

**MM 30****Relations class xi****Time 1 hour**Report errors or suggestions to errors@cbsemath.com**1 Mark Each**

1. If $A = \{1, 2\}$, form the set $A \times A \times A$.
2. If $A \times B = \{(a, 1), (b, 3), (a, 3), (b, 1), (a, 2), (b, 2)\}$, find A and B.
3. If $A = \{1, 3, 5\}$, $B = \{x, y\}$ represent the following products by arrow diagrams:
 $A \times B$
4. Let R be the relation on the set N of natural numbers defined by
 $R = \{(a, b) : a + 3b = 12, a \in N, b \in N\}$. Find R
5. If the set A has p elements, B has q elements, then find the number of elements in $A \times B$
6. Determine the domain and range of the following relations on R:

$$R_1 = \left\{ \left(x, \frac{1}{x} \right) : 0 < x < 6, x \in N \right\}$$

4 Marks Each

7. The adjacent figure shows a relation R between the sets P and Q. Write this relation R in (i) set builder form (ii) roster form. What is its domain and range?
8. Let R be the relation on Z defined by $R = \{(a, b) : a, b \in Z, a - b \text{ is an even integer}\}$. Find the domain and range of R.
9. In the set of natural numbers, Let R be the relation defined on N as aRb if and only if $a, b \in N$ and $a + 2b = 11$. Write R as the set of ordered pairs. Find the domain of R and the range of R. Also write R^{-1} .

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6 Marks Each



MM 30

Relations class xi

Time 1 hour

10. Let R be the relation on the set Z of all integers defined by $(x, y) \in R \Rightarrow x - y$ is divisible by n . Prove that
- (i) $(x, x) \in R$ for all $x \in Z$
 - (ii) $(x, y) \in R \Rightarrow (y, x) \in R$ for all $x, y \in Z$
 - (iii) $(x, y) \in R$ and $(y, x) \in R$ for all $x, y \in Z \Rightarrow (x, z) \in R$ for all $x, y, z \in R$.
11. Let $A = \{1, 2, 3, \dots, 14\}$ Define a relation R from A to A by $R = \{(x, y) : 3x - y = 0, \text{ where } x, y \in A\}$. Depict this relationship using an arrow diagram. Write down its domain, co-domain and range.

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