relation on Z such that aRb if and only if $a = b^2$. Then R satisfies

(A) Reflexive
(B) Transitive
(C) Symmetric
(D) Antisymmetric

- A
- B
- C
- D (selected)

*

R is a relation on $\mathbb{Z}_+ \times \mathbb{Z}_+$ such that $(a,b)R(c,d)$ if and only if $ad = bc$. Then R is

(A) an equivalence relation
(B) a partial order relation
(C) symmetric and transitive
(D) reflexive only

- A (selected)
- B
- C
- D

*

If $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6\}$, then the symmetric difference $A \oplus B$ is

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

(B) $\{1, 2, 5, 6\}$

(C) $\{3, 4\}$

(D) $\{1, 2, 3, 4, 5, 6\}$

- ( ) A
- (•) B
- ( ) C
- ( ) D

*

R is a relation on $A = \{1, 2, 3\}$ such that $(a, b) \in R$ if and only if $a + b =$ even number. Then the matrix of inverse relation $M_{R^{-1}}$ is

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

- ( ) A
- ( ) B
- (•) C
- ( ) D

*

Let $A = \{1,2,3\}$ and R be a relation on A defined by $R = \{(1,1),(1,3),(2,2),(3,1),(3,3)\}$. Then the matrix of complement relation $M_{\bar{R}}$ is

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

- (●) A
- ( ) B
- ( ) C
- ( ) D

*

Let A=$\{1,2,3,4\}$ and R be a relation on A is defined by $R = \{(1,1),(1,2),(2,3),(3,4)\}$. Then the reflexive closure of R is

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

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

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

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

- ( ) A
- ( ) B
- ( ) C
- (●) D

*

Let A={1, 2, 3} and let R be a relation on A be given by $R = \{(1,1),(2,2),(3,3)\}$.
The transitive closure of R is

(A) R

(B) $R \cup \{(1,2)\}$

(C) $R - \{(1,1)\}$

(D) $R \cup \{(1,2),(2,1)\}$

- (●) A
- ( ) B
- ( ) C
- ( ) D

*

Let $f(x) = x^3 - 4x$ and $g(x) = \frac{1}{x^2+1}$ be functions on R. Then $f \circ g$ is

(A) $\left(\frac{1}{x^2+1}\right)^3 - 8\left(\frac{1}{x^2+1}\right)$

(B) $\left(\frac{1}{x^2+1}\right)^3 - 4\left(\frac{1}{x^2+1}\right)$

(C) $\left(\frac{1}{x^2+1}\right)^3 + 4\left(\frac{1}{x^2+1}\right)$

(D) $4\left(\frac{1}{x^2+1}\right) - \left(\frac{1}{x^2+1}\right)^3$

- ( ) A
- (●) B
- ( ) C
- ( ) D

*

Let $f : A \to B$ and $g : B \to C$ be bijections. Then $g \circ f$ is

(A) a bijection

(B) not a bijection

(C) only surjective

(D) only injective

- (selected) A
- B
- C
- D

*

If $S = \{1,2,3,4,5\}$ and if the function $f : S \to S$ is given by $f = \{(1,2),(2,1),(3,4),(4,5),(5,3)\}$, then f^{-1} is

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

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

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

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

- A
- B
- (selected) C
- D

*

If $f : A \to B$, $g : B \to C$ and $h : C \to D$ be bijections, then $(h \circ g) \circ f =$?

(A) $f^{-1} \circ g^{-1} \circ h^{-1}$

(B) $h \circ (g \circ f)$

(C) $g \circ f^{-1} \circ h^{-1}$

(D) $f^{-1} \circ g \circ h^{-1}$

- ( ) A
- (•) B
- ( ) C
- ( ) D

*

If R is a relation on $A = \{1, 2, 3\}$ such that $(a, b) \in R$ if and only if $a + b =$ even, then R^2 is

(A) $\{(1,3),(3,1),(3,3),(2,2)\}$

(B) $\{(1,1),(3,1),(2,2)\}$

(C) $\{(1,1),(3,3),(1,3)\}$

(D) $\{(1,1),(1,3),(3,1),(3,3),(2,2)\}$

- ( ) A
- ( ) B
- ( ) C
- (•) D

*

If R is a relation defined on a set A = { 1 ,2 , 3 , 4},then the exact number of iterations required to compute transitive closure of R, by using Warshall 's algorithm is

A) 1

B) 2

C) 3

D) 4

- ( ) A
- ( ) B
- ( ) C
- (•) D

*

The divisibility relation defined on a set A = { 2 , 4, 5, 10 , 12 , 20 , 25 } is

A) Irreflexive

B) Antisymmetric

C) Not transitive

D) symmetric

- ( ) A
- (•) B
- ( ) C
- ( ) D

*

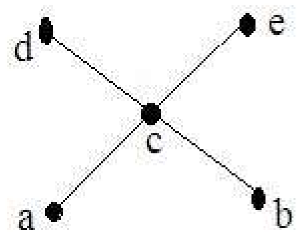
Which of the following pair of elements appearing in the Hasse diagram are not related

A) (a , c)

B) (a , d)

C) (a , b)

D) (a , e)



- ( ) A
- ( ) B
- (•) C
- ( ) D