

1. $f(x) = \sqrt{(a-x)x^2+ax+b}$ $x=1$, $a-a+1+b > 0 \rightarrow 1+a+b-1 > 0$
 $\rightarrow b > 1-1a$
 $\rightarrow a-1 > 0 \rightarrow a > 1$ $\left| \begin{aligned} (a-x)x^2+ax+b &= (a-x)(x-1)^2 \rightarrow (a-x)(x^2-2x+1) \\ &\rightarrow (a-x)x^2-2(a-x)x+(a-x) \rightarrow -2(a-x)x+a-x \end{aligned} \right.$
 $\rightarrow a=1$
 $\rightarrow b=1-1a \rightarrow 1-1 \times 1 \rightarrow b=0$

2. $f(x) = \sqrt{x^2+mx+m^2}$ $x=0$, $0-m^2 > 0 \rightarrow m^2 < 0 \rightarrow m < 0$
 $\rightarrow m < 0$
 $\rightarrow \sqrt{2} < m < \sqrt{2}$
 $\rightarrow \sqrt{2} < m < \sqrt{2}$

10. $f(x) = \frac{\sqrt{4-x^2}}{[x]+[x]+1}$ $\Rightarrow \sqrt{4-x^2} > 0 \rightarrow 4-x^2 > 0 \rightarrow x^2 < 4 \rightarrow -2 < x < 2$
 $[x]+[x]+1 \neq 0 \Rightarrow [x]+[x]+1 \neq 0 \rightarrow [x]+[x] \neq -1$
 $D_f = [-2, 2] \rightarrow -2, -1, 0, 1, 2 \rightarrow \text{نہیں}$

15. $y = \sqrt{x^2+3x}$ $\rightarrow x^2+3x > 0 \rightarrow x(x+3) > 0$
 $D_f = [-3, +\infty)$

20. $y = \frac{\sqrt{(x^2-1)(x^2-3x^2)}}{x^2-1}$ $\rightarrow \frac{(x-1)(x+1)(x^2-3x^2)}{(x-1)(x^2+x+1)}$
 $D_f = (-\infty, 0] \cup [3, +\infty)$

25. $y = \sqrt{|x-1|-x^2}$ $\rightarrow |x-1|-x^2 > 0 \rightarrow |x-1| > x^2$
 $\rightarrow x-1 > x^2 \rightarrow x > 1$
 $\rightarrow x-1 < x^2 \rightarrow x < 1$
 $D_f = (-\infty, 0] \cup [1, +\infty)$

30. $y = \sqrt{4-x^2}$ $\rightarrow 4-x^2 > 0 \rightarrow x^2 < 4 \rightarrow -2 < x < 2$
 $\rightarrow x^2 < 4 \rightarrow x < 2$
 $D_f = [-2, 2]$

4- الف) $y = \sqrt{1-x|x|}$ $\rightarrow 1-x|x| \geq 0 \rightarrow x|x| \leq 1 \rightarrow x^2 \leq 1 \rightarrow x \leq 1$
 $\rightarrow x \geq -1$
 $\rightarrow x \in [-1, 1]$
 ب) $y = \frac{x^2}{\sqrt{3-|x-1|}}$ $\rightarrow 3-|x-1| > 0 \rightarrow |x-1| < 3 \rightarrow x-1 < 3 \rightarrow x < 4$
 $\rightarrow x-1 > -3 \rightarrow x > -2$

$D_f = (-\infty, 1]$

$D_f = (-2, 4)$

5- الف) $y = \frac{\sin^2 x - 1}{\cos x} = \frac{\cos^2 x}{\cos x} \rightarrow \cos x \neq 0 \rightarrow D_f = \{k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{\cos x}{2\cos x - 1} \rightarrow 2\cos x - 1 \neq 0 \rightarrow 2\cos x \neq 1 \rightarrow \cos x \neq \frac{1}{2}$

$D_f = \mathbb{R} - \{2k\pi \pm \frac{\pi}{3}\}$

15- الف) $y = \frac{x+3}{|2x+1|-|x+3|}$ $\rightarrow |2x+1| - |x+3| \neq 0$
 $|2x+1| = |x+3| \rightarrow (2x+1)^2 = (x+3)^2$
 $\rightarrow 4x^2 + 4x + 1 = x^2 + 6x + 9 \rightarrow 3x^2 - 2x - 8 = 0$
 $(x+2)(x-4) = 0$
 $x = -2$ or $x = 4$

$D_f = \mathbb{R} - \{-2, 4\}$

ب) $y = \sqrt{|2x+1| - |x+3|}$ $\rightarrow |2x+1| \geq |x+3| \rightarrow (2x+1)^2 \geq (x+3)^2$
 $\rightarrow 4x^2 + 4x + 1 \geq x^2 + 6x + 9 \rightarrow 3x^2 - 2x - 8 \geq 0$
 $\rightarrow (x+2)(x-4) \geq 0$
 $x \leq -2$ or $x \geq 4$

$D_f = (-\infty, -2] \cup [4, +\infty)$

9- الف) $f(x) = \sqrt{\log_{1/5}^{(x-1)}}$ $\rightarrow \log_{1/5}^{(x-1)} \geq 0$
 $\rightarrow x-1 \leq 1 \rightarrow x \leq 2$
 $\rightarrow x-1 > 0 \rightarrow x > 1$
 $\rightarrow x \in (1, 2]$
 ب) $y = \log_{1/5}^{(x-1)}$ $\rightarrow \log_{1/5}^{(x-1)} > 0 \rightarrow x-1 < 1 \rightarrow x < 2$
 $\rightarrow x-1 > 0 \rightarrow x > 1$
 $\rightarrow x \in (1, 2)$

$D_f = (1, 2)$

$$\text{الف) } y = \log(r \cos x + 1) \rightarrow r \cos x + 1 > 0 \rightarrow \cos x > -\frac{1}{r} \quad -10$$

$$D_f = \left(rKx - \frac{r\pi}{r}, rKx + \frac{r\pi}{r} \right) \checkmark \quad 25$$

$$\text{ب) } y = \sqrt{\log \frac{x-1}{x+1}} \rightarrow \frac{x-1}{x+1} > 0 \rightarrow \frac{-1}{+ \infty - 1 +} \rightarrow (-\infty, -1) \cup (1, +\infty) \quad ①$$

$$\downarrow \log \frac{x-1}{x+1} \geq 0 \rightarrow \frac{x-1}{x+1} \geq 1 \rightarrow \frac{rx}{x+1} \geq 0$$

$$\text{① و ②} = D_f = (-\infty, -1) \cup (1, +\infty)$$

$$\frac{-1 \quad 0}{+ \infty - 1 +} \quad ①$$

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