EXAM-DAY · 90-MIN REVISION CARD

Relations and Functions

Print this · Fold it · Carry to the exam-hall gate · Revise once · Then walk in.

FORMULAS & KEY RESULTS

Ordered pair: (a, b) = (c, d) ⇔ a = c AND b = d.

Cartesian product: A × B = {(a, b) : a ∈ A, b ∈ B}. |A × B| = |A| · |B|.

Relation R from A to B: any subset R ⊆ A × B. Domain(R) = {a : (a,b) ∈ R}; Range(R) = {b : (a,b) ∈ R}.

Reflexive: (a, a) ∈ R ∀ a. Symmetric: (a,b) ∈ R ⇒ (b,a) ∈ R. Transitive: (a,b),(b,c) ∈ R ⇒ (a,c) ∈ R. Equivalence = all three.

Function f: A → B: each a ∈ A has EXACTLY one image f(a) ∈ B.

One-one: f(a) = f(b) ⇒ a = b. Onto: range = codomain. Bijection: one-one AND onto.

Algebra: (f ± g)(x) = f(x) ± g(x); (fg)(x) = f(x)g(x); (f/g)(x) = f(x)/g(x), g(x) ≠ 0.

Composition: (f∘g)(x) = f(g(x)). Generally f∘g ≠ g∘f.

Inverse: f^{-1} exists ⇔ f is bijective. Then f^{-1}∘f = identity on A, f∘f^{-1} = identity on B.

Standard real functions: identity f(x)=x; constant f(x)=c; modulus f(x)=|x|; signum sgn(x) ∈ {−1,0,1}; greatest integer [x]; fractional part {x} = x − [x] ∈ [0,1).

TOP 5 PYQ PATTERNS

1 List A × B or write a relation R in roster form
2 marks · 90% of years
Row-major listing; check (x,y) lies in correct sets.

2 Find domain and range of a real function
3 marks · 85% of years
Domain = allowed inputs; range = actual outputs. Check √ ⩾ 0 and denominator ≠ 0.

3 Show f is one-one / onto / bijective
3 marks · 70% of years
Definitions first, then symbolic proof or counter-example.

4 Composition or algebra of functions at a point
2 marks · 60% of years
Inner function first, then outer; remember composition is non-commutative.

5 Sketch a standard real function + state domain/range
4 marks · 55% of years
Memorise four shapes; labelled axes; correct open/filled dots for [x].

90-MIN REVISION FLOW

0-15 min
Re-read definitions: ordered pair, A×B, relation, function. Hand-write 5 examples of each (small finite sets).

15-35 min
Drill |A×B| counting and roster-form questions from NCERT exercise 2.1 (Q1-Q8). Set a 60-sec timer per question.

35-55 min
Domain/range practice: do 6 mixed functions (√, 1/x, |x|, [x], piecewise). Match domain in interval notation.

55-75 min
Sketch the 5 standard real functions on a single sheet. Label axes, domain, range under each.

75-85 min
Composition: f(x)=2x+1, g(x)=x²−3. Compute (f∘g)(x), (g∘f)(x), and both at x=2. Verify non-equality.

85-90 min
Self-quiz: 5 MCQs from drill. Check answers and mark misconceptions to revisit tomorrow.

Confidence, not anxiety. You've practised this all year. Trust your steps. Don't change strategy on exam morning.
Helpline: **+91 70330 05444** · **readyforboards.com**