

PRACTICE PROBLEMS

1. If a relation $R = \{(0, 0), (2, 4), (-1, -2), (3, 6), (1, 2)\}$, then write domain of R
2. If a relation $R = \{(0, 0), (2, 4), (-1, -2), (3, 6), (1, 2)\}$, then write range of R .
3. If a relation $R = \{(0, 0), (2, 4), (-1, -2), (3, 6), (1, 2)\}$, then write R in the builder form.
4. If a relation $R = \{(0, 0), (2, 4), (-1, -2), (3, 6), (1, 2)\}$, then represent R by an arrow diagram.
5. If $A = \{1, 2, 3, 4, \dots, 14\}$ and a relation R is defined from A to A by $R = \{(x, y): 3x - y = 0, x, y \in A\}$. Write R in roster form
6. Let $A = \{1, 2\}$ and $B = \{3, 4\}$. Find the number of relations from A to B .
7. Find the linear relation between the components of the ordered pairs of the relation R where $R = \{(2, 1), (4, 7), (1, -2), \dots\}$
8. The range of the relation $\{(1, 0), (2, 0), (3, 0), (4, 0), (0, 0)\}$ is
 - (1) $\{1, 2, 3, 4, 0\}$
 - (2) $\{0\}$
 - (3) $\{1, 2, 3, 4\}$
 - (4) None of above

9. Find the domain and range of each of the relations given below:

(i) $R = \{(-1, 1), (1, 1), (-2, 4), (2, 4), (3, 9)\}$

(ii) $R = \left\{ \left(x, \frac{1}{x} \right) : x \text{ is an integer, } 0 < x < 5 \right\}$

(iii) $R = \{(x, y) : x + 2y = 8 \text{ and } x, y \in \mathbb{N}\}$

(iv) $R = \{(x, y) : y = |x - 1|, x \in \mathbb{Z} \text{ and } |x| \leq 3\}$

10. Let $A = \{1, 3, 5, 7\}$ and $B = \{2, 4, 6, 8\}$. Let $R = \{(x, y) : x \in A, y \in B \text{ and } x > y\}$.

(i) Write R in roster form.

(ii) Find domain (R) and range (R).

(iii) Depict R by an arrow diagram.

11. Let $A = \{2, 4, 5\}$ and $B = \{1, 2, 3, 4, 6, 8\}$. Let $R = \{(x, y) : x \in A, y \in B \text{ and } x \text{ divides } y\}$.

(i) Write R in roster form.

(ii) Find domain (R) and range (R).

12. Let $A = \{2, 3, 4, 5\}$ and $B = \{3, 6, 7, 10\}$. Let $R = \{(x, y) : x \in A, y \in B \text{ and } x \text{ is relatively prime to } y\}$.

(i) Write R in roster form.

(ii) Find domain (R) and Range (R).

13. Define a relation R from \mathbb{Z} to \mathbb{Z} , given by $R = \{(a, b) : a, b \in \mathbb{Z} \text{ and } (a - b) \text{ is an integer}\}$.
Find domain and range of R .

14. Let $R = \{(x, y) : x, y \in \mathbb{Z} \text{ and } x^2 + y^2 \leq 4\}$.

(i) Write R in roster form.

(ii) Find domain and range.

15. Let $A = \{2, 3\}$ and $B = \{3, 5\}$.

(i) Find $(A \times B)$ and $n(A \times B)$.

(ii) How many relations can be defined from A to B ?

16. Let $R = \{(a, b) : a, b \in \mathbb{Z} \text{ and } b = 2a - 4\}$. If $(a, -2) \in R$ and $(4, b^2) \in R$. Then, write the values of a and b .

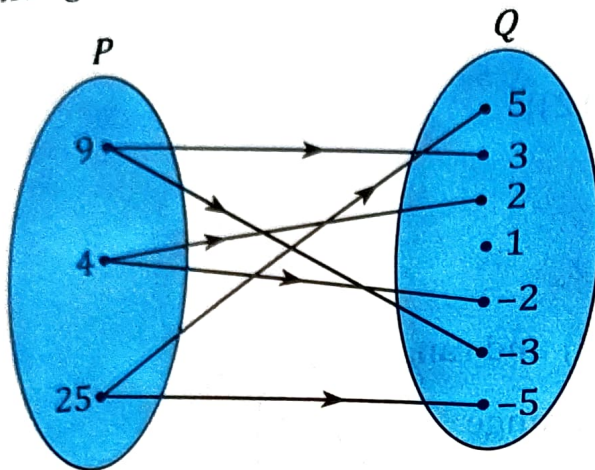
17. Let R be a relation on \mathbb{Z} , defined by $(x, y) \in R \Leftrightarrow x^2 + y^2 = 9$. Then, write R as set of ordered pairs. What is its domain?

18. Let A be the set of first five natural numbers and let R be a relation on A , defined by $(x, y) \in R$ if $x \leq y$. Express R and R^{-1} as sets of ordered pairs. Find: domain and range.

CASE STUDY TYPE QUESTIONS

Read the following passages and answer the questions that follow:

1. A class XI teacher, after teaching the topic of 'Relations; tries to assess the performance of her students over this topic. The figure shows a relation between the sets P and Q.



(i) This relation in set builder form is:

- (a) $R = \{(x, y) : x \text{ is square root of } y, x \in P, y \in Q\}$ (b) $R = \{(x, y) : y \text{ is square of } x, x \in P, y \in Q\}$
(c) $R = \{(x, y) : x \text{ is square of } y, x \in P, y \in Q\}$ (d) None of these

(ii) The domain of relation is:

- (a) $\{1, 2, 3, 4, 5\}$ (b) $\{4, 9, 25, 5\}$ (c) $\{4, 9\}$ (d) $\{4, 9, 25\}$

(iii) The range of relation is:

- (a) $\{4, 9, 25\}$ (b) $\{1, 2, 3, 4, 5\}$
(c) $\{-2, 2, -3, 3, -5, 5\}$ (d) $\{-5, -3, -2, 1, 2, 3, 5\}$

(iv) This relation in roster form is:

- (a) $\{(9, 3), (4, 2), (25, 5)\}$
(b) $\{(9, 3), (9, -3), (4, 2), (4, -2), (25, 5), (25, -5)\}$
(c) $\{(9, -3), (4, -2), (25, -5)\}$
(d) None of the above

(v) The total number of relation from set P are:

- (a) 32 (b) 64 (c) 128 (d) None of these