MATHEMATICS MCQ BOOKLET

Grade 9 · Chapter 3 · Sets and Relations

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Independent MCQs on sets, Venn diagrams, operations on two and three sets, laws of union and intersection, Cartesian products, and binary relations. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a short explanation of why it is correct.

A. Important / Main Topics

1. A set is a well-defined collection of:

(A) distinct objects
(B) possibly repeated objects with no rule
(C) only numbers greater than 10
(D) ordered pairs only

Correct Answer: A

Explanation: Well-defined membership and no repetition are part of the definition.

2. “Tall students in a class” fails to be a set mainly because it is not:

(A) written in roster form
(B) well-defined: tall has no sharp test
(C) a subset of N
(D) disjoint from Q

Correct Answer: B

Explanation: “Tall students in a class” fails to be a set mainly because it is not well-defined: tall has no sharp test.

3. “Stones with mass less than 1 kg” is well-defined because:

(A) stones are pretty
(B) all stones weigh 1 kg
(C) a measuring test decides in or out
(D) mass is irrational

Correct Answer: C

Explanation: “Stones with mass less than 1 kg” is well-defined because a measuring test decides in or out.

4. In roster form, repeating an element is not allowed, so the natural numbers among 2, 3, 3, 4, −9 are:

(A) {2, 3, 3, 4, −9}
(B) {−9, 2, 3, 4}
(C) {3}
(D) {2, 3, 4}

Correct Answer: D

Explanation: −9 is not natural here, and 3 is listed once.

5. The set of even primes is:

(A) {2}
(B) empty
(C) {2, 4}
(D) all even numbers

Correct Answer: A

Explanation: 2 is the unique even prime, so the correct choice is {2}.

6. The set of natural numbers less than 1 is:

(A) {0}
(B) the empty set
(C) {1}

(D) {1, 2, …}

Correct Answer: B

Explanation: N starts at 1 in this course, so nothing in N is smaller than 1.

7. Set-builder form writes a set by a:

(A) picture of mangoes only
(B) Venn shading only
(C) defining rule for a variable x
(D) Cartesian graph only

Correct Answer: C

Explanation: One names a typical element and the condition it must satisfy.

8. The vertical bar in {x | x □ Z} is read as:

(A) divides
(B) union
(C) absolute value
(D) such that

Correct Answer: D

Explanation: It introduces the membership rule, so the correct choice is such that.

9. N = {1, 2, 3, …} denotes:

(A) natural numbers
(B) whole numbers
(C) integers
(D) rationals

Correct Answer: A

Explanation: N = {1, 2, 3, …} denotes natural numbers.

10. W = {0, 1, 2, 3, …} denotes:

(A) natural numbers excluding 0
(B) whole numbers
(C) integers
(D) primes

Correct Answer: B

Explanation: W = {0, 1, 2, 3, …} denotes whole numbers.

11. Z = {0, ±1, ±2, …} denotes:

(A) naturals
(B) wholes only
(C) integers
(D) rationals only

Correct Answer: C

Explanation: Z = {0, ±1, ±2, …} denotes integers.

12. Q is the set of rationals p/q with p, q integers and:

(A) q = 0
(B) p = 0 always
(C) p > q
(D) q ≠ 0

Correct Answer: D

Explanation: Division by zero is excluded, so the correct choice is q ≠ 0.

13. R in set-builder form is {x | x □ Q or x □ Q'}, which means reals are:

(A) rationals or irrationals
(B) only integers
(C) only primes

(D) only wholes

Correct Answer: A

Explanation: R in set-builder form is {x | x □ Q or x □ Q'}, which means reals are rationals or irrationals.

14. The real numbers cannot be listed in a complete roster because:

(A) R is empty
(B) R is infinite in a way that a finite or simple list cannot exhaust it
(C) R has only 10 elements
(D) roster form is illegal

Correct Answer: B

Explanation: Descriptive or set-builder language is used instead of a full.

15. A □ B is the set of elements that belong to:

(A) both A and B only
(B) neither A nor B
(C) A or B or both
(D) A but not B

Correct Answer: C

Explanation: Union collects everything that appears in at least one of the sets.

16. A ∩ B is the set of elements that belong to:

(A) A or B
(B) A but not B
(C) the universal set only
(D) both A and B

Correct Answer: D

Explanation: A ∩ B is the set of elements that belong to both A and B.

17. If P = {2, 4, 6, 8} and Q = {6, 8, 10}, then P □ Q equals:

(A) {2, 4, 6, 8, 10}
(B) {6, 8}
(C) {2, 4, 10}
(D) {10}

Correct Answer: A

Explanation: List each distinct element from either set once.

18. If P = {2, 4, 6, 8} and Q = {6, 8, 10}, then P ∩ Q equals:

(A) {2, 4}
(B) {6, 8}
(C) {10}
(D) empty

Correct Answer: B

Explanation: Only 6 and 8 sit in both, so the correct choice is {6, 8}.

19. A − B is:

(A) {x | x □ A and x □ B}
(B) {x | x □ B and x □ A}
(C) {x | x □ A and x □ B}
(D) A □ B

Correct Answer: C

Explanation: Difference keeps members of A that are not in B.

20. If A = {2, 4, 6, 8} and B = {4, 8, 10}, then A − B equals:

(A) {4, 8}
(B) {10}
(C) {2, 4, 6, 8, 10}

(D) {2, 6}

Correct Answer: D

Explanation: If A = {2, 4, 6, 8} and B = {4, 8, 10}, then A − B equals {2, 6}.

21. In general A − B compared with B − A is:

(A) not necessarily equal
(B) always equal
(C) always empty
(D) always the universal set

Correct Answer: A

Explanation: Set difference is not commutative, so the correct choice is not necessarily equal.

22. If U is the universal set and A □ U, then A' (or A^c) equals:

(A) A
(B) U − A
(C) A □ U
(D) A ∩ A

Correct Answer: B

Explanation: The complement is everything in U that is not in A.

23. A ∩ A' equals:

(A) U
(B) A
(C) the empty set
(D) A'

Correct Answer: C

Explanation: Nothing can lie both in A and outside A.

24. A □ A' equals:

(A) empty
(B) A
(C) A − A'
(D) U

Correct Answer: D

Explanation: Every member of U is either in A or in the complement.

25. Two sets are disjoint when:

(A) A ∩ B is empty
(B) A □ B = U
(C) A □ B
(D) A = B

Correct Answer: A

Explanation: Disjoint means no shared element, so the correct choice is A ∩ B is empty.

26. Two sets are overlapping when their intersection is non-empty and:

(A) each is a subset of the other
(B) neither is a subset of the other
(C) their union is empty
(D) they are equal

Correct Answer: B

Explanation: Two sets are overlapping when their intersection is non-empty and neither is a subset of the other.

27. A is a subset of B when:

(A) some element of A misses B
(B) A ∩ B is empty
(C) every element of A is in B

(D) A = U

Correct Answer: C

Explanation: Membership in A forces membership in B, so the correct choice is every element of A is in B.

28. In a Venn diagram the universal set is drawn as a:

(A) circle only
(B) single point
(C) arrow
(D) rectangle

Correct Answer: D

Explanation: Sets inside U are usually circles or ovals.

29. If A = {1, 2, 3}, B = {3, 4, 5}, C = {5, 6}, then B ∩ C equals:

(A) {5}
(B) {3}
(C) {3, 5}
(D) empty

Correct Answer: A

Explanation: The only shared member of B and C is 5, so the correct choice is {5}.

30. With A = {1, 2, 3}, B = {3, 4, 5}, C = {5, 6}, A □ (B ∩ C) equals:

(A) {1, 2, 3}
(B) {1, 2, 3, 5}
(C) {5}
(D) {1, 2, 3, 4, 5, 6}

Correct Answer: B

Explanation: B ∩ C = {5}, then union with A adds 5 to {1, 2, 3}.

31. With A = {1, 2, 3}, B = {3, 4, 5}, C = {5, 6}, A ∩ (B □ C) equals:

(A) {1, 2, 3}
(B) {5}
(C) {3}
(D) empty

Correct Answer: C

Explanation: B □ C = {3, 4, 5, 6}; the overlap with A is {3}.

32. The associative law of union is:

(A) A □ B = B ∩ A
(B) A ∩ A' = U
(C) (A □ B)' = A' □ B'
(D) (A □ B) □ C = A □ (B □ C)

Correct Answer: D

Explanation: Grouping of unions can be changed without changing the result.

33. The associative law of intersection is:

(A) (A ∩ B) ∩ C = A ∩ (B ∩ C)
(B) A □ (B ∩ C) = (A □ B) ∩ C always without extra sets
(C) A − B = B − A
(D) A × B = B × A

Correct Answer: A

Explanation: The associative law of intersection is (A ∩ B) ∩ C = A ∩ (B ∩ C).

34. The distributive law of union over intersection is:

(A) A □ (B ∩ C) = (A ∩ B) □ C
(B) A □ (B ∩ C) = (A □ B) ∩ (A □ C)
(C) A ∩ (B □ C) = A □ B □ C

(D) A □ (B ∩ C) = A ∩ B ∩ C

Correct Answer: B

Explanation: Union distributes across a pair the way multiplication distributes across a sum, with roles as in the formula.

35. The distributive law of intersection over union is:

(A) A ∩ (B □ C) = A □ B □ C
(B) A □ (B ∩ C) = A ∩ B
(C) A ∩ (B □ C) = (A ∩ B) □ (A ∩ C)
(D) A ∩ (B □ C) = (A □ B) ∩ C

Correct Answer: C

Explanation: Intersection distributes over union, so the correct choice is A ∩ (B □ C) = (A ∩ B) □ (A ∩ C).

36. A □ A equals:

(A) empty
(B) U
(C) A'
(D) A

Correct Answer: D

Explanation: Union with itself does not add new members (idempotent law).

37. A ∩ A equals:

(A) A
(B) U
(C) empty
(D) A'

Correct Answer: A

Explanation: The common members of A with A are just A.

38. (A')' equals:

(A) empty
(B) A
(C) U
(D) A'

Correct Answer: B

Explanation: (A')' equals A.

39. n(A □ B) equals:

(A) n(A) + n(B)
(B) n(A) − n(B)
(C) n(A) + n(B) − n(A ∩ B)
(D) n(A) · n(B)

Correct Answer: C

Explanation: n(A □ B) equals n(A) + n(B) − n(A ∩ B).

40. If n(A) = 24, n(B) = 18 and n(A □ B) = 31, then n(A ∩ B) equals:

(A) 13
(B) 7
(C) 55
(D) 11

Correct Answer: D

Explanation: 24 + 18 − 31 = 11, so the correct choice is 11.

41. If n(A − B) = 23, n(A ∩ B) = 2 and n(A □ B) = 44, then n(B − A) equals:

(A) 19
(B) 21

(C) 23
(D) 25

Correct Answer: A

Explanation: n(A □ B) = n(A − B) + n(A ∩ B) + n(B − A), so 44 = 23 + 2 + n(B − A) and n(B − A) = 19.

42. 50 houses: 25 have lawns, 32 have porches, 15 have both. How many have neither?

(A) 7
(B) 8
(C) 10
(D) 15

Correct Answer: B

Explanation: Union = 25 + 32 − 15 = 42, so neither = 50 − 42 = 8.

43. Every student plays at least one game. 350 play badminton, 280 table tennis, 150 both. The total is:

(A) 630
(B) 150
(C) 480
(D) 70

Correct Answer: C

Explanation: 350 + 280 − 150 = 480, so the correct choice is 480.

44. 70 people; 48 like tea, 40 like coffee; everyone likes at least one. How many like both?

(A) 22
(B) 8
(C) 88
(D) 18

Correct Answer: D

Explanation: Both = 48 + 40 − 70 = 18, so the correct choice is 18.

45. 80 students; 50 study English, 45 study Maths, 20 study both. How many study neither?

(A) 5
(B) 15
(C) 25
(D) 0

Correct Answer: A

Explanation: Union = 50 + 45 − 20 = 75, so neither = 80 − 75 = 5.

46. An ordered pair (a, b) equals (c, d) if and only if:

(A) a = d and b = c
(B) a = c and b = d
(C) a + b = c + d
(D) ab = cd

Correct Answer: B

Explanation: Both coordinates must match, in order, so the correct choice is a = c and b = d.

47. (2, 5) compared with (5, 2) is:

(A) the same pair
(B) undefined
(C) different because order matters
(D) equal after union

Correct Answer: C

Explanation: First and second places are distinguished.

48. If (x + 1, 3) = (4, y − 1), then (x, y) equals:

(A) (4, 3)
(B) (5, 2)

(C) (3, 2)
(D) (3, 4)

Correct Answer: D

Explanation: If (x + 1, 3) = (4, y − 1), then (x, y) equals (3, 4).

49. If (2a, 2b + 3) = (−10, −b), then a equals:

(A) −5
(B) 5
(C) −10
(D) 2

Correct Answer: A

Explanation: If (2a, 2b + 3) = (−10, −b), then a equals −5.

50. A × B = {(x, y) | x □ A and y □ B}. If A = {1, 2} and B = {a, b}, then n(A × B) equals:

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

Correct Answer: B

Explanation: n(A × B) = n(A) · n(B) = 2 · 2 = 4, so the correct choice is 4.

51. A × B is empty if:

(A) A = B
(B) A □ B
(C) either A or B is empty
(D) n(A) = n(B)

Correct Answer: C

Explanation: There is no pair if there is no first or no second coordinate available.

52. In general A × B equals B × A:

(A) always
(B) never
(C) only when both are empty or one is a singleton always
(D) if and only if A = B (for non-empty sets of this type)

Correct Answer: D

Explanation: Swapping coordinates changes the pairs unless the two sets are the same.

53. n(A × B) compared with n(B × A) is:

(A) equal, even if the sets of pairs differ
(B) always different
(C) n(A) + n(B)
(D) always 0

Correct Answer: A

Explanation: n(A × B) compared with n(B × A) is equal, even if the sets of pairs differ.

54. The number of subsets of A × B, hence the number of binary relations from A to B, is:

(A) n(A) + n(B)
(B) 2^{n(A)·n(B)}
(C) n(A) · n(B)
(D) 2^{n(A)+n(B)}

Correct Answer: B

Explanation: Each subset of the Cartesian product is a relation.

55. If n(A) = 3 and n(B) = 2, the number of relations from A to B is:

(A) 6
(B) 32

(C) 64
(D) 8

Correct Answer: C

Explanation: 2^{3·2} = 2^6 = 64, so the correct choice is 64.

56. If n(A) = 4, the number of relations on A (subsets of A × A) is:

(A) 16
(B) 2^8 = 256
(C) 8
(D) 2^{16}

Correct Answer: D

Explanation: n(A × A) = 16, so 2^{16} relations, so the correct choice is 2^{16}.

57. A binary relation from A to B is:

(A) any subset of A × B
(B) any subset of A □ B
(C) always A × B itself only
(D) a number n(A)

Correct Answer: A

Explanation: That is the definition used in the unit.

58. The empty subset of A × B is called a:

(A) universal relation
(B) void relation
(C) onto function always
(D) disjoint union

Correct Answer: B

Explanation: A relation with no ordered pairs is void.

59. The domain of a relation is the set of all:

(A) second components of its pairs
(B) unions of A and B
(C) first components of its pairs
(D) complements

Correct Answer: C

Explanation: The domain of a relation is the set of all first components of its pairs.

60. The range of a relation is the set of all:

(A) first components
(B) elements of U
(C) indices
(D) second components of its pairs

Correct Answer: D

Explanation: Range collects the right entries, so the correct choice is second components of its pairs.

61. If R = {(2, 1), (4, 3), (2, 5)}, then Dom R equals:

(A) {2, 4}
(B) {2, 4, 2}
(C) {1, 3, 5}
(D) {2}

Correct Answer: A

Explanation: The distinct first elements are 2 and 4.

62. If R = {(2, 1), (4, 3), (2, 5)}, then Range R equals:

(A) {2, 4}
(B) {1, 3, 5}

(C) {2}
(D) empty

Correct Answer: B

Explanation: The distinct second elements are 1, 3 and 5.

63. If R = {(0, 0), (2, 4), (3, 9)}, then R^{−1} equals:

(A) {(0, 0), (2, 4), (3, 9)}
(B) {(2, 0), (3, 2)}
(C) {(0, 0), (4, 2), (9, 3)}
(D) {(9, 4, 0)}

Correct Answer: C

Explanation: Inverse swaps each ordered pair, so the correct choice is {(0, 0), (4, 2), (9, 3)}.

64. Dom(R^{−1}) equals:

(A) Dom R
(B) A □ B
(C) empty always
(D) Range R

Correct Answer: D

Explanation: The first entries of the inverse are the old second entries.

65. Range(R^{−1}) equals:

(A) Dom R
(B) Range R
(C) U
(D) R itself

Correct Answer: A

Explanation: The second entries of the inverse are the old first entries.

66. A = {1, 2, 3}, B = {0, 1, 3}, R = {(a, b) | a > b}. Then R equals:

(A) {(1, 1), (3, 3)}
(B) {(1, 0), (2, 0), (2, 1), (3, 0), (3, 1)}
(C) {(1, 3), (2, 3)}
(D) A × B

Correct Answer: B

Explanation: Keep pairs from A × B whose first coordinate is strictly larger.

67. For that same R, the range does not include 3 from B because:

(A) 3 is not in B
(B) 3 is irrational
(C) no a in A is greater than 3
(D) R is void

Correct Answer: C

Explanation: The largest a is 3, which is not greater than 3.

68. If T = {0, ±1, ±2} and R_1 = {(x, y) | x + y = 0}, then (2, −2) is:

(A) not in R_1
(B) in the complement of T × T only
(C) a triple
(D) in R_1

Correct Answer: D

Explanation: 2 + (−2) = 0, so the pair satisfies the rule.

69. E = {2, 4, 6}, F = {0, 1, 2}, R_2 = {(x, y) | x + y = 6}. Then R_2 equals:

(A) {(4, 2), (6, 0)}
(B) {(2, 4)}

(C) {(2, 2), (4, 1)}
(D) E × F

Correct Answer: A

Explanation: 4 + 2 = 6 and 6 + 0 = 6; 2 + 4 is impossible because 4 □ F.

70. Relations may be shown by tables of pairs, arrow diagrams, and:

(A) only Roman numerals
(B) graphs of the ordered pairs
(C) only characteristic bars
(D) only radicals

Correct Answer: B

Explanation: Relations may be shown by tables of pairs, arrow diagrams, and graphs of the ordered pairs.

71. If A □ B then A − B equals:

(A) A
(B) B
(C) the empty set
(D) B − A

Correct Answer: C

Explanation: Every member of A already lies in B, so nothing remains.

72. If A − B = B − A = empty, then:

(A) A is disjoint from B
(B) A □ B is empty
(C) A' = B
(D) A = B

Correct Answer: D

Explanation: Each set has no leftover elements, so they contain exactly the same members.

73. If A □ B = A and A ∩ B = B, then:

(A) B □ A
(B) A □ B
(C) A ∩ B is empty
(D) A = empty

Correct Answer: A

Explanation: Union equal to A means B contributes nothing new, so B □ A; inter.

74. n(A) = p implies n(A × A) equals:

(A) p
(B) p²
(C) 2p
(D) 2^p

Correct Answer: B

Explanation: n(A) = p implies n(A × A) equals p².

75. If n(B) = t, the number of binary relations on B is:

(A) t
(B) t²
(C) 2^{t²}
(D) 2^t

Correct Answer: C

Explanation: There are t² pairs in B × B and 2^{t²} subsets.

76. Mathematics is described as a study of patterns, structures, and:

(A) only cooking recipes
(B) only Roman history

(C) only book prices
(D) their relationships

Correct Answer: D

Explanation: Mathematics is described as a study of patterns, structures, and their relationships.

77. The next square after 1, 4, 9, 16 in the pattern of k^2 is:

(A) 25
(B) 20
(C) 32
(D) 18

Correct Answer: A

Explanation: The next square after 1, 4, 9, 16 in the pattern of k^2 is 25.

78. If X = {a, b, c, d, e}, Y = {a, c, e}, Z = {g, h}, then (X ∩ Y) ∩ Z equals:

(A) {a, c, e}
(B) empty
(C) {g, h}
(D) {a}

Correct Answer: B

Explanation: X ∩ Y = {a, c, e} shares nothing with Z.

79. If X = {a, b, c, d, e}, Y = {a, c, e}, Z = {g, h}, then (X □ Y) □ Z has how many elements?

(A) 5
(B) 8
(C) 7
(D) 2

Correct Answer: C

Explanation: 7 — this correctly answers the question.

80. n(A) = 60, n(B) = 48, n(A ∩ B) = 20, n(U) = 90. Then n(A □ B) equals:

(A) 108
(B) 28
(C) 90
(D) 88

Correct Answer: D

Explanation: 60 + 48 − 20 = 88, so the correct choice is 88.

B. Less Important / Secondary Topics

81. A collection of lighter stones is a poor set example because lighter is:

(A) not an objective cut-off
(B) a precise SI unit
(C) always 1 kg
(D) a prime number

Correct Answer: A

Explanation: A collection of lighter stones is a poor set example because lighter is not an objective cut-off.

82. Letters of the word set in roster form are:

(A) {s, e, t, t}
(B) {s, e, t}
(C) {set}
(D) empty

Correct Answer: B

Explanation: Three distinct letters; repetition is dropped.

83. Even integers E include:

(A) only positives 2, 4, 6, …
(B) only odds
(C) 0 and both positive and negative even integers
(D) only primes

Correct Answer: C

Explanation: The chapter lists 0, ±2, ±4, …, so the correct choice is 0 and both positive and negative even integers.

84. Odd integers O start their usual list at:

(A) 0
(B) 2, 3, 5
(C) 1/2
(D) ±1, ±3, ±5, …

Correct Answer: D

Explanation: Odd means not divisible by 2, so the correct choice is ±1, ±3, ±5, ….

85. Primes P begin:

(A) {2, 3, 5, 7, 11, …}
(B) {1, 2, 3, 5, …}
(C) {0, 1, 2}
(D) {4, 6, 8}

Correct Answer: A

Explanation: 1 is not prime; 2 is the first prime, so the correct choice is {2, 3, 5, 7, 11, …}.

86. Common elements of A and B are written how many times in A ∩ B?

(A) twice
(B) once
(C) n(A) times
(D) never

Correct Answer: B

Explanation: A set lists each member once, so the correct choice is once.

87. If A = {1, 2, 3} and B = {4, 5}, they are:

(A) overlapping
(B) equal
(C) disjoint
(D) complements of each other always

Correct Answer: C

Explanation: If A = {1, 2, 3} and B = {4, 5}, they are disjoint.

88. If A = {2, 3, 5, 7, 9} and B = {0, 3, 5, 8}, they are overlapping because:

(A) A □ B
(B) A ∩ B is empty
(C) A = B
(D) A ∩ B = {3, 5} ≠ empty and neither set contains the other

Correct Answer: D

Explanation: If A = {2, 3, 5, 7, 9} and B = {0, 3, 5, 8}, they are overlapping because A ∩ B = {3, 5} ≠ empty and neither set contains the other.

89. Brackets in A □ (B ∩ C) mean one should first compute:

(A) B ∩ C
(B) A □ B
(C) A ∩ C
(D) the complement of A

Correct Answer: A

Explanation: Parentheses set the inner operation, so the correct choice is B ∩ C.

90. Idempotent flavour: A □ A' □ A equals:

(A) A
(B) U
(C) A'
(D) empty

Correct Answer: B

Explanation: A □ A' is already U, and U □ A = U, so the correct choice is U.

91. In a school of 10 teachers, 5 teach Maths, 3 teach Biology, all 10 teach English, and Maths/Biology are disjoint inside English. Only English is taught by:

(A) 8 teachers
(B) 5 teachers
(C) 2 teachers
(D) 10 teachers

Correct Answer: C

Explanation: In a school of 10 teachers, 5 teach Maths, 3 teach Biology, all 10 teach English, and Maths/Biology are disjoint inside English. Only English is taught by 2 teachers.

92. In a three-sport survey the region outside all three circles counts people who play:

(A) all three
(B) exactly two
(C) only cricket
(D) none of the three games

Correct Answer: D

Explanation: Outside the union is the complement of C □ H □ F.

93. n(only A) for two sets equals:

(A) n(A) − n(A ∩ B)
(B) n(A)
(C) n(A □ B)
(D) n(B)

Correct Answer: A

Explanation: Remove the shared part from A, so the correct choice is n(A) − n(A ∩ B).

94. The first element of (a, b) is a and the second is:

(A) also a
(B) b
(C) a + b
(D) A × B

Correct Answer: B

Explanation: That is the ordered-pair convention, so the correct choice is b.

95. Each element of A × B is called an:

(A) index
(B) mantissa
(C) ordered pair
(D) radicand

Correct Answer: C

Explanation: Pairs (x, y) with x from A and y from B.

96. The number of possible subsets of A × B is 2 to the power:

(A) n(A) + n(B)
(B) n(A) − n(B)
(C) 2
(D) n(A × B)

Correct Answer: D

Explanation: A finite set with k elements has 2^k subsets.

97. Arrow diagrams for P × Q draw an arrow from every member of P to:

(A) every member of Q
(B) one member of Q only
(C) P itself only
(D) the empty set

Correct Answer: A

Explanation: The full product pairs each first coordinate with all second coordinates.

98. A × (B □ C) equals:

(A) (A □ B) × C
(B) (A × B) □ (A × C)
(C) A □ B □ C
(D) empty always

Correct Answer: B

Explanation: A × (B □ C) equals (A × B) □ (A × C).

99. A × (B ∩ C) equals:

(A) A ∩ B ∩ C
(B) (A ∩ B) × C
(C) (A × B) ∩ (A × C)
(D) B × C

Correct Answer: C

Explanation: The same distributive pattern holds for inter.

100. If (a + 1, 4) = (2, b − 3), then b equals:

(A) 1
(B) 4
(C) 5
(D) 7

Correct Answer: D

Explanation: a + 1 = 2 so a = 1, and 4 = b − 3 so b = 7.

101. A relation on a single set A is a subset of:

(A) A × A
(B) A □ A
(C) A'
(D) N

Correct Answer: A

Explanation: Pairs are taken from A with itself, so the correct choice is A × A.

102. For R = {(a, b) | a, b □ Z and a + b = 0}, Dom R compared with Range R is:

(A) a proper subset
(B) equal (both all of Z)
(C) empty
(D) only N

Correct Answer: B

Explanation: Every integer x pairs with −x, and every integer appears as a second component too.

103. Tabular form of {(a, b) | a, b □ N and a · b = 6} includes:

(A) only (1, 6)
(B) (0, 6)
(C) (1, 6), (2, 3), (3, 2), (6, 1)
(D) (−1, −6)

Correct Answer: C

Explanation: Tabular form of {(a, b) | a, b □ N and a · b = 6} includes (1, 6), (2, 3), (3, 2), (6, 1).

104. A relation can be written in set-builder form by stating:

(A) only n(A)
(B) only the universal set
(C) only the mantissa
(D) the condition on (x, y)

Correct Answer: D

Explanation: The rule picks which pairs from A × B belong to R.

105. Graphs of a relation plot each ordered pair as a:

(A) point in the plane
(B) Venn circle
(C) radical sign
(D) log table row

Correct Answer: A

Explanation: The unit shows Cartesian-product points on axes.

106. If n(A) = 34, n(B) = 52, n(A □ B) = 60, then n(A ∩ B) equals:

(A) 86
(B) 26
(C) 18
(D) 8

Correct Answer: B

Explanation: 34 + 52 − 60 = 26, so the correct choice is 26.

107. De Morgan style from the playground: (A □ B)' equals:

(A) A' □ B'
(B) A ∩ B
(C) A' ∩ B'
(D) A □ B

Correct Answer: C

Explanation: The complement of a union is the inter.

108. Cataloguing products in a mall with overlapping categories is a real-world use of:

(A) only logarithms
(B) only scientific notation
(C) only cube roots
(D) Venn diagrams and set operations

Correct Answer: D

Explanation: The unit lists classification problems as applications of three-set Venn diagrams.