QUICK DRILL · CBSE CLASS 11

Relations and Functions

Mathematics · Chapter 2 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	15	20 min	+1 / 0	⩾ 12/15

OBJECTIVES

Reinforce the four core topics of Relations and Functions via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

SECTION · QUICK DRILL

Q 1–15 · 20 MIN

Q1. If A = {1, 2} and B = {3, 4, 5}, then |A × B| equals:

(A) 5 **(B)** 6
(C) 8 **(D)** 10

PYQ 2019 · Delhi · 1m · ? 25s

Q2. If (2x − 1, y + 3) = (5, 7), then (x, y) equals:

(A) (3, 4) **(B)** (2, 4)
(C) (3, 5) **(D)** (2, 5)

PYQ 2020 · All India · 1m · ? 30s

Q3. Let A = {1, 2, 3}. The relation R = {(1, 2), (2, 3)} on A is:

(A) Reflexive **(B)** Symmetric
(C) Transitive **(D)** None of these

PYQ 2018 · Delhi · 1m · ? 45s

Q4. The domain of the function f(x) = 1/(x − 3) is:

(A) R **(B)** R \ {0}
(C) R \ {3} **(D)** [3, ∞)

PYQ 2021 · Delhi · 1m · ? 30s

Q5. The range of f(x) = |x| − 2 on R is:

(A) [0, ∞) **(B)** [−2, ∞)
(C) R **(D)** (−∞, −2]

PYQ 2022 · All India · 1m · ? 40s

Q6. If f(x) = 2x + 1 and g(x) = x², then (f∘g)(2) equals:

(A) 5 **(B)** 7
(C) 9 **(D)** 25

PYQ 2022 · Delhi · 1m · ? 30s

Q7. If |A| = 3 and |B| = 4, the number of relations from A to B equals:

(A) 12 **(B)** 2^{12}
(C) 3^4 **(D)** 4^3

PYQ 2019 · All India · 1m · ? 35s

Q8. The function f: N → N, f(x) = x + 2 is:

(A) One-one and onto **(B)** One-one but not onto
(C) Onto but not one-one **(D)** Neither one-one nor onto

PYQ 2020 · Delhi · 1m · ? 50s

Q9. The value of [−1.5] + [2.7] equals (where [·] is greatest integer):

(A) 1 **(B)** 0
(C) −1 **(D)** 2

PYQ 2021 · All India · 1m · ? 40s

Q10. If A = {1, 2}, the identity relation on A has how many elements?

(A) 1 **(B)** 2
(C) 3 **(D)** 4

PYQ 2018 · All India · 1m · ? 25s

Q11. The domain of $f(x) = \sqrt{(x - 2)}$ is:

(A) R
(B) $[0, \infty)$
(C) $[2, \infty)$
(D) $(2, \infty)$

PYQ 2023 · Delhi · 1m · 30s

Q12. If $f(x) = x^2$ and $g(x) = x + 1$, then $(g \circ f)(3)$ equals:

(A) 7
(B) 9
(C) 10
(D) 16

PYQ 2022 · All India · 1m · 30s

Q13. Which of the following is NOT a function from A = {1, 2, 3} to B = {a, b}?

(A) {(1,a),(2,a),(3,b)}
(B) {(1,b),(2,a),(3,a)}
(C) {(1,a),(1,b),(2,a),(3,b)}
(D) {(1,a),(2,b),(3,a)}

PYQ 2019 · Delhi · 1m · 45s

Q14. Range of the signum function sgn(x) is:

(A) R
(B) {0, 1}
(C) {−1, 1}
(D) {−1, 0, 1}

PYQ 2020 · Delhi · 1m · 25s

Q15. If A = {1, 2, 3} and R = {(a, b) : a, b ∈ A, a + b ⩽ 4}, the number of elements in R is:

(A) 4
(B) 5
(C) 6
(D) 9

PYQ 2021 · Delhi · 1m · 60s

ANSWER KEY & EXPLANATIONS

Q 1–15 · MARK YOUR SCORE

Q1. Answer: B

$|A \times B| = |A| \cdot |B| = 2 \cdot 3 = 6$.

Q2. Answer: A

$2x - 1 = 5 \Rightarrow x = 3$. $y + 3 = 7 \Rightarrow y = 4$. So $(x, y) = (3, 4)$.

Q3. Answer: D

Reflexive needs (1,1),(2,2),(3,3) — missing. Symmetric needs (2,1),(3,2) — missing. Transitive needs (1,3) from (1,2)+(2,3) — missing. None hold.

Q4. Answer: C

Denominator must be non-zero, so $x - 3 \neq 0 \Rightarrow x \neq 3$. Domain = R \ {3}.

Q5. Answer: B

$|x| \geqslant 0$ for all x, so $|x| - 2 \geqslant -2$. Minimum −2 at x = 0; can be arbitrarily large. Range = $[-2, \infty)$.

Q6. Answer: C

$(f \circ g)(2) = f(g(2)) = f(2^2) = f(4) = 2 \cdot 4 + 1 = 9$.

Q7. Answer: B

$|A \times B| = 12$; number of subsets of a 12-element set = 2^{12}. Each subset is a relation.

Q8. Answer: B

One-one: $f(a)=f(b) \Rightarrow a+2 = b+2 \Rightarrow a=b$ ✓. Onto: $1 \in$ codomain N, but $x+2 = 1 \Rightarrow x = -1 \notin$ N. So 1 has no pre-image. One-one, not onto.

Q9. Answer: B

$\lfloor -1.5 \rfloor = -2$ (largest integer $\leqslant -1.5$). $\lfloor 2.7 \rfloor = 2$ (largest integer $\leqslant 2.7$). Sum = −2 + 2 = 0.

Q10. Answer: B

Identity relation = $\{(a, a) : a \in A\} = \{(1,1), (2,2)\}$. So 2 elements.

Q11. Answer: C

Need $x - 2 \geqslant 0 \Rightarrow x \geqslant 2$. Domain = $[2, \infty)$. 2 itself is allowed since $\sqrt{0} = 0$.

Q12. Answer: C

$(g \circ f)(3) = g(f(3)) = g(9) = 9 + 1 = 10$.

Q13. Answer: C

Option C maps 1 to both a and b — violates 'each x has UNIQUE image'. Hence not a function.

Q14. Answer: D

sgn(x) = −1 if x < 0; sgn(0) = 0; sgn(x) = 1 if x > 0. Range = {−1, 0, 1}.

Q15. Answer: B

List pairs (a,b) with a+b ⩽ 4 on A×A: (1,1) sum 2 ✓; (1,2) 3 ✓; (1,3) 4 ✓; (2,1) 3 ✓; (2,2) 4 ✓; (2,3) 5 ×; (3,1) 4 ✓; (3,2) 5 ×; (3,3) 6 ×. Total 6. Hmm. Let me recount: (1,1),(1,2),(1,3),(2,1),(2,2),(3,1) = 6. Answer should be C (6), not B. Correcting → answer is C.