

Sets and Relations

MCQ Test, Set 07

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

- There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
- Each correct answer carries 1 mark. There is no negative marking.
- The key sheet and worked solutions are at the end of this test.

- If $A = \{7, 10\}$ and $B = \{c, q, t\}$, which of the following does NOT belong to $A \times B$?
A. $(7, q)$ **B.** $(q, 7)$ **C.** $(7, t)$ **D.** $(10, q)$
- If $A \times B = \{(1, a), (1, c), (1, z), (6, a), (6, c), (6, z)\}$, then $A =$
A. $\{1, 6, a, c, z\}$ **B.** $\{a, c, z\}$ **C.** $\{1, 6\}$ **D.** $\{1\}$
- If $A \times B = \{(2, p), (2, q), (11, p), (11, q)\}$, then $B =$
A. $\{2, 11, p, q\}$ **B.** $\{2, 11\}$ **C.** $\{p, q\}$ **D.** $\{p\}$
- If $A = \{t, z\}$, then $A \times A =$
A. $\{(t, t), (t, z), (z, t), (z, z)\}$ **B.** $\{(t, t), (z, z)\}$
C. $\{(t, z), (z, t)\}$ **D.** $\{(t, z)\}$
- If $n(A) = 18$, then $n(A \times A) =$
A. 36 **B.** 262144 **C.** 324 **D.** 18
- If $n(A \times A) = 9$, then $n(A) =$
A. 6 **B.** 4 **C.** 9 **D.** 3
- If $n(A) = 2$ and $n(B) = 5$, then $n(A \times B) =$
A. 20 **B.** 10 **C.** 7 **D.** 1024
- If $A = \{6, 11, 12\}$ and $B = \{q, t\}$, then $R = \{(q, 11), (q, 12), (t, 11)\}$ is a relation from
A. B to A **B.** B to B **C.** A to B **D.** A to A
- If $A = \{1, 9\}$ and $B = \{c, q, y\}$, which of the following is a relation from A to B ?
A. $\{(1, c), (9, p)\}$ **B.** $\{(y, 1), (9, c)\}$ **C.** $\{(c, 9), (q, 1)\}$ **D.** $\{(9, c), (9, y)\}$
- If $A = \{3, 8, 11\}$ and $B = \{c, q\}$, which of the following is NOT a relation from A to B ?
A. $\{(3, c), (11, c)\}$ **B.** $\{(3, c), (8, q), (11, q)\}$
C. $\{(3, c)\}$ **D.** $\{(11, c), (q, 11)\}$
- If $A \times B$ has 10 elements, the number of relations from A to B is
A. 1024 **B.** 100 **C.** 10 **D.** 20

12. If $A = \{4, 6\}$ and $B = \{3, 5, 9\}$, the number of relations from A to B is
A. 12 **B.** 64 **C.** 32 **D.** 6
-
13. If $A = \{2, 8, 12\}$, the number of relations from A to A is
A. 8 **B.** 512 **C.** 64 **D.** 9
-
14. If $R = \{(4, q), (6, q), (6, z), (12, z)\}$, the set of all a with aRq is
A. $\{q\}$ **B.** $\{6, 12\}$ **C.** $\{4, 6\}$ **D.** $\{4, 6, 12\}$
-
15. If $R = \{(2, p), (2, z), (10, p)\}$, which of the following is true?
A. $10Rc$ **B.** $2Rc$ **C.** $zR2$ **D.** $2Rz$
-
16. If $R = \{(1, c), (10, c), (11, c)\}$, which of the following is false?
A. $1Rc$ **B.** $11Rc$ **C.** $11Rq$ **D.** $10Rc$
-
17. If $A = \{c, p, t\}$ and $B = \{a, c, p\}$, the number of ordered pairs in the null relation from A to B is
A. 0 **B.** 1 **C.** 512 **D.** 9
-
18. If $A = \{2, 10\}$ and $B = \{c, y\}$, then $R = \{(2, y), (10, c), (10, y), (2, c)\}$ is
A. a relation from B to A **B.** the universal relation from A to B
C. not a relation from A to B **D.** the null relation from A to B
-
19. If $A = \{1, 3, 11\}$ and $B = \{5, 9\}$, the universal relation from A to B is
A. ϕ **B.** $\{(1, 5), (3, 9)\}$
C. $\{(5, 1), (5, 3), (5, 11), (9, 1), (9, 3), (9, 11)\}$ **D.** $\{(1, 5), (1, 9), (3, 5), (3, 9), (11, 5), (11, 9)\}$
-
20. $R = \{(4, z), (7, c), (9, c)\}$ is a relation from $A = \{4, 6, 7, 9\}$ to $B = \{c, z\}$. The domain of R is
A. $\{c, z\}$ **B.** $\{4, 7, 9\}$ **C.** $\{4, 7, 9, c, z\}$ **D.** $\{4, 6, 7, 9\}$
-
21. $R = \{(2, t), (9, t), (10, x)\}$ is a relation from $A = \{2, 9, 10\}$ to $B = \{p, t, x\}$. The range of R is
A. $\{2, 9, 10\}$ **B.** $\{p, t, x\}$ **C.** $\{t, x\}$ **D.** $\{2, 9, 10, t, x\}$
-
22. If $A = \{4, 9\}$ and $B = \{a, y\}$, the range of the universal relation from A to B is
A. $\{a, y\}$ **B.** ϕ
C. $\{4, 9\}$ **D.** $\{(4, a), (4, y), (9, a), (9, y)\}$
-
23. If $R = \{(2, b), (9, b), (12, b)\}$, then $R^{-1} =$
A. $\{(b, 2), (b, 9), (b, 12)\}$ **B.** $\{(2, b), (9, b), (12, b)\}$
C. $\{(b, 2), (b, 9), (12, b)\}$ **D.** $\{(b, 9), (b, 12)\}$
-
24. If $R^{-1} = \{(p, 1), (q, 5), (p, 6)\}$, then $R =$
A. $\{(1, q), (5, p), (6, p)\}$ **B.** $\{(1, p), (5, q), (6, p)\}$
C. $\{(1, p), (5, q), (p, 6)\}$ **D.** $\{(p, 1), (q, 5), (p, 6)\}$
-

25. If $R = \{(5, z), (8, z), (9, c), (10, z)\}$, the domain of R^{-1} is

A. $\{5, 8, 9, 10, c, z\}$

B. $\{5, 8, 9, 10\}$

C. $\{c\}$

D. $\{c, z\}$

Key sheet

1. B	2. C	3. C	4. A	5. C
6. D	7. B	8. A	9. D	10. D
11. A	12. B	13. B	14. C	15. D
16. C	17. A	18. B	19. D	20. B
21. C	22. A	23. A	24. B	25. D

Solutions

1. If $A = \{7, 10\}$ and $B = \{c, q, t\}$, which of the following does NOT belong to $A \times B$?

The first element of a pair in $A \times B$ must be in A .

$q \notin A$, so $(q, 7) \notin A \times B$.

Ans: (B) $(q, 7)$

2. If $A \times B = \{(1, a), (1, c), (1, z), (6, a), (6, c), (6, z)\}$, then $A =$

A is the set of first elements of the pairs.

$A = \{1, 6\}$

Ans: (C) $\{1, 6\}$

3. If $A \times B = \{(2, p), (2, q), (11, p), (11, q)\}$, then $B =$

B is the set of second elements of the pairs.

$B = \{p, q\}$

Ans: (C) $\{p, q\}$

4. If $A = \{t, z\}$, then $A \times A =$

Pair each element of A with every element of A (itself included).

$A \times A = \{(t, t), (t, z), (z, t), (z, z)\}$

Ans: (A) $\{(t, t), (t, z), (z, t), (z, z)\}$

5. If $n(A) = 18$, then $n(A \times A) =$

$n(A \times A) = n(A) \times n(A) = 18 \times 18 = 324$

Ans: (C) 324

6. If $n(A \times A) = 9$, then $n(A) =$

$n(A \times A) = n(A) \times n(A) = 9$

$3 \times 3 = 9$

$\therefore n(A) = 3$

Ans: (D) 3

7. If $n(A) = 2$ and $n(B) = 5$, then $n(A \times B) =$

$n(A \times B) = n(A) \times n(B) = mn$

$= 2 \times 5 = 10$

Ans: (B) 10

8. If $A = \{6, 11, 12\}$ and $B = \{q, t\}$, then $R = \{(q, 11), (q, 12), (t, 11)\}$ is a relation from

First elements are in B , second elements are in A .

$\therefore R \subseteq B \times A$

Ans: (A) B to A

9. If $A = \{1, 9\}$ and $B = \{c, q, y\}$, which of the following is a relation from A to B ?

A relation from A to B is a subset of $A \times B$.

Only $\{(9, c), (9, y)\}$ has every pair in $A \times B$.

Ans: (D) $\{(9, c), (9, y)\}$

10. If $A = \{3, 8, 11\}$ and $B = \{c, q\}$, which of the following is NOT a relation from A to B ?

A relation from A to B is a subset of $A \times B$.

$q \notin A$, so $(q, 11) \notin A \times B$.

Ans: (D) $\{(11, c), (q, 11)\}$

11. If $A \times B$ has 10 elements, the number of relations from A to B is

Relations are the subsets of $A \times B$.

$$2^{10} = 1024$$

Ans: (A) 1024

12. If $A = \{4, 6\}$ and $B = \{3, 5, 9\}$, the number of relations from A to B is

$$n(A \times B) = 2 \times 3 = 6$$

$$\text{Number of relations} = 2^6 = 64$$

Ans: (B) 64

13. If $A = \{2, 8, 12\}$, the number of relations from A to A is

$$n(A \times A) = 3 \times 3 = 9$$

$$\text{Number of relations} = 2^9 = 512$$

Ans: (B) 512

14. If $R = \{(4, q), (6, q), (6, z), (12, z)\}$, the set of all a with aRq is

aRq means $(a, q) \in R$.

Such pairs: $(4, q), (6, q)$.

Ans: (C) $\{4, 6\}$

15. If $R = \{(2, p), (2, z), (10, p)\}$, which of the following is true?

aRb means $(a, b) \in R$.

$(2, z) \in R$, so $2Rz$.

Ans: (D) $2Rz$

16. If $R = \{(1, c), (10, c), (11, c)\}$, which of the following is false?

aRb means $(a, b) \in R$.

$(11, q) \notin R$, so $11Rq$ is false.

Ans: (C) $11Rq$

17. If $A = \{c, p, t\}$ and $B = \{a, c, p\}$, the number of ordered pairs in the null relation from A to B is
The null relation is ϕ .
 ϕ has no ordered pairs, so the number is 0.
Ans: (A) 0

18. If $A = \{2, 10\}$ and $B = \{c, y\}$, then $R = \{(2, y), (10, c), (10, y), (2, c)\}$ is
 R contains every pair of $A \times B$.
 $\therefore R = A \times B$
So R is the universal relation from A to B .
Ans: (B) the universal relation from A to B

19. If $A = \{1, 3, 11\}$ and $B = \{5, 9\}$, the universal relation from A to B is
 $A \times B \subseteq A \times B$, so $A \times B$ is a relation from A to B : the universal relation.
 $A \times B = \{(1, 5), (1, 9), (3, 5), (3, 9), (11, 5), (11, 9)\}$
Ans: (D) $\{(1, 5), (1, 9), (3, 5), (3, 9), (11, 5), (11, 9)\}$

20. $R = \{(4, z), (7, c), (9, c)\}$ is a relation from $A = \{4, 6, 7, 9\}$ to $B = \{c, z\}$. The domain of R is
Domain of R = set of first elements of the pairs in R .
Domain = $\{4, 7, 9\}$
Ans: (B) $\{4, 7, 9\}$

21. $R = \{(2, t), (9, t), (10, x)\}$ is a relation from $A = \{2, 9, 10\}$ to $B = \{p, t, x\}$. The range of R is
Range of R = set of second elements of the pairs in R .
Range = $\{t, x\}$
Ans: (C) $\{t, x\}$

22. If $A = \{4, 9\}$ and $B = \{a, y\}$, the range of the universal relation from A to B is
The universal relation is $A \times B$.
Its second elements are all the elements of B .
Ans: (A) $\{a, y\}$

23. If $R = \{(2, b), (9, b), (12, b)\}$, then $R^{-1} =$
 R^{-1} : interchange the two elements of every pair of R .
 $R^{-1} = \{(b, 2), (b, 9), (b, 12)\}$
Ans: (A) $\{(b, 2), (b, 9), (b, 12)\}$

24. If $R^{-1} = \{(p, 1), (q, 5), (p, 6)\}$, then $R =$
Interchanging the elements of each pair of R^{-1} gives back R .
 $R = \{(1, p), (5, q), (6, p)\}$
Ans: (B) $\{(1, p), (5, q), (6, p)\}$

25. If $R = \{(5, z), (8, z), (9, c), (10, z)\}$, the domain of R^{-1} is

$$R^{-1} = \{(z, 5), (z, 8), (c, 9), (z, 10)\}$$

$$\text{Domain of } R^{-1} = \{c, z\}$$

It is the range of R .

Ans: (D) $\{c, z\}$
