SmartKalike

CBSE Class 12 · Maths

Relations and Functions

10 most probable questions for Boards 2027

Q1. 1 mark · Very short answer

For A = {1, 2}, let R = ∅. How many ordered pairs in A are related under R?

Answer

∴ Number of ordered pairs related under R = 0

Q2. 2 marks · Short answer

Let A = {1, 2} and R = {(1, 1), (1, 2)}. Write A × A and identify the empty and universal relations in A. Verify that R is a subset of A × A.

Answer

A × A = {(1, 1), (1, 2), (2, 1), (2, 2)}
Empty relation = ∅
Universal relation = A × A = {(1, 1), (1, 2), (2, 1), (2, 2)}
R = {(1, 1), (1, 2)}
∴ R ⊂ A × A

Q3. 3 marks · Multiple choice

Which of the following conditions makes a function f : X → Y bijective?
(A) f is one-one only
(B) f is onto only
(C) f is both one-one and onto
(D) f is neither one-one nor onto

Answer

(C) f is both one-one and onto — a function is bijective if it is both one-one and onto.

Q4. 4 marks · Long answer

On A = {1, 2, 3}, let R = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 1)}. Check whether R is reflexive, symmetric and transitive, giving a reason for each conclusion.

Answer

Reflexive: (1, 1), (2, 2), (3, 3) ∈ R
∴ R is reflexive.

Symmetric: (1, 2) ∈ R and (2, 1) ∈ R; the diagonal pairs are symmetric as well.
∴ R is symmetric.

The only non-diagonal pairs are (1, 2) and (2, 1); their compositions yield only (1, 1) and (2, 2), which belong to R. Compositions involving diagonal pairs also yield pairs in R.
∴ R is transitive.

Q5. 5 marks · Long answer

Let f : A → B, where A = {1, 2, 3} and B = {2, 4, 6}, be defined by f(x) = 2x. Find the range of f and use it to check whether f is onto. State the relationship between the range and co-domain when a function is onto.

Answer

A function is onto if and only if its range equals its co-domain.
f(1) = 2(1) = 2
f(2) = 2(2) = 4
f(3) = 2(3) = 6
Range(f) = {2, 4, 6} = B
∴ f is onto.

Q6. 1 mark · Very short answer

An equivalence relation on A = {1, 2, 3, 4} has classes {1, 3} and {2, 4}. Find the equivalence class containing 3.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/relations-and-functions

Q7. 2 marks · Short answer

On A = {1, 2, 3}, let R = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 1)}. Given that R is reflexive, symmetric and transitive, determine whether R is an equivalence relation, with a reason.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/relations-and-functions

Q8. 3 marks · Multiple choice

Let f be a function from a three-element set to itself. If f is onto, which statement must be true?
(A) f is many-one
(B) f is one-one
(C) f is not onto
(D) f has exactly two images

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/relations-and-functions

Q9. 4 marks · Long answer

On Z, define a relation R by a R b if and only if 2 divides a − b. Show that R has exactly two equivalence classes and write them explicitly.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/relations-and-functions

Q10. 5 marks · Long answer

For f : R → R defined by f(x) = 2x, prove that f is one-one and onto.

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