Nishant Jindal

Concept → ↓ing fxn while Remove or applying always change Sign of Inequality.

Q $y = \log_2(\log_{1/3} x)$ find Dm?

$2 > 0$

$2 \neq 1$

$\cancel{\log_{1/3}} x > 0$,

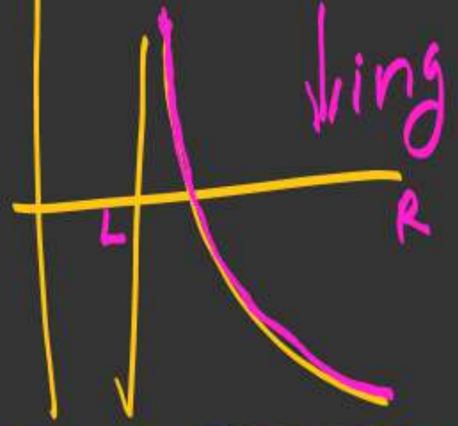
$\frac{1}{3} > 0$, $\frac{1}{3} \neq 1$

$x > 0$

Base $= \frac{1}{3}$

$L \xleftarrow{?} Km$

↓ing



$x < \left(\frac{1}{3}\right)^0$

$x < 1$

$x \in (0, 1)$

45

Q. $f(x) = \log_{10}\left(\frac{x-5}{x^2-10x+24}\right)$ Df?

Base $= 10 > 0$, Base $= 10 \neq 1$

$\frac{(x-5)}{(x-4)(x-6)} > 0$

$-$ $+$ $-$ $+$

4 5 6

$x \in (4, 5) \cup (6, \infty)$

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$Y = \log_a |f(x)|$ Defined.

$Base = a > 0$

$Base = a \neq 1$

$|f(x)| > 0 \Rightarrow f(x) \neq 0$

Q $f(x) = \log_4 |4x-3|$ D_f?

$4>0,\ 4\neq 1$

$4x-3 \neq 0$

$x \neq \frac{3}{4} \Rightarrow x \in (-\infty,\infty) - \{\frac{3}{4}\}$

$x \in R - \{\frac{3}{4}\}$

Q $Y = \log_4 |\log_e x|$ find D_f?

$4>0$	$e>0$
$4\neq 1$	$e\neq 1$
$\log_e x \neq 0$	$x>0$

$x \neq e^0$

$x \neq 1$

$x \in (0,\infty) - \{1\}$

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Q $f(x)=\log_{x-4}(x^2-11x+24)$ find D_f

Q $f(x)=\frac{1}{\sqrt{\log_{1/2}(x^2-7x+13)}}$

Q $f(x)=\sin^{-1}(\log_e x)$,,

Q $\boxed{f(x)=\sqrt{4^x+8^{\left(\frac{2}{3}\right)(x-2)}-13-2^{2(x-1)}}}$

Q $f(x)=\sqrt{\frac{\log_{.3}|x-2|}{|x|}}$

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Q $f(x)=\sqrt{4^x+8^{\frac{2}{3}(x-2)}-13-2^{2(x-1)}}$

$a^{m\times n}=(a^m)^n$

$8^{\frac{2}{3}\times(x-2)}=\left(8^{\frac{2}{3}}\right)^{x-2}=\left(2^{3\times\frac{2}{3}}\right)^{x-2}=4^{x-2}=\frac{4^x}{4^2}$

$2^{2(x-1)}$

$(2^2)^{x-1}=4^{x-1}$

$=\frac{4^x}{4}$

$=\sqrt{4^x+\frac{4^x}{4^2}-13-\frac{4^x}{4}}=\sqrt{4^x\left(1+\frac{1}{16}-\frac{1}{4}\right)-13}$

$f(x)=\sqrt{4^x\left(\frac{16+1-4}{16}\right)-13}$

for Dom → $4^x\left(\frac{13}{16}\right)-13\geq 0$

$\Rightarrow 4^x\left(\frac{\cancel{13}}{16}\right)\geq \cancel{13}\Rightarrow 4^x\geq 16$

$4^x\geq 4^2\Rightarrow x\geq 2\Rightarrow x\in[2,\infty)$

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$(a^m)^n = a^{m \times n}$ | $f(x) = \sqrt{2^{\sin^{-1}(\log_3 x)}}$

Q $y = \sqrt{e^{\sin^{-1}\left(\log_2 \frac{x^2}{2}\right)}}$ find D_f?

$y = \left(e^{\sin^{-1}\left(\log_2 \frac{x^2}{2}\right)}\right)^{1/2} = e^{\frac{\sin^{-1}\left(\log_2 \frac{x^2}{2}\right)}{2}}$

constant

$\frac{1}{2} \times \sin^{-1}\left(\log_2 \frac{x^2}{2}\right)$

Const. $x \in R$

$-1 \le \cancel{\log}_2 \frac{x^2}{2} \le 1$

$2^{-1} \le \frac{x^2}{2} \le 2^1$

$2 \times \left\{\frac{1}{2} \le \frac{x^2}{2} \le 2\right\}$

$\sqrt{2^{\sin^{-1}(\log_3 x)}}$

$1 \le x^2 \le 4$

$-2 \quad -1 \quad 0 \quad 1 \quad 2$

$\sqrt{1} \le \sqrt{x^2} \le \sqrt{4}$

$1 \le |x| \le 2$

$x \in [-2, -1] \cup [1, 2]$

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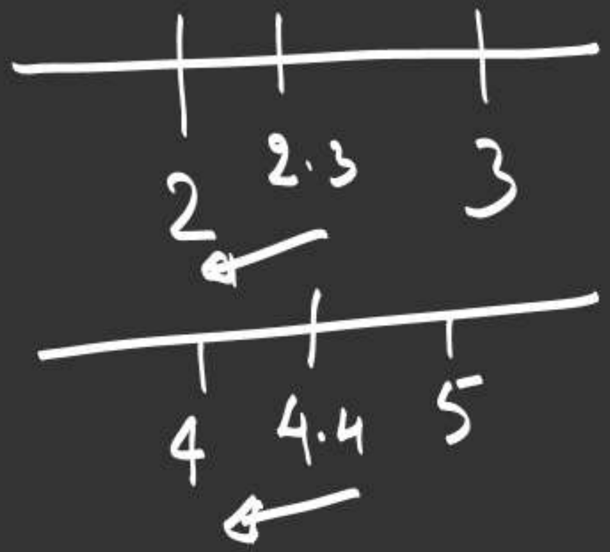
(9) Greatest Integer fxn.

(1) It is Rep as $f(x) = [x]$

(2) It gives Left side's Integer's value for Non Integers.



$[2.3] = 2$ $\quad$ $[4] = 4$ $\quad$ $[-13] = -13$

$[4.4] = 4$ $\quad$ $[-4.4] = -5$

$[-16.1] = -17$ $\quad$ $[-8.9] = -9$

$[8.9] = 8$ $\quad$ $[8] = 8$ $\{ [-8] = .8$

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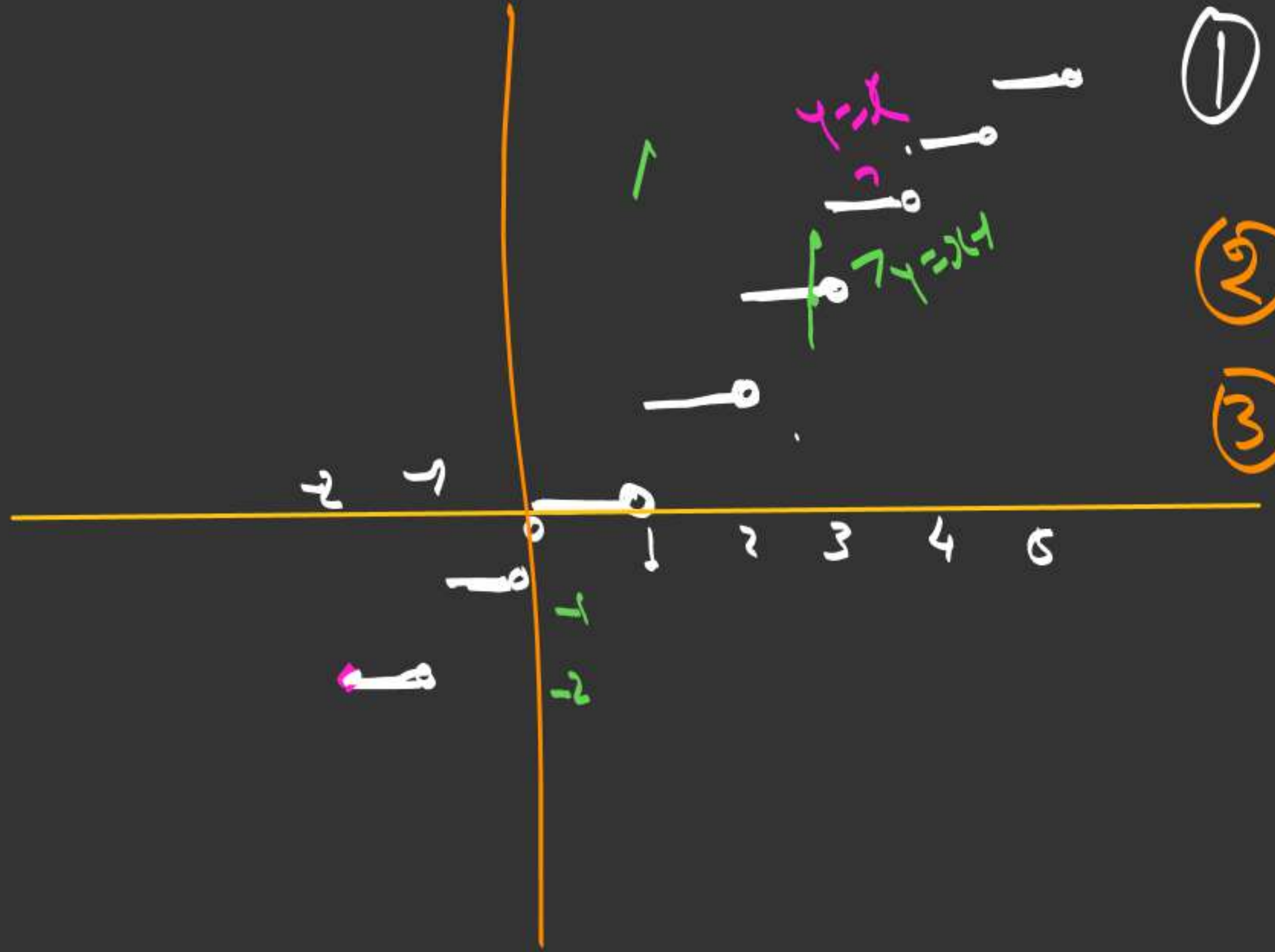
(3) Graph of $f(x) = [x]$

$\boxed{\text{Range} = y = \text{Answer} = \text{Int}}$



① $x \geq [x] > x-1$

② Dom → $x \in R$.

③ Range $y = \{I\}$

$[2.3] = 2$

$[-2.3] = -3$

$[3] = 3$

$[-4] = -4$

Answer = Integer

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Q $f(x) = \sin[\pi^2]x + \sin[-\pi^2]x$

find $f\left(\frac{\pi}{2}\right) = ?$

$\pi \simeq 3.14$

$\pi^2 \simeq 9.86$

$f(x) = \sin[9.86]x + \sin[-9.86]x$

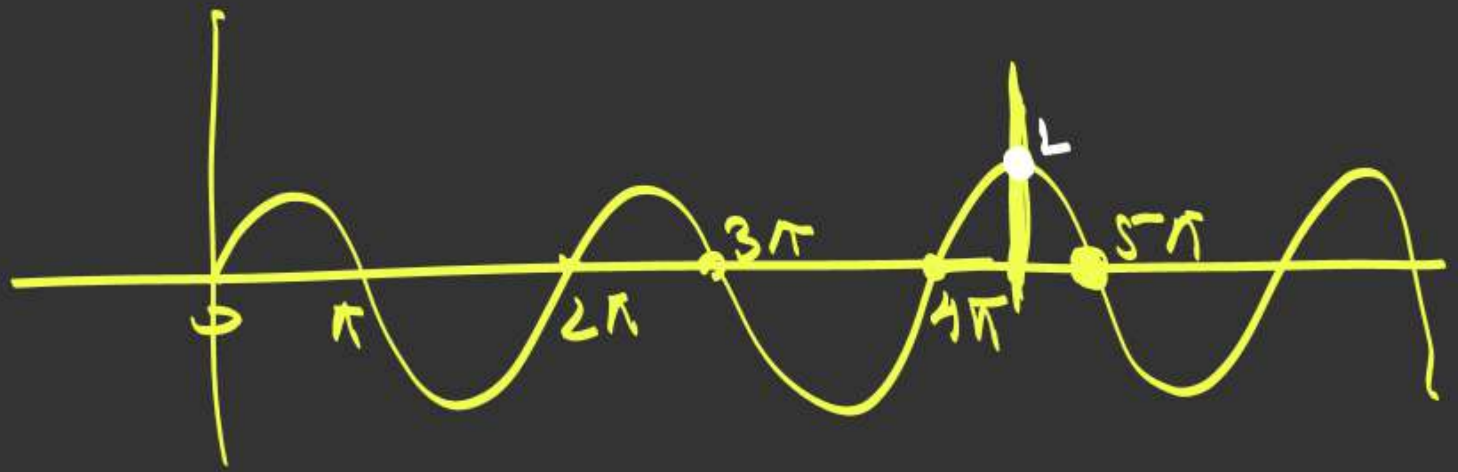
$f(x) = \sin 9x + \sin(-10x)$

$f(x) = \sin 9x - \sin 10x$

$f\left(\frac{\pi}{2}\right) = \sin\left(\frac{9\pi}{2}\right) - \sin \cancel{10}^{5}\frac{\pi}{\cancel{2}} = 1 - 0$

4.5π

$= 1$



Q Exact value of

$[\log_2 1] + [\log_2 2] + [\log_2 3] + \dots + [\log_2 16]$

$$2\times 1 + 4\times 2 + 8\times 3 + 16\times 4 + 32\times 5 + 6 + 6 + 6 = 276$$

$=1$ $\quad 1<x<2 \quad$ $=2$

$$\lceil \log_2 2\rceil + \lceil \log_2 3\rceil + \lceil \log_2 4\rceil + \cdots + \lceil \log_2 8\rceil + \lceil \log_2 9\rceil + \cdots + \lceil \log_2 16\rceil + \lceil \log_2 17\rceil$$

$98+160 \quad 258+18$

$$\cdots + \lceil \log_2 32\rceil + \lceil \log_2 33\rceil + \cdots + \underbrace{\lceil \log_2 64\rceil}_{6} + \underbrace{\lceil \log_2 65\rceil}_{6} + \underbrace{\lceil \log_2 66\rceil}_{6}$$

$= 1$

$\lceil \cdots 4\rceil = 1$

$\rceil = 2$

$\lceil \log_2 5\rceil = \lceil 2<x<3\rceil = 2$

$\lceil \log_2 6\rceil = \lceil 2<x<3\rceil = 2$

$\lceil \log_2 7\rceil = \lceil 2<x<3\rceil = 2$

$\lceil \log_2 8\rceil = \lceil 3\rceil = 3$

$\lceil \log_2 9\rceil = \lceil 3<x<4\rceil = 2$

$\lceil \log_2 10\rceil = \lceil 3<x<4\rceil = 3$

$\lceil \log_2 11\rceil = \lceil 3<x<4\rceil = 3$

$\lceil \log_2 12\rceil = \lceil 3<x<4\rceil = 3$

$\lceil \log_2 13\rceil = \lceil 3<x<4\rceil = 3$

$\lceil \log_2 14\rceil = \lceil 3<x<4\rceil = 3$

$\lceil \log_2 15\rceil = \lceil 3<x<4\rceil = 3$

$\lceil \log_2 16\rceil = \lceil 4\rceil = 4$

$\lceil \log_2 16\rceil = \lceil 4\rceil = 4$

$\lceil \log_2 17\rceil = \lceil 4<x<5\rceil = 4$

$\lceil \log_2 18\rceil = \lceil 4<x<5\rceil = 4$

$\lceil \log_2 19\rceil = \lceil 4<x<5\rceil = 4$

$\lceil \log_2 20\rceil = \lceil 4<x<5\rceil = 4$

$\lceil \log_2 21\rceil = \lceil 4<x<5\rceil = 4$

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Properties

① $[I] = I$

② $[x+n] = [x]+n$

$[x+2] = [x]+2$

$[x-4] = [x]-4$

(3) $\boxed{[x]+[-x] = \begin{cases} 0 & x = I \\ -1 & x \neq I \end{cases}}$

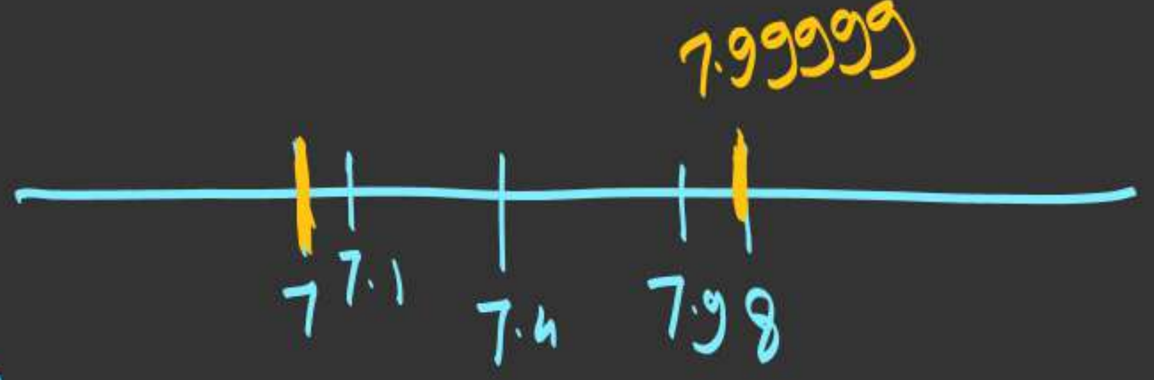
$x = 4$

$[4]+[-4] = \cancel{4} + (\cancel{-4}) = 0$

$x = 4.9$ (Non Int)

$[4.9]+[-4.9] = 4 + (-5) = -1$

(D) $[x]=7$



$[7]=7$

$[7.1]=7$

$[7.4]=7$

$[7.9]=7$

$[7.999]=7$

$[8]=8$

$[x]=7 \Rightarrow x \in [7,8)$

$[x]=7$ Tab tak degu Jab tak
tr betna x 7 se Start ho
& 7.99999.. tak Jaye $\Rightarrow x \in [7,8)$

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$$[x] = n \Rightarrow x \in [n, n+1)$$

$$[x] = 14$$

$$x \in [14, 15)$$

$$[x] = -7$$

$$x \in [-7, -7+1)$$

$$\in [-7, -6)$$