

Function

$$\textcircled{1} f = \{ (1,2), (3,4), (5,6) \}$$

$$\text{Domain} = \{1, 3, 5\} \quad f^{-1} = \{ (2,1), (4,3), (6,5) \}$$

$$\text{Range} = \{2, 4, 6\}$$

$f \rightarrow$ Function

$$\textcircled{2} A = \{ (1,2), (1,4), (3,4) \}$$

$A \rightarrow$ Not Function

$$A^{-1} = \{ (2,1), (4,1), (4,3) \}$$

$$\textcircled{3} g = \{ (1,2), (-1,1), (4,3) \} \text{ is a function}$$

g^{-1} এর ডোমে কত ?

$$g^{-1} = \{ (2,1), (1,-1), (3,4) \}$$

Function

① $f(x) = \sqrt{x-1}$ श्य जव $f(10) = ?$

$$\therefore f(10) = \sqrt{10-1}$$

$$= \sqrt{9}$$

$$= \boxed{3} \text{ Ans}$$

② one-one function / एक-एक फलन

$$f(x) = x^3$$

$$f(1) = 1^3 = 1$$

$$f(-1) = (-1)^3 = -1$$

$$f(2) = 2^3 = 2 \times 2 \times 2 = 8$$

$$f(x) = x^2$$

$$f(1) = (1)^2 = 1$$

$$f(-1) = (-1)^2 = 1$$

$$f(3) = 9$$

$$f(-3) = 9$$

$x^2, 4, 6, \dots$ ছোট সংখ্যা হয় = এক-এক নয়

$x^5, x^4, x^6, x^8 + 1 \rightarrow$ এক-এক নয়

$x^{3,5,7,11, \dots}$ বিজোড় সংখ্যা হয় = এক-এক

$x, x^3, x^3 + 1, x^5 + 5 \rightarrow$ এক-এক ~~সংখ্যা~~

(২) $y = x^3 -$ এক-এক নয়

(৩) $y = x^3 - 2x - 1 \rightarrow$ বিজোড় সংখ্যক

$y = x^3 + 3x - 4 \rightarrow$ বিজোড় //

$y = 3x^4 - 2x - 4x^3 - 1 \rightarrow$ বিজোড় 4

$$4. \quad S = \{(2, 3), (4, 3), (5, 10), (9, 6)\}$$

$$\text{Range} = \{3, 10, 6\}, \quad \text{Domain} = \{2, 4, 5, 9\}$$

$$S^{-1} = \{(3, 2), (3, 4), (10, 5), (6, 9)\}$$

$$\rightarrow \text{Domain} = \{3, 10, 6\}, \quad \text{Range} = \{2, 4, 5, 9\}$$

$$6. \quad f(x) = x^3, \quad \text{Domain} = \{0, 2\}$$

$$f(0) = 0^3 \\ = \boxed{0}$$

$$f(2) = 2^3 \\ = 2 \times 2 \times 2 \\ = \boxed{8}$$

$$\therefore \text{Range} = \{0, 8\}$$

7. $y = 3x^3 \rightarrow$ घातकीय

लघाविक्रमिक $\rightarrow \log, \ln$

$$y = \log x^3, \quad y = \ln x^4$$

अवकलन द्वारा फलन $\rightarrow | |$

$$y = |x|, \quad y = |x^2 + 1|$$

8. $f(x) = 3x + 2, \quad g(x) = x - 2$

$$\therefore g(f(2)) = g(3 \times 2 + 2)$$

$$= g(8)$$

$$= 8 - 2$$

$$= \boxed{6}$$

Ans

$$f(x) = x + 3, \quad g(x) = 2x - 1$$

$$g(f(2)) = g(2 + 3)$$

$$= g(7)$$

$$= 2 \times 7 - 1$$

$$= \boxed{13} \text{ Ans.}$$

$$F(x) = \frac{x}{x-2}, \quad \underline{f^{-1}(2)} = ?$$

$$\text{ধরি, } \frac{x}{y} = \frac{x}{x-2}$$

$$\text{বা, } xy - 2y = x$$

$$\text{বা, } xy - x = 2y$$

$$\text{বা, } x(y-1) = 2y$$

$$\text{বা, } x = \frac{2y}{y-1}$$

$$\underline{f^{-1}(x)} = \frac{2x}{x-1}$$

$$f^{-1}(2) = \frac{2 \times 2}{2-1}$$

$$= \boxed{4}$$

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10 $f(x) = 5$ এর ক্ষেত্রে x এর মান নির্ণয় করুন

$$\begin{array}{l} \underline{\underline{F(x) = x^x}} \\ F(3) = 3^3 \\ \quad = 27 \end{array} \quad \left| \quad \begin{array}{l} F(x) = x \\ \quad = 5 \end{array} \right. \quad \boxed{x = 5}$$

11) $F(x) = 2x - 1$, $F(1) + F(-4) \Rightarrow$

$$\begin{aligned} F(1) &= 2 \times 1 - 1 \\ &= 2 - 1 \\ &= 1 \end{aligned} \quad \begin{aligned} &= 1 - 13 \\ &= \boxed{-12} \end{aligned}$$

$$\begin{aligned} F(-4) &= 2 \times (-4) - 1 \\ &= -8 - 1 \\ &= -9 \end{aligned}$$

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10. $f(x) = 5$ হলে x এর মান কত? $x = 5$

$$\begin{array}{l} F(x) = x^x \\ F(3) = 3^3 \\ \quad = 9 \end{array} \quad \left. \vphantom{\begin{array}{l} F(x) = x^x \\ F(3) = 3^3 \\ \quad = 9 \end{array}} \right\} F(x) = x$$

11. $F(x) = 2x - 1$, $F(1) + F(-6) = ?$

$$\begin{aligned} F(1) &= 2 \times 1 - 1 \\ &= 2 - 1 \\ &= 1 \end{aligned} \quad \begin{aligned} &= 1 - 13 \\ &= \boxed{-12} \end{aligned}$$

$$\begin{aligned} F(-6) &= 2 \times (-6) - 1 \\ &= -12 - 1 \\ &= -13 \end{aligned}$$

12. $S = \{(1,5), (2,10), (3,15)\}$ হলে S^{-1} এর ডোমে কত

$$\therefore S^{-1} = \{(5,1), (10,2), (15,3)\}$$

$$S^{-1} \text{ এর ডোমেন} = \{5, 10, 15\}$$

13.

$$P(x) = 3x^3 - 2x^2 - 7x + 8$$

$$\therefore P(-2) = 3(-2)^3 - 2(-2)^2 - 7(-2) + 8$$

$$= -24 - 8 + 14 + 8$$

$$= -32 + 22$$

$$= \boxed{-10} \text{ Ans.}$$

14.

$$f(x) = \sqrt{x-1} \text{ ডোমেন কত?}$$

$$\text{এখন, } x-1 \geq 0$$

$$\text{বা, } \boxed{x \geq 1}$$

15. $F(x) = (x-1)^2$ ज्ञात $F(-7) = ?$

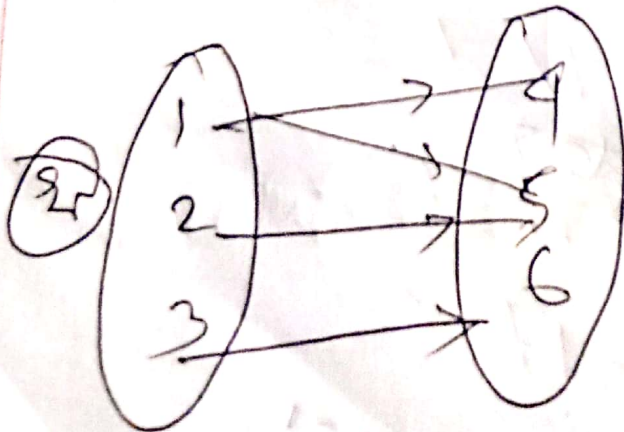
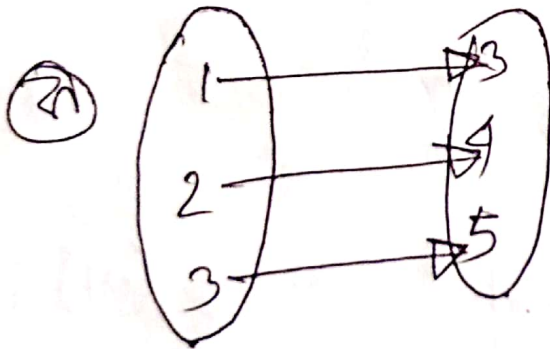
$$\therefore F(-7) = (-7-1)^2$$

$$= (-8)^2$$

$$= \boxed{64} \text{ Ans.}$$

$$8 \times 8 = 64$$

16. एक-एक फलन



18 $f(y) = \sqrt{1-y}$

$$f(1) = \sqrt{1-1} = 0$$

~~$f\left(\frac{2}{X}\right) = \sqrt{1-2} = \sqrt{-1}$~~

$$F(-3) = \sqrt{1-(-3)}$$

$$= \sqrt{1+3}$$

$$= \sqrt{4}$$

$$= 2$$

$$F(0) = \sqrt{1-0} = \sqrt{1} = 1$$

19. $F(x) = \frac{3}{x-1}$, $F^{-1}(3)$

दिया, $y = \frac{3}{x-1}$

$$\Rightarrow xy - y = 3$$

~~$$\Rightarrow xy = 3 + y$$~~

$$\Rightarrow xy = 3 + y$$

$$\Rightarrow x = \frac{3+y}{y}$$

~~$$\Rightarrow x = \frac{3+y}{y}$$~~

$$f^{-1}(x) = \frac{3+x}{x}$$

~~$$f^{-1}(x) = \frac{3+x}{x}$$~~

$$f^{-1}(3) = \frac{3+3}{3} = \frac{6}{3} = 2$$

~~$$f^{-1}(3) = \frac{3+3}{3}$$~~

30. $F: \{1, 2, 3, 4\} \rightarrow \mathbb{R}, F(x) = 2x + 1$

~~$F(1) = 5$~~

$F(x) = 2x$

21. one-one and onto

22. $F(x) = x - 1$

$F(1) = 1 - 1 = 0$

$F(10) = 10 - 1 = 9$

$F(1) + F(10) = 0 + 9 = 9$

9

23. 2 असमरूपीय Function — \log, \ln

24. $f(x) = |x| + x$ যখন $-3 < x < 3$

সম্বন্ধ = $] -3, 3 [$ বা, $(-3, 3)$