MATHS

BOOKS - MARVEL MATHS (HINGLISH)

SETS, RELATIONS AND FUNCTIONS

Examples

1. If $f(x) = \dfrac{q(x-p)}{q-p} + \dfrac{p(x-q)}{p-q}$, ... $p \neq q$, find: $f(p) + f(q)$.

▶ **Watch Video Solution**

2. If $f(x) = 2x - 3$, find $f(0)$, $f(1)$, $f(-2)$ and $f\left(\dfrac{x+3}{2}\right)$.

▶ **Watch Video Solution**

3. If $f(x) = (x - 2)(x - 3)(x + 5)$, where $-1 \le x \le 5$, find $f(-1)$, $f(3)$, $f(6)$, whichever exist(s). Also find x, if $f(x) = 0$.

▶ **Watch Video Solution**

4. A function f is defiend piece-wise as follows:

$f(x) = 3x + 5$, if $-3 \le x < 0$

$\quad\quad = 2x - 1$, if $0 \le x < 2$

$\quad\quad = 2 - x$, if $2 \le x < 4$.

State the domain of f. Also, evaluate $f(1), f(3), f(-2), f(0), f(2)$ and $f(5)$, whichever exist(s).

▶ **Watch Video Solution**

5. If $f(x)$ is a linear function such that $f(0) = -3$ and $f(2) = 7$, find the formula for $f(x)$.

▶ **Watch Video Solution**

6. If $f(x)$ is a quadratic function such that $f(0) = 2$, $f(1) = 3$ and $f(4) = 42$, find the value of $f(5)$.

> ▶ Watch Video Solution

7. If $f(x) = x^2 - 6x + 7$, solve the equation: $f(x) = f(2x + 1.\ )$

> ▶ Watch Video Solution

8. If $f(x + 1) = x^2 - 5x + 6$, find the formula for $f(x)$.

> ▶ Watch Video Solution

9. If $y = f(x) = \dfrac{x + 1}{2x + 3}$, where $x \neq -\dfrac{3}{2}$, show that: $f(y) = \dfrac{3x + 4}{8x + 11}$

.

> ▶ Watch Video Solution

10. If $f(x) = \dfrac{1}{1-x}$ and $g(x) = \dfrac{x-1}{x}$ find $(f \circ g)$ and $(g \circ f)$.

Comment upon your answer

11. Show that the inverse of the function $f(x) = \dfrac{1-x}{1+x}$, where $x \neq -1$, is itself

12. find the range of the function (i) $f(x) = 3x + 4$, where $-1 \leq x \leq 5$

13. Find the range of the function (ii) $g(x) = 2 - 3x$, where $-3 \leq x \leq 2$

.

14. Find the range of the function (i) $F(x) = 2x^2 + 5$, where $-3 \le x \le 2$

A. $R_F = \{y \in R \mid -5 \le y \le 23\}$.

B. $R_F = \{y \in R \mid 5 \le y \le 23\}$.

C. $R_F = \{y \in R \mid 5 \le y \le 13\}$.

D. None of these

Answer: B

▶ Watch Video Solution

15. Find the range of the function (ii) $G(x) = 3 - 2x^2$, where $-4 \le x \le 5$.

A. $R_G = \{y \in R \mid -47 \le y \le 3\}$.

B. $R_G = \{y \in R \mid -29 \le y \le 3\}$.

C. $R_G = \{y \in R \mid -47 \le y \le 5\}$.

D. None of these

Answer: A

> ▶ Watch Video Solution

---

16. Find the range of the function $f(x) = x^2 - 8x + 18$, where $x \in R$.

> ▶ Watch Video Solution

---

17. Given $f(x) = x^2 + x^{-2}$ and $g(x) = x^4 + x^{-4}$. If a real number a is such that $a + a^{-1} = 3$, find the numerical values of $f(a)$ and $g(a)$.

> ▶ Watch Video Solution

---

18. If $f(x) = \dfrac{1+x}{1-x}$, show that: $f(2x) = \dfrac{3f(x) - 1}{3 - f(x)}$.
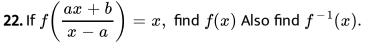
> ▶ Watch Video Solution

19. A function f is such that $f(x + 1) = f(x) + f(1) + 1$ for all real values of x. Find $f(0)$ If it is given that $f(1) = 1$, find $f(2), f(3)$ and $f(-1)$.

20. If $2f(x) + 3f\left(\dfrac{1}{x}\right) = x - 1$. find the value of $f(2)$.

21. If g(x) = $x^2 + x - 2$ and $\dfrac{1}{2}g(f(x)) = 2x^2 - 5x + 2$, then f(x) is

22. If $f\left(\dfrac{ax + b}{x - a}\right) = x$, find $f(x)$ Also find $f^{-1}(x)$.

23. If $f(x) = x \cdot \log\left(\dfrac{1-x}{1+x}\right)$, determine whether the function f is even

or odd or neither.

24. Find whether the following functions are even or odd or none

$$f(x) = \log\left(x + \sqrt{1+x^2}\right)$$

Mcqs

1. If

$A = \{w, o, l, f\}, B = \{f, l, o, w\}, C = \{f, o, w, l\}$ and $D = (\{f, o, l, l, o,$

then

A. $A \neq B \neq C \neq D$

B. $A \cup B \cup C \neq D$

C. $A = B = C \subset D$

D. $A = B = C = D$

Answer: D

▶ **Watch Video Solution**

---

2. If $A = \{x \mid x \in R, x \geq 3\}$ and $\{x \mid x \in R, x < 4\}$, then: $A \cap B =$

A. $\{x \mid x \in R, 3 < x < 4\}$

B. $[x \mid x \in R, 3 \leq x < 4\}$

C. Both 1 and 2

D. none of these.

Answer: B

▶ **Watch Video Solution**

3. If $A = \{1, 2, 3\}, B = \{2, 4, 6, 8\}$ and $C = \{2, 4, 5, 6\}$, then:

$a \cap (B \cup C) =$

A. $\{3\}$

B. $\{2\}$

C. $\{2, 3\}$

D. none of these.

Answer: B

▶ **Watch Video Solution**

4. If $A = \{x : x \text{ is a multiple of } 3\}$ and

$B = \{x : x \text{ is a multiple of } 5\}$. Then, $A \cap B$ is given by

A. $\{3, 6, 9, \ldots \}$

B. $\{5, 10, 15, \ldots\}$

C. $\{15, 30, 45, \ldots\}$

D. none of these.

Answer: C

---

5. If $aN = \{ax \mid x \in N\}$, then: $3N \cap 7N =$

A. 10 N

B. 4 N

C. $-N$

D. 21 N

Answer: D

6. Find the smallest set A such that $A \cup \{1, 2\} = \{1, 2, 3, 5, 9\}$.

A. $\{1, 3, 9\}$

B. $\{9, 3, 5\}$

C. $\{2, 9, 5\}$

D. none of these.

Answer: B

▶ **Watch Video Solution**

---

7. If $A = \{2, 3\}, B = \{4, 5\}$ and $C = \{5, 6\}$, then $n\{(A \times B) \cup (B \times C)\}$ is

A. $\{(1, 3), (2, 3), (2, 4), (3, 4), (4, 5), (5, 6)\}$

B. $\{(2, 3), (2, 4), (3, 4), (3, 5), (4, 5), (4, 6), (5, 5), (5, 6)\}$

C. $\{(2, 4, 5), (3, 5, 6)\}$

D. none of these.

Answer: B

---

8. If $A = \{1, 2, 3\}, B = \{3, 4\}, C = \{4, 5, 6\}$, then number of elements in the set $(A \times B) \cap (B \times C)$ is equal to

A. $\{(3, 4)\}$

B. $\{(1, 3), (2, 4), (3, 3)\}$

C. $\{(3, 3), (4, 5), (4, 6)\}$

D. none of these.

Answer: A

---

9. If $A = \{x \mid x^2 - 5x + 6 = 0\}$, then the power set of A is

A. $\{\phi, \{5\}, \{6\}, \{5, 6\}, A\}$

B. $\{\phi, \{2\}, \{3\}, A\}$

C. $\{\phi, \{2, 3\}, \{3, 2\}, A\}\}$

D. none of these.

Answer: B

▶ Watch Video Solution

---

10. The number of non-empty subset of $\{0, 1, 2, 3\}$ is

A. 14

B. 15

C. 16

D. 17

Answer: B

▶ Watch Video Solution

11. If $A = \{0, 1, 2, 3, 4\}$, then the number of proper subsets of A is

A. 120

B. 30

C. 31

D. 32

Answer: C

▶ **Watch Video Solution**

12. Which of the following is the empty set

A. $\{x \mid x \in R, x^2 - 1 = 0\}$

B. $\{x \mid x \in R, x^2 - 9 = 0\}$

C. $\{x \mid x \in R, x^2 - x + 2\}$

D. $\{x \mid x \in R, x^2 + 1 = 0\}$

Answer: D

> ▶ Watch Video Solution

13. If $A = \{4^n - 3n - 1 : n \in N)$ and $B = \{9(n - 1) : n \in N\}$

then

A. $X = Y$

B. $X \supset Y$

C. $X \subset Y$

D. none of these.

Answer: C

> ▶ Watch Video Solution

14. Two finite sets have m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The value of m and n is

    A. $m = 7, n = 3$

    B. $m = 6, n = 3$

    C. $m = 5, n = 1$

    D. none of these.

Answer: B

▶ **Watch Video Solution**

---

15. If $A = \{1, 2, 3, 4, 5\}$ and $B = \{2, 3, 6, 7\}$, then the number of elements in the set $(A \times B) \cap (B \times A)$ is

    A. 18

    B. 16

C. 4

D. 0

Answer: C

---

16. If $A = \{1, 2, 3\}, B = \{4, 5, 6\}$ and $C = \{1, 2\}$, then:

$(A - B) \times (A \cap C) =$

A. $\{(1, 3), (1, 5)\}$

B. $\{(2, 1), (2, 2), (2, 3)\}$

C. $\{(1, 2), (1, 3), (1, 5)\}$

D. none of these.

Answer: D

17. If A and B are any two sets then $A - B = A \cap B'$

A. $B \cap A'$

B. $A \cap B'$

C. $(A' \cup B)'$

D. none of these.

Answer: A

▶ **Watch Video Solution**

18. If A and B are any two sets then: $(A \cup B) - (A \cap B) =$

A. $A - B$

B. $B - A$

C. $(A - B) \cup (B - A)$

D. none of these.

Answer: C

---

19. If A and B are two such that $A \cup B = A \cap B,$ then

A. $A \subseteq B$

B. $B \subseteq A$

C. $A = B$

D. none of these.

Answer: C

---

20. If X and Y are any two sets, then: $X \cap (X \cup Y) =$

A. X

B. Y

C. ϕ

D. none of these.

Answer: A

▶ **Watch Video Solution**

21. If A and B are two disjoint subsets of a universal set U, then:

$$(A \cup B) \cap B =$$

A. A

B. B

C. ϕ

D. none of these.

Answer: B

▶ **Watch Video Solution**

22. If X and Y are two sets, then $X \cap (Y \cup X)$ equals

A. X

B. Y

C. ϕ

D. none of these.

Answer: C

▶ Watch Video Solution

23. Power set of the set $A = \{\phi, \{\phi\}\}$ is

A. A

B. $\{\phi, \{\phi\}, A\}$

C. $\{\phi, \{\phi\}, \{\{\phi\}\}, A\}$

D. none of these.

Answer: C

24. $A - (A - B) =$

A. $A \cap B$

B. $A \cap B$

C. $A \cup B$

D. $A \cap B$

Answer: D

25. If $(1, 3), (2, 5)$ and $(3, 3)$ are the three elements of $A \times B$ and the total number of elements in $A \times B$ is 6 then the remaining elements of $A \times B$ are

A. $(1, 5), (, 2, 3), (3, 5)$

B. $(5, 1), (3, 2), (5, 3)$

C. $(1, 5), (2, 3), (5, 3)$

D. none of these.

Answer: A

▶ **Watch Video Solution**

---

26. If $n(A) = 3, n(B) = 5$ and $n(A \cap B) = 2,$ then: $n(A \times B) =$

A. 6

B. 36

C. 15

D. none of these.

Answer: C

▶ **Watch Video Solution**

27. the collection of intellgent students in a class is :

A. a null set

B. a singleton set

C. a finite set

D. not a well-defined collection

Answer: D

▶ **Watch Video Solution**

---

28. In a group of 1000 people, there are 750 who can speak Hindi and 400 who can speak Bengali. How many can speak Hindi only? How many can speak Bengali only? How many can speak both Hindi and Bengali?
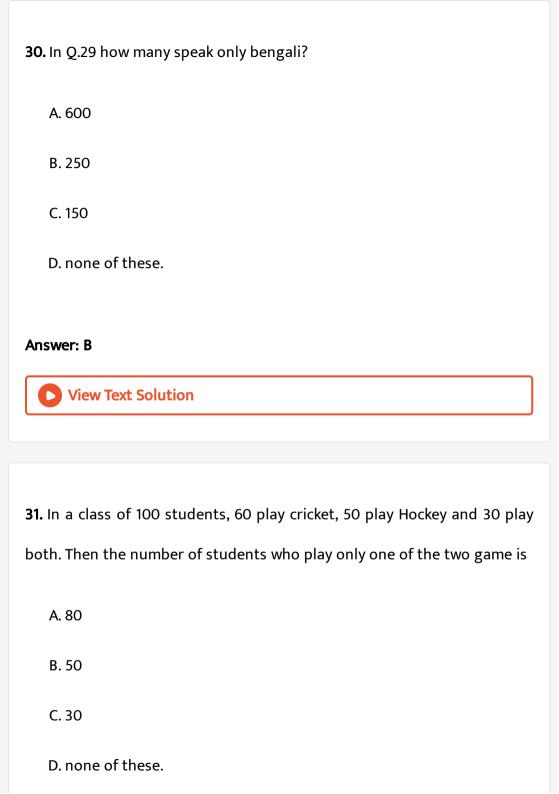
A. 150

B. 600

C. 250

D. none of these.

Answer: A

▶ Watch Video Solution

---

29. In Q.29 how many speak only hindi?

A. 150

B. 250

C. 600

D. none of these.

Answer: C

▶ View Text Solution

30. In Q.29 how many speak only bengali?

A. 600

B. 250

C. 150

D. none of these.

Answer: B

▶ **View Text Solution**

---

31. In a class of 100 students, 60 play cricket, 50 play Hockey and 30 play both. Then the number of students who play only one of the two game is

A. 80

B. 50

C. 30

D. none of these.

Answer: B

---

32. In Q.32, has many play none of the two games?

A. 20

B. 80

C. 50

D. 30

Answer: A

---

33. Let $n(U) = 700, n(A) = 200, n(B) = 300$ and $n(A \cap B) = 100$, then find $n(A' \cap B')$

A. 400

B. 600

C. 300

D. none of these.

Answer: C

34. If A and B are subsets of the universal set E such that $n(E) = 50, n(A) = 35, n(B) = 22$ and $n(A' \cap B') = 3,$ then: $n(A \cap B)$ and $n(A \cup B)$ are respectively

A. (47,10)

B. (45,25)

C. (12,47)

D. none of these.

Answer: D

35. If A and B are subsets of the universal set X, where $n(X) = 50, n(A) = 35, n(A \cap B) = 10$ and $n[(A \cup B)]' = 3,$ then the value of $n(B), n(A \cap B), n(A \cup B)$ are respectively.

A. 45,13,38

B. 22,12,38

C. 85,45,13

D. none of these.

Answer: B

36. If A and B are subsets of the universal set S such that $n(S) = 100$, $n(A') = 85$, $n(B') = 80$ and $n(A \cap B)' = 95$, then: $n(A \cup B) =$

A. 15

B. 5

C. 20

D. 30

Answer: D

▶ Watch Video Solution

37. If A,B,C are subsets of the universal set U such that $n(U) = 692$, $n(B) = 230$, $n(C) = 370$, $n(B \cap C) = 20$, $n(A' \cap B' \cap C')$ = then: $n(A \cap B' \cap C') =$

A. 876

B. 784

C. 172

D. none of these.

Answer: C

> ▶ Watch Video Solution

38. In a class of 100 students, 55 students have passed in Mathematics and 67 students have passed in Physics. Then the number of students who have passed in Physics only is

A. 22

B. 33

C. 10

D. 45

Answer: D

39. Q. In a college of 300 students, every student reads 5 newspaper and every newspaper is read by 60 students. The number of newspapers is (1) at least 30 (2) at most 20 (3) exactly 25 (4) none of these

A. at least 30

B. at most 20

C. exactly 25

D. none of these.

Answer: C

40. If f is linear function such that $f(2) = 6$ and $f(3) = 4$, then:
$f(x) =$

A. $2x + 2$

B. $3x$

C. $10 - 2x$

D. none of these.

Answer: C

> ▶ Watch Video Solution

41. If $f(x) = ax + 5$ and $f(-1) = 4$, then: $a =$

A. -1

B. 0

C. 1

D. 9

Answer: C

> ▶ Watch Video Solution

42. If $f(x) = 3x + b$ and $f(1) = 8$ then: $b =$

A. 3

B. 5

C. 4

D. none of these.

Answer: B

▶ Watch Video Solution

43. If $f(x) = ax + b$, where $f(0) = 3$ and $f(1) = 5$, then: $(a, b) \equiv$

A. $(2, 3)$

B. (2,4)

C. (1,3)

D. (3,5)

Answer: A

---

44. If $f(x)$ is a quadratic function such that $f(0) = 3, f(1) = 6$ and $f(2) = 11,$ then: $f(x) =$

A. $2x^3 + x + 3$

B. $x^3 + x + 3$

C. $x^3 + 2x + 3$

D. none of these.

Answer: C

45. If $f(x) = ax^2 + bx + 2$, where $f(-1) = 7$ and $f(1) = 5$, then: $f(a, b) \equiv$

    A. $(4, -1)$

    B. $(1, -4)$

    C. $(4, 1)$

    D. none of these.

Answer: A

> ▶ **Watch Video Solution**

46. If $f(x) = ax^2 - 3x + c$ where $f(2) = 3$ and $f(3) = 10$, then: $(a, c) \equiv$

    A. $(1, 2)$

    B. $(-1, 2)$

    C. $(2, 1)$

D. $(-2, 1)$

Answer: C

47. if $f(x) = ax^2 + bx + c,$ where $f(0) = 4, f(1) = 3$ and $f(-1) = 9,$ then: $(a, b, c) \equiv$

A. $(2, -3, 4)$

B. $(2, -3, 4)$

C. $(-2, 3, 4)$

D. none of these.

Answer: A

48. If $f(x) = x^2 + 2x + 1$, then: $f(x - 1) \equiv$

A. $x^2 - 2x - 1$

B. x^2

C. $x^2 - 2x + 1$

D. none of these.

Answer: B

▶ Watch Video Solution

49. If $f(x) = \dfrac{x - 1}{x + 1}$ then $f(2x)$ is equal to

A. $\dfrac{f(x) + 1}{f(x) + 3}$

B. $\dfrac{3f(x) + 1}{f(x) + 3}$

C. $\dfrac{f(x) + 3}{f(x) + 1}$

D. $\dfrac{f(x) + 3}{3f(x) + 1}$

Answer: B

---

50. If $f(x) = \log\left(\dfrac{1+x}{1-x}\right)$, then: $f\left(\dfrac{a+b}{1+ab}\right) =$

A. $f(ab)$

B. $f(a) + f(b)$

C. $f(a) - f(b)$

D. none of these.

Answer: B

---

51. If $f(x-1) = f(x+1)$, where $f(x) = x^2 - 2x + 3$, then: $x =$

A. 1

B. 2

C. 3

D. none of these.

Answer: A

---

52. If $f(x - 1) = f(x + 2)$, where $f(x) = 1 + x - x^2$ then: $x =$

A. -2

B. 0

C. 1

D. -1

Answer: D

53. If $f(x - 1) = x^2$, then find $f(x + 1)$

A. $x^2 + 2x + 1$

B. $x^2 + 4x + 1$

C. $x^2 + 4x + 4$

D. none of these.

Answer: C

▶ **Watch Video Solution**

54. If $f(x) = 3x + 4$ then: $f\left(\dfrac{x - 4}{3}\right) =$

A. 1

B. x

C. 0

D. none of these.

Answer: B

---

55. If $f(x) = 2x - 5$, then: $f^{-1}(x) =$

A. $2x + 5$

B. $-2x + 5$

C. $\dfrac{x + 5}{2}$

D. none of these.

Answer: C

---

56. If $f(x) = \dfrac{2x + 15}{3}$, then: $f^{-1}(x) =$

A. $\dfrac{3x - 2}{15}$

B. $\dfrac{3x - 15}{2}$

C. $\dfrac{15 - x}{2}$

D. none of these.

Answer: B

▶ **Watch Video Solution**

---

57. If $f(x) = \dfrac{1 - x}{1 + x}$, where $x \neq -1$, then: $f^{-1}(x) =$

A. $f(x)$

B. $\dfrac{x + 1}{x - 1}$

C. $\dfrac{x - 1}{x + 1}$

D. none of these.

Answer: A

▶ **Watch Video Solution**

58. Let the function f be defined by $f(x) = \left(\dfrac{2x + 1}{1 - 3x} \right)$ then $f^{-1}(x)$ is

A. $\dfrac{x - 1}{3x + 2}$

B. $\dfrac{3x + 2}{x - 1}$

C. $\dfrac{x + 1}{3x - 2}$

D. none of these.

Answer: A

▶ Watch Video Solution

59. If $f(x) = x - x^2 + x^3 - x^4 + \ldots$ where $|x| < 1$, then: $f^{-1}(x) =$

A. $\dfrac{x}{1 + x}$

B. $\dfrac{x}{x - 1}$

C. $\dfrac{1 - x}{x}$

D. $\dfrac{1}{x}$

Answer: B

---

60. If $f(x) = \dfrac{3x}{7} + 2$ for all $x \in R$, then: $f^{-1}(1) =$

A. -6

B. -7

C. -24

D. none of these.

Answer: D

---

61. If $f(x) = \dfrac{2x}{5} - 3$ for all $x \in R$ then: $f^{-1}(-5) =$

A. 7

B. -11

C. -5

D. none of these.

Answer: C

▶ **Watch Video Solution**

---

62. If $f(x) = \dfrac{x-1}{x+1}$, then $f\left(\dfrac{1}{f(x)}\right)$ equals

A. 0

B. 1

C. x

D. $\dfrac{1}{x}$

Answer: D

▶ **Watch Video Solution**

63. Let A = {x, y, z}, B = {u, v, w} and f : A → B be defined by f(x) = u, f(y) = v, f(z) = w. Then, f is

  A. one-one but onto

  B. onto but not one-one

  C. both one-one and onto

  D. none of these.

Answer: C

> ▶ **Watch Video Solution**

64. Formula $f(x) = x^2$ defines a one-one function when

  A. $0 \leq x$

  B. $-3 \leq x \leq 5$

  C. $-1 \leq x$

  D. none of these.

Answer: A

---

65. If $f(x) = x^2$, if $x \geq 1$, $= 1$, if $x < 1$, then

A. $f\left(-\dfrac{1}{2}\right) = \dfrac{1}{4}$ and $f\left(\dfrac{3}{2}\right) = \dfrac{9}{4}$

B. $f\left(-\dfrac{1}{2}\right) = 1$ and $f\left(\dfrac{3}{2}\right) = 1$

C. $f\left(-\dfrac{1}{2}\right) = \dfrac{1}{4}$ and $f\left(\dfrac{3}{2}\right) = 1$

D. $f\left(-\dfrac{1}{2}\right) = 1$ and $f\left(\dfrac{3}{2}\right) = \dfrac{9}{4}$

Answer: D

---

66. If $f(x) = \dfrac{1}{x} - 1$ where $x \neq 0$, then: $f(x) + f(-x) + 2 =$

A. -1

B. 0

C. 1

D. 2

Answer: B

> ▶ Watch Video Solution

---

67. If $f(x) = \dfrac{1}{x} - 1$ where $x \neq 0$, then: $f(x) - 2.\ f(2x) =$

A. -1

B. 0

C. 1

D. 2

Answer: C

> ▶ Watch Video Solution

68. If $f(x) = \dfrac{1}{x} - 1$ where $x \neq 0$, then: $\left(\dfrac{1}{x}\right) - \dfrac{1}{1 + f(x)} =$

A. -1

B. 0

C. 1

D. 2

Answer: A

▶ Watch Video Solution

69. If $f(x) = \dfrac{1}{x} - 1$ where $x \neq 0$, then: $f(1 - x) =$

A. $f\left(\dfrac{1}{x}\right)$

B. $\dfrac{1}{f(x)}$

C. $-\dfrac{f(1)}{(x)}$

D. none of these.

Answer: B

70. If $f(x) = \dfrac{1}{x} - 1$ where $x \neq 0$, then: $f(x) + \dfrac{1}{f(x+1)} =$

A. -1

B. 0

C. 1

D. -2

Answer: D

71. If $f(x) = x^2$ and $g(x) = 2x$, then

A. $g \circ f = f + f$

B. $g \circ f = g + g$

C. $f \circ g = g + g$

D. $f \circ g = f + f$

Answer: A

▶ Watch Video Solution

---

72. If g(x) = $x^2 + x - 2$ and $\frac{1}{2}g(f(x)) = 2x^2 - 5x + 2$, then f(x) is

A. $2x - 3$

B. $2x + 3$

C. $2x^2 + 3x + 1$

D. $2x^2 - 3x - 1$

Answer: A

▶ Watch Video Solution

73. If $f(x) = x^2 + \dfrac{1}{x^2}$, $g(x) = x^4 + \dfrac{1}{x^4}$ and $a + \dfrac{1}{a} = 3$, then the

respectively values of $f(a)$ and $g(a)$ are

A. 9,81

B. 7,47

C. 9,47

D. none of these.

Answer: B

▶ Watch Video Solution

74. If $f(x) = 4x - 3$, where $-3 \le x \le 1$ then the range of the function

f is given by

A. $-1 \le f(x) \le 15$

B. $-15 \le f(x) \le 1$

C. $1 \le f(x) \le 15$

D. none of these.

75. If $f(x) = 2x + 3$, where $1 \le x \le 2$, then the range of the function f

is given by

A. $1 \le f(x) \le 7$

B. $-1 \le f(x) \le 7$

C. $-7 \le f(x) \le 1$

D. none of these.

76. If $g(x) = 3 - 4x$ where $-2 \le x \le 3$, then the range of function g is given by

A. $-11 \le g(x) \le 9$

B. $-11 \le g(x) \le -9$

C. $-9 \le g(x) \le 11$

D. none of these.

Answer: C

▶ **Watch Video Solution**

---

77. If $h(x) = 5x^2 + 6$ where $-3 \le x \le 4$, then the range of function h is given by

A. $-6 \le h(x) \le 86$

B. $6 \le h(x) \le 86$

C. $-86 \le h(x) \le 6$

D. none of these.

Answer: B

---

78. If $f(x) = 6 - 5x^2$, where $-4 \leq x \leq 5$, then the range of the function

f is given by

A. $-119 \leq f(x) \leq 6$

B. $-116 \leq f(x) \leq 9$

C. $-61 \leq f(x) \leq 19$

D. none of these.

Answer: A

79. If $\phi(x) = x^2 + 4x + 5$ where $x \in R$, then the range of the function ϕ is given by

    A. $\phi(x) \leq 1$

    B. $\phi(x) \geq 1$

    C. $-1 \leq \phi(x) \leq 1$

    D. none of these.

Answer: B

▶ **Watch Video Solution**

---

80. If $\phi(x) = x^2 - 6x + 8$ where $x \in R$ then the range of the function ϕ is given by

    A. $\phi(x) \geq -1$

    B. $\phi(x) \geq 1$

    C. $-1 \leq \phi \leq 1$

D. none of these.

Answer: A

81. If $f(x) = \dfrac{2x + 1}{3x - 2}$ then: $(f \circ f)(2) =$

A. 1

B. 3

C. 4

D. 2

Answer: D

82. If $f(x) = (x - 2)^2$ and $g(x) = 3x - 3$ then: $(f \circ g)(2) =$

A. 2

B. 0

C. 1

D. 3

Answer: C

▶ **Watch Video Solution**

83. If the function $f(x) = 3x + a$ and $g(x) = 4x + 9$ are such that $(g \circ g)(x) = (g \circ f)(x)$, then: $a =$

A. 1

B. 5

C. 6

D. -2

Answer: C

84. If $f \circ g = g \circ f,$ where $f(x) = 2x + 5$ and $g(x) = 3x + h,$ then:

$h =$

A. 5

B. 10

C. 15

D. 6

Answer: B

85.   If

$f = \{(1, 2), (2, 3), (3, 5), (5, 8)\}$ and $g = \{(2, 1), (3, 2), (5, 3), (8, 5)\}$

then $f \circ g =$

A. $\{(1, 2), (2, 3), (3, 5), (5, 8), (2, 1), (3, 2), (5, 3), (8, 5)\}$

B. $\{(2, 2), (3, 3), (5, 5), (8, 8,)\}$

C. $\{(1, 1), (2, 2), (3, 3), (5, 5)\}$

D. none of these.

Answer: B

▶ **View Text Solution**

86. If $f: R \to R$ and $g: R \to R$ defined by $f(x) = 2x + 3$ and $g(x) = x^2 + 7$ then the values of x for which $f(g(x)) = 25$ are

A. ± 1

B. ± 2

C. ± 3

D. ± 4

Answer: B

87. If $f(x) = 1 + 2x$ and $g(x) = \dfrac{x}{2}$, then: $(f \circ g)(x) - (g \circ f)(x) =$

A. 4

B. $\dfrac{1}{4}$

C. 2

D. $\dfrac{1}{2}$

Answer: D

88. If $f(x) = x^2$ and $g(x) = x^2 + 1$ then: $(f \circ g)(x) = (g \circ f)(x) =$

A. $2x$

B. $2. f(x)$

C. $[f(x)]^2$

D. none of these.

Answer: B

▶ Watch Video Solution

89. If $y = f(x)$ is one-one onto function, then: $(f^{-1} \circ f)(x) =$

A. x

B. y

C. $\dfrac{x}{y}$

D. $\dfrac{y}{x}$

Answer: A

▶ Watch Video Solution

90. If $y = f(x)$ is one-one onto function, then: $(fof^{-1})(y) =$

A. x

B. y

C. $\dfrac{x}{y}$

D. $\dfrac{y}{x}$

Answer: B

▶ **Watch Video Solution**

---

91. If $f(x) = \dfrac{2x + 3}{x - 2}$, then: $(f \circ f)(x) =$

A. $\dfrac{3x + 2}{x - 3}$

B. x

C. $\dfrac{3x + 4}{x - 3}$

D. none of these.

Answer: B

▶ **Watch Video Solution**

92. If a function $f(x) = \dfrac{ax + b}{cx + d}$ is such that $(f \circ f)(x) = x$, then

A. $d = -a$

B. $d = a$

C. $a = b = 1$

D. $a = b = c = d = 1$

Answer: A

▶ View Text Solution

93. If $f\left(\dfrac{ax + b}{x - a}\right) = x$, then $f^{-1}(x) = $ (a) x (b) $\dfrac{bx + a}{x - b}$ (c) $f(x)$

A. x

B. $\dfrac{bx + a}{x - b}$

C. $f(x)$

D. none of these.

Answer: C

---

94. If $f(x) = \dfrac{x-3}{x+1}$, then: $f(x) = \dfrac{x-3}{x+1}$,

A. x

B. $-x$

C. $4x$

D. $-4x$

Answer: A

---

95. If $f(x) = a - \dfrac{1}{x+b}$, where $a + b = 1$, then: $(f \circ f \circ f)(x) =$

A. x

B. $\dfrac{ax + b}{x - a}$

C. $\dfrac{x - 1}{x + b}$

D. none of these.

Answer: A

> ▶ **Watch Video Solution**

---

96. If f(x)=ax+b and g(x)=cx+d, then f(g(x))=g(f(x)) is equivalent to

A. $f(a) = g(c)$

B. $f(c) = g(a)$

C. $f(b) = g(b)$

D. $f(d) = g(b)$

Answer: D

> ▶ **Watch Video Solution**

97. If $f(x) = \log\left(\dfrac{1+x}{1-x}\right)$ and $g(x) = \left(\dfrac{3x + x^3}{1 + 3x^2}\right)$, then $f(g(x))$ is equal to $f(3x)$ (b) $\{f(x)\}^3$ (c) $3f(x)$ (d) $-f(x)$

98. If $f(x) = 2x^n + a$, where $f(2) = 26$ and $f(4) = 138$, then: $f(3) =$

A. 56

B. 112

C. 82

D. 64

Answer: D

99. If $A = \{(x, y) : y = e^x, x \in R\}$ and $B = \{(x, y) : y = e^{-2x}, x \in R\}$, then

A. $A \cap B = \phi$

B. $A \cap B = \phi$

C. $A \cap B = R$

D. none of these.

Answer: B

▶ Watch Video Solution

100. If R is a relation from set $A = \{11, 12, 13\}$ to set $B = \{8, 10, 12\}$ defined by $y = x - 3$, then write R^{-1}.

A. $\{(11, 8), (10, 13)\}$

B. $\{(8, 11), (13, 10)\}$

C. $\{(8, 11), (10, 13)\}$

D. $\{(8, 11), (10, 13), (12, 12)\}$

Answer: C

▶ Watch Video Solution

---

101. If $f(x) = 1 - \dfrac{1}{x}$ then write the value of $f\left(f\left(\dfrac{1}{x}\right)\right)$.

A. $- f(x)$

B. $\dfrac{1}{f(-x)}$

C. $\dfrac{1}{f(x)}$

D. $f\left(-\dfrac{1}{x}\right)$

Answer: C

▶ Watch Video Solution

---

102. If : $f\left(x + \dfrac{1}{x}\right) = x^3 + \dfrac{1}{x^3}$, where $x \neq 0$ then: $f(x) = \ldots$

A. $x^3 - 3x$

B. $3x^3 - x$

C. $3x - x^3$

D. $1 - 3x^2$

Answer: A

103. If: $A \times B = \{(1, 1), (1, 2), (1, 3), (2, 1), (2, 2), (2, 3)\}$, then: $A =$

A. $\{1, 2, 3\}$

B. $\{1, 2\}$

C. $\{1, 3\}$

D. $\{2, 3\}$

Answer: B

104. A function f from the set of natural number to integers defined by

$$f(n) = \begin{cases} \frac{n-1}{2} & \text{when n is odd} \\ -\frac{n}{2} & \text{when n is even} \end{cases}$$

A. one-one but onto

B. onto but not one-one

C. one-one and onto both

D. neither one-one nor onto

Answer: C

▶ Watch Video Solution

105. If $f : R \to R$ satisfies $f(x + y) = f(x) + f(y)$, for all real x, y and $f(1) = m.$ then: $\sum\limits_{r=1}^{n} f(r) =$

A. $\dfrac{mn}{2}$

B. $\dfrac{m(n+1)}{2}$

C. $mn(n+1)$

D. $m(n)\dfrac{n+1}{2}$

Answer: D

106. If $f(n+1) = \dfrac{2F(n)+1}{2}$, $n = 1, 3, , and F(1) = 2$. Then $F(101)$

equals 52 (b) 49 (c) 48 (d) 51

A. 48

B. 49

C. 51

D. 52

Answer: D

107. If : $f(x) = \sqrt[n]{(x^m)}$, where $n \in N$, is even function then m is

A. an even integer

B. an odd integer

C. any integer

D. $f(x)$ cannot be even

Answer: A

▶ **Watch Video Solution**

108. Given the function $f(x) = \dfrac{a^x + a^{-x}}{2}$ $(where\, a > 2) Then f(x + y) + f(x - y) =$ $2f(x)f(y)$ (b) $f(x)f(y)$ $\dfrac{f(x)}{f(y)}$ (d) none of these

A. $2f(x).\, f(y)$

B. $f(x).\, f(y)$

C. $\dfrac{f(x)}{f(y)}$

D. none of these.

Answer: A

> ▶ Watch Video Solution

109. If $f(x) = ax^2 + bx + c$ satisfies the identity $f(x+1) - f(x) = 8x + 3$ for all $x \in R$ Then (a,b)=

A. $(2, 1)$

B. $(4, -1$

C. $(-1, 4)$

D. (-1,1)`

Answer: B

> ▶ Watch Video Solution

110. If : $f(x) = x^2$ and $g(x) = 2^x$, then, the solution set of the equation $(f \circ g)(x) = (g \circ f)(x)$ is

A. R

B. $\{0\}$

C. $\{0, 2\}$

D. R^+

Answer: C

▶ Watch Video Solution

111. Let $f(x) = \dfrac{\alpha x}{x + 1}$, $x \neq -1$. Then, for what values of α is f[f(x)]=x?

A. $\sqrt{2}$

B. $-\sqrt{2}$

C. 1

D. -1

Answer: D

---

112. The value of parameter α, for which the function $f(x) = 1 + \alpha x, \alpha \neq 0$ is the inverse of itself

A. -2

B. -1

C. 1

D. 2

Answer: B

---

113. If $f(x) = (a - x^n)^{\frac{1}{n}}, a > 0$ and $n \in N$, then prove that $f(f(x)) = x$ for all x.

A. a

B. x

C. a^n

D. x^n

Answer: B

114. If $f(x) = \dfrac{3x + 2}{5x - 3}$, then

A. $f^{-1}(x) = f(x)$

B. $f^{-1}(x) = -f(x)$

C. $(f \circ f)(x) = -x$

D. $19f^{-1}(x) = -f(x)$

Answer: A

115. If $f(x) = 2^x$, then $f(0), f(1), f(2)...$are in

A. A.P.

B. G.P.

C. H.P.

D. none of these.

Answer: B

▶ **Watch Video Solution**

---

116. If f(x)=ax+b and g(x)=cx+d, then f(g(x))=g(f(x)) is equivalent to

A. $f(a) = g(c)$

B. $f(b) = g(b)$

C. $f(d) = g(b)$

D. $f(c) = g(a)$

Answer: C

---

117. Let $f(x) = \dfrac{ax + b}{cx + d}$. Then the $fof(x) = x$, provided that :
$(a \neq 0, b \neq 0, c \neq 0, d \neq 0)$

A. $d = -a$

B. $d = a$

C. $a = b = c = d = 1$

D. $a = b = 1$

Answer: A

118. If $f(x) : \left(25 - x^4\right)^{\frac{1}{4}}$ for $0 < x < \sqrt{5}$ then $f\left(f\left(\dfrac{1}{2}\right)\right) =$

A. 2^{-4}

B. 2^{-3}

C. 2^{-2}

D. 2^{-1}

Answer: D

▶ Watch Video Solution

---

119. If $f(x) = 2x^n + a$, where $f(2) = 26$ and $f(4) = 138$, then: $f(3) =$

A. 56

B. 82

C. 64

D. 122

Answer: C

120. Two finite sets have m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The value of m and n is

A. $(7, 6)$

B. $(6, 3)$

C. $(5, 1)$

D. (8,7)`

Answer: B

121. If $f(x) = \cos(\log x)$, then $f(x)f(y) - \frac{1}{2}\left[f\left(\frac{x}{y}\right) + f(xy)\right] =$

A. − 1

B. 1/2

C. − 2

D. none of these.

Answer: D

▶ Watch Video Solution

---

122. If $f(x) = \sin(\log x)$ then $f(xy) + f\left(\dfrac{x}{y}\right) - 2f(x)\cos(\log y) =$ (A) $\cos(\log x)$ (B) $\sin(\log y)$ (C) $\cos(\log(xy))$ (D) 0

A. 1

B. 0

C. − 1

D. $\sin(\log x) . \cos(\log y)$

Answer: B

123. If $f(x) = \dfrac{1-x}{1+x}$, then $f[f(\cos 2\theta)] =$

A. $\tan 2\theta$

B. $\sec 2\theta$

C. $\cos 2\theta$

D. $\cot 2\theta$

Answer: C

124. If: $f(x) = bx^2 + cx + d$ and $: f(x+1) - f(x) = 8x + 3$, then:

A. $b = 2, c = 1$

B. $b = 4, c = -1$

C. $b = -1, c = 4$

D. $b = -1, c = 1$

Answer: B

> ▶ Watch Video Solution

125. if $f(x) = \dfrac{x}{x-1}$ then $\dfrac{f(a)}{f(a+1)} = ?$

A. $f(-a)$

B. $f\left(\dfrac{1}{a}\right)$

C. $f(a^2)$

D. $f\left(\dfrac{-a}{a-1}\right)$

Answer: C

> ▶ Watch Video Solution

126. If: $f(\theta) = \log\left(\dfrac{1+\theta}{1-\theta}\right)$, then: $f\left(\dfrac{2\theta}{1+\theta^2}\right) =$

A. $[f(\theta)]^2$

B. $[f(\theta)]^3$

C. 2. $f(\theta)$

D. 3. $f(\theta)$

Answer: C

▶ **Watch Video Solution**

---

127. If $f(x) = \dfrac{x - 3}{x + 1}$ then f[f{f(x)}] equals

A. x

B. $-x$

C. $\dfrac{x}{2}$

D. $-\dfrac{1}{x}$

Answer: A

▶ **Watch Video Solution**

128. If $f(x) = \dfrac{x - |x|}{|x|}$, then $f(-1) =$

A. 1

B. -2

C. 0

D. 2

Answer: B

▶ Watch Video Solution

129. If $f(x) = 4x^3 + 3x^2 + 3x + 4$, then $x^3 f\left(\dfrac{1}{x}\right)$ isequal to

A. $f(-x)$

B. $f\left(\dfrac{1}{x}\right)$

C. $\left[f\left(\dfrac{1}{x}\right)\right]^2$

D. $f(x)$

Answer: D

130. If the function $f: N \to N$ is defined by $f(x) = \sqrt{x}$, then $\dfrac{f(25)}{f(16) + f(1)}$ is equal to

A. $\dfrac{5}{6}$

B. $\dfrac{5}{7}$

C. $\dfrac{5}{3}$

D. 1

Answer: D

131. If $f(x) = \dfrac{x}{x-1} = \dfrac{1}{y}$ then the value of $f(y)$ is

A. x

B. $x + 1$

C. $x - 1$

D. $1 - x$

Answer: D

▶ Watch Video Solution

---

132. Let the function f be defined by $f(x) = \left(\dfrac{2x+1}{1-3x}\right)$ then $f^{-1}(x)$ is

A. $\dfrac{x-1}{3x+2}$

B. $\dfrac{3x+2}{x-1}$

C. $\dfrac{x+1}{3x-2}$

D. $\dfrac{2x+1}{1-3x}$

Answer: A

133. If $f(x) = \dfrac{2x - 1}{x + 5}$, $x \neq -5$, then $f^{-1}(x)$ is equal to

A. $\dfrac{x + 5}{2x + 2}$

B. $\dfrac{5x + 1}{2 - x}$

C. $\dfrac{5x - 1}{2 - x}$

D. $\dfrac{x - 5}{2x + 1}$

Answer: B

134. Let f(x) be the greatest integer function and g(x) be the modulus function.

What is $(g \circ f)\left(-\dfrac{5}{3}\right) - (f \circ g)\left(-\dfrac{5}{3}\right)$ equal to?

A. 1

B. -1

C. 2

D. 4

Answer: A

▶ Watch Video Solution

---

135. If: $f(x) = \dfrac{x}{x+1}$ and $g(x) = \dfrac{x}{1-x}$, then: $(f \circ g)(x) =$

A. $\dfrac{1}{x}$

B. $\dfrac{1}{1-x}$

C. $x - 1$

D. x

Answer: D

▶ Watch Video Solution

136. If, from $R \to R$, $f(x) = (x + 1)^2$ and $g(x) = x^2 + 1$, then: $(f \circ g)(- 3) =$

A. 121

B. 112

C. 211

D. none of these.

Answer: A

▶ Watch Video Solution

---

137. If $g(x) = 1 + \sqrt{x}$ and $f(g(x)) = 3 + 2\sqrt{x} + x$ then f(x) is equal to

A. $1 + 2x^2$

B. $2 + x^2$

C. $1 + x$

D. $2 + x$

138. If: $f(x) = 5 - x^2, g(x) = 3x - 4$, then: $(f \circ g)(- 1) =$

A. $- 44$

B. $- 54$

C. $- 32$

D. $- 64$

139. The function $f(x) = \sec\left[\log\left(x + \sqrt{1 + x^2}\right)\right]$ is

A. odd

B. even

C. neither even nor odd

D. constant

Answer: B