Arivaali

MATHEMATICS

Practice Book

10th Standard

Unit wise Selected Questions



The detailed Answers of these Questions are available in 10th Standard Arivaali Mathematics Guide





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Easy way of Scoring More Marks in 10th Standard Mathematics

Qn. No.	Topics	Marks	Total
1 - 14	Book Back Multiple Choice Questions (125)	14	53 Only the simple practice is enough
43	Practical Geometry Questions	8	
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15 - 16	Unit-1 (2 Mark Questions)	4	
29	Unit-1 (5 Mark Questions)	5	
27	Unit-8 (2 Mark Questions)	2	
41	Unit-8 (5 Mark Questions)	5	
20 - 22	Unit-4 (2 Mark Questions)	2	
34 - 36	Unit-4 (5 Mark Questions)	5	
17 - 18	Unit-2 (2 Mark Questions)	2	47 An extra practice is needed.
30 - 31	Unit-2 (5 Mark Questions)	10	
19 - 20	Unit-3 (2 Mark Questions)	4	
32 - 35	Unit-3 (5 Mark Questions)	10	
21 - 23	Unit-5 (2 Mark Questions)	2	
36 - 37	Unit-5 (5 Mark Questions)	5	
24 - 25	Unit-6 (2 Mark Questions)	2	
38	Unit-6 (5 Mark Questions)	5	
26 - 27	Unit-7 (2 Mark Questions)	2	
39 - 40	Unit-7 (5 Mark Questions)	5	
	Total Marks		100

1 RELATIONS AND FUNCTIONS

1 MARK QUESTIONS

Book Back (Exercise: 1.6) Questions

1. If $n(A \times B) = 6$ and $A = \{1, 3\}$ then $n(B)$ is
   (a) 1 (b) 2
   (c) 3 (d) 6

2. $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is
   (a) 8 (b) 20
   (c) 12 (d) 16

3. If $A = \{1, 2\}$, $B = \{1, 2, 3, 4\}$, $C = \{5, 6\}$ and $D = \{5, 6, 7, 8\}$ then state which of the following statements is true.
   (a) $(A \times C) \subset (B \times D)$ (b) $(B \times D) \subset (A \times C)$
   (c) $(A \times B) \subset (A \times D)$ (d) $(D \times A) \subset (B \times A)$

4. If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements in B is
   (a) 3 (b) 2
   (c) 4 (d) 8

5. The range of the relation $R = \{(x, x^2) \mid x$ is a prime number less than $13\}$ is
   (a) $\{2, 3, 5, 7\}$
   (b) $\{2, 3, 5, 7, 11\}$
   (c) $\{4, 9, 25, 49, 121\}$
   (d) $\{1, 4, 9, 25, 49, 121\}$

6. If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal then (a, b) is
   (a) $(2, -2)$ (b) $(5, 1)$
   (c) $(2, 3)$ (d) $(3, -2)$

7. Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty relations that can be defined from A to B is
   (a) m^n (b) n^m
   (c) $2^{mn} - 1$ (d) 2^{mn}

8. If $\{(a, 8), (6, b)\}$ represents an identity function, then the value of a and b are respectively
   (a) (8, 6) (b) (8, 8)
   (c) (6, 8) (d) (6, 6)

9. Let $A = \{1, 2, 3, 4\}$ and $B = \{4, 8, 9, 10\}$. A function $f : A \to B$ given by $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$ is a
   (a) Many-one function
   (b) Identity function
   (c) One-to-one function
   (d) Into function

10. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then f o g is
    (a) $\frac{3}{2x^2}$ (b) $\frac{2}{3x^2}$
    (c) $\frac{2}{9x^2}$ (d) $\frac{1}{6x^2}$

11. If $f: A \to B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to
    (a) 7 (b) 49
    (c) 1 (d) 14

12. Let f and g be two functions given by
    $f = \{(0, 1), (2, 0), (3, -4), (4, 2), (5, 7)\}$
    $g = \{(0, 2), (1, 0), (2, 4), (-4, 2), (7, 0)\}$
    then the range of f o g is
    (a) $\{0, 2, 3, 4, 5\}$ (b) $\{-4, 1, 0, 2, 7\}$
    (c) $\{1, 2, 3, 4, 5\}$ (d) $\{0, 1, 2\}$

13. Let $f(x) = \sqrt{1 + x^2}$ then
    (a) $f(xy) = f(x).f(y)$
    (b) $f(xy) \geq f(x).f(y)$
    (c) $f(xy) \leq f(x).f(y)$
    (d) None of these

14. If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are
    (a) $(-1, 2)$ (b) $(2, -1)$
    (c) $(-1, -2)$ (d) $(1, 2)$

15. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
    (a) linear (b) cubic
    (c) reciprocal (d) quadratic

2 Mark Questions

1. If A = {1, 3, 5} and B = {2, 3} then find A × B and B × A.

2. Find A × B, A × A and B × A, if A = {2, –2, 3} and B = {1, –4}

3. Find A × B, A × A and B × A, if A = B = {p, q}

4 Find A × B, A × A and B × A, if A = {m, n}; B = ϕ.

5. Let A = {1,2,3} and B = {x | x is a prime number less than 10}. Find A × B and B × A.

6. Let A = {1, 3, 5} and B = {2, 3}. Is A × B = B × A? If not why?

7. If A = {1, 3, 5} and B = {2, 3} then show that n(A × B) = n(B × A) = n(A) × n(B).

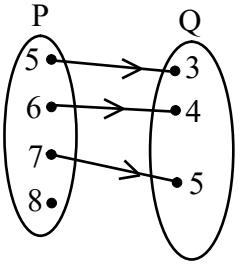
8. If A × B = {(3,2), (3,4), (5,2), (5,4)} then find A and B.

9. If B × A = {(–2, 3), (–2, 4), (0, 3), (0, 4), (3, 3), (3, 4)} find A and B.

10. A Relation R is given by the set {(x, y) | $y = x + 3$, $x \in \{0, 1, 2, 3, 4, 5\}$}. Determine its domain and range.

11. Let A= {1, 2, 3, 4, ... , 45} and R be the relation defined as "is square of a number" on A. Write R as a subset of A×A. Also find domain and range of R.

12. The arrow diagram shows a relationship between the sets P and Q. Write the relation in (i) set builder form (ii) Roster form.



13. If X = {–5, 1, 3, 4} and Y = {a, b, c}, then which of the following relations are functions from X to Y?
    (i) R_1 = {(–5, a), (1, a), (3, b)}
    (ii) R_2 = {(–5, b), (1, b), (3, a), (4, c)}
    (iii) R_3 = {(–5, a), (1, a), (3, b), (4, c), (1, b)}

14. A relation $f: X \to Y$ is defined by $f(x) = x^2 - 2$ where, X = {–2, –1, 0, 3} and Y = R (i) List the elements of f (ii) Is 'f' a function?

15. Let f be a function $f: N \to N$ be defined by $f(x) = 3x + 2, x \in N$. Find the images of 1, 2, 3.

16. Let f be a function $f: N \to N$ be defined by $f(x) = 3x + 2, x \in N$. Find the pre-images of 29, 53.

17. Let A = {1, 2, 3, 4} and B = N. Let $f: A \to B$ be defined by $f(x) = x^3$ then, (i) find the range of f (ii) identify the type of function.

18. Show that the function $f: N \to N$ defined by $f(m) = m^2 + m + 3$ is one-one function.

19. Let f be a function $f: N \to N$ be defined by $f(x) = 3x + 2, x \in N$. (i) Find the range of f. (ii) Identify the type of function.

20. Given $f(x) = 2x - x^2$, find (i) $f(1)$ (ii) $f(x + 1)$ (iii) $f(x) + f(1)$.

21. Let $f(x) = 2x + 5$. If $x \neq 0$ then find $\frac{f(x+2) - f(2)}{x}$.

22. If A = {–2, –1, 0, 1, 2} and $f: A \to B$ is an onto function defined by $f(x) = x^2 + x + 1$ then find B.

23. Using the functions f and g given below, find f o g and g o f. Check whether f o $g = g$ o f.
    $f(x) = 3 + x$, $g(x) = x - 4$

24. Using the functions f and g given below, find f o g and g o f. Check whether f o $g = g$ o f.
    $f(x) = 4x^2 - 1$, $g(x) = 1 + x$

25. Find f o g and g o f when $f(x) = 2x + 1$ and $g(x) = x^2 - 2$.

26. Using the functions f and g given below, find f o g and g o f. Check whether f o $g = g$ o f.
    $f(x) = x - 6$, $g(x) = x^2$

27. Using the functions f and g given below, find f o g and g o f. Check whether f o $g = g$ o f.
    $f(x) = \frac{x+6}{3}$, $g(x) = 3 - x$

28. Using the functions f and g given below, find f o g and g o f. Check whether f o $g = g$ o f.
    $f(x) = \frac{2}{x}$, $g(x) = 2x^2 - 1$

29. Find the value of k, such that f o $g = g$ o f
    $f(x) = 2x - k$, $g(x) = 4x + 5$

30. If $f(x) = 3x - 2$, $g(x) = 2x + k$ and if f o $g = g$ o f, then find the value of k.

31. Find the value of k, such that f o $g = g$ o f
    $f(x) = 3x + 2$, $g(x) = 6x - k$

32. If $f(x) = 2x - 1$, $g(x) = \frac{x+1}{2}$, show that f o $g = g$ o $f = x$

33. Let $f(x) = x^2 - 1$. Find (i) f o f (ii) f o f o f

34. Find k if $fof(k) = 5$ where $f(k) = 2k - 1$.

5 Mark Questions

1. If A = {5, 6}, B = {4, 5, 6}, C = {5, 6, 7}, Show that A × A = (B × B) ∩ (C × C).
2. Given A = {1, 2, 3}, B = {2, 3, 5}, C = {3, 4} and D = {1, 3, 5}, check if (A ∩ C) × (B ∩ D) = (A × B) ∩ (C × D) is true?
3. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime numbers. Verify that (A ∩ B) × C = (A × C) ∩ (B × C).
4. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime numbers. Verify that A × (B – C) = (A × B) – (A × C).
5. Let A = $\{x \in W | x < 2\}$, B = $\{x \in N | 1 < x \leq 4\}$ and C = {3, 5}. Verify that (A ∪ B) × C = (A × C) ∪ (B × C).
6. Let A = $\{x \in W | x < 2\}$, B = $\{x \in N | 1 < x \leq 4\}$ and C = {3, 5}. Verify that A × (B ∪ C) = (A × B) ∪ (A × C).
7. Let A = $\{x \in W | x < 3\}$, B = $\{x \in N | 1 < x \leq 5\}$ and C = {3, 5, 7} verify that A × (B ∪ C) = (A × B) ∪ (A × C).
8. Let A = $\{x \in W | x < 2\}$, B = $\{x \in N | 1 < x \leq 4\}$ and C = {3, 5}. Verify that A × (B ∩ C) = (A × B) ∩ (A × C) .
9. Let A = $\{x \in N | 1 < x < 4\}$, B = $\{x \in W | 0 \leq x < 2\}$ and C = $\{x \in N | x < 3\}$. Then verify that (i) A × (B ∪ C) = (A × B) ∪ (A × C) (ii) A × (B ∩ C) = (A × B) ∩ (A × C).
10. Let X = {1, 2, 3, 4} and Y = {2, 4, 6, 8, 10} and R = {(1, 2), (2, 4), (3, 6), (4, 8)}. Show that R is a function and find its domain, co-domain and range?
11. Let A = {1, 2, 3, 4} and B = {2, 5, 8, 11, 14} be two sets. Let $f: A \to B$ be a function given by $f(x) = 3x - 1$. Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form.
12. Let f : A → B be a function defined by $f(x) = \frac{x}{2} - 1$ where A = {2, 4, 6, 10, 12}, B = {0, 1, 2, 4, 5, 9}. Represent f by (i) set of ordered pairs (ii) a table (iii) an arrow diagram (iv) a graph.
13. Represent the function f = {(1, 2), (2, 2), (3, 2), (4, 3), (5, 4)} through (i) an arrow diagram (ii) a table form (iii) a graph.
14. Represent the given relation by (i) an arrow diagram (ii) a graph and (iii) a set in roster form, wherever possibe $\{(x, y) / y = x + 3, x, y$ are natural number $< 10\}$
15. Given the function $f : x \to x^2 - 5x + 6$, evaluate (i) $f(-1)$ (ii) $f(2a)$ (iii) $f(2)$ (iv) $f(x-1)$.

16. A function f is defined by $f(x) = 2x - 3$.
    (i) find $\frac{f(0) + f(1)}{2}$.
    (ii) find x such that $f(x) = 0$.
    (iii) find x such that $f(x) = x$.
    (iv) find x such that $f(x) = f(1 - x)$

17. If the function f is defined by
$$f(x) = \begin{cases} x+2 & \text{if } x > 1 \\ 2 & \text{if } -1 \le x \le 1 \\ x-1 & \text{if } -3 < x < -1; \end{cases}$$
    find the values of
    (i) $f(3)$
    (ii) $f(0)$
    (iii) $f(-1.5)$ (iv) $f(2) + f(-2)$

18. A function $f : [-5, 9] \to R$ is defined as follows:
$$f(x) = \begin{cases} 6x+1 & \text{if } -5 \le x < 2 \\ 5x^2 - 1 & \text{if } 2 \le x < 6 \\ 3x - 4 & \text{if } 6 \le x \le 9 \end{cases}$$
    Find
    (i) $f(-3) + f(2)$
    (ii) $f(7) - f(1)$
    (iii) $2f(4) + f(8)$
    (iv) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

19. If the function $f : R \to R$ defined by
$$f(x) = \begin{cases} 2x + 7; & x < -2 \\ x^2 - 2; & -2 \le x < 3 \\ 3x - 2; & x \ge 3 \end{cases},$$
    then find the values of
    (i) $f(4)$
    (ii) $f(-2)$
    (iii) $f(4) + 2f(1)$
    (iv) $\frac{f(1) - 3f(4)}{f(-3)}$.

20. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$. Prove that f o $(g$ o $h) = (f$ o $g)$ o h.

21. Consider the functions $f(x)$, $g(x)$, $h(x)$ as given below. Show that $(f$ o $g)$ o $h = f$ o $(g$ o $h)$.
    $f(x) = x^2$, $g(x) = 2x$ and $h(x) = x + 4$

22. Consider the functions $f(x)$, $g(x)$, $h(x)$ as given below. Show that $(f$ o $g)$ o $h = f$ o $(g$ o $h)$.
    $f(x) = x - 1$, $g(x) = 3x + 1$ and $h(x) = x^2$

23. Consider the functions $f(x)$, $g(x)$, $h(x)$ as given below. Show that $(f$ o $g)$ o $h = f$ o $(g$ o $h)$.
    $f(x) = x - 4$, $g(x) = x^2$ and $h(x) = 3x - 5$

24. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$, Prove that $(f$ o $g)$ o $h = f$ o $(g$ o $h)$.

25. Find x if $gff(x) = fgg(x)$, given $f(x) = 3x + 1$ and $g(x) = x + 3$.