

۱. $f(x) = \sqrt{(a-2)x^2 + ax + b}$ و $D = [3 + \infty)$

$(a-2)=0 \rightarrow a=2 \rightarrow 2x+b \geq 0$ و $2(3)+b=0 \rightarrow b=-6$

جواب: $b=-6$

۲. $f(x) = \sqrt{x^2 + 2x + 2 - m^2} \rightarrow x^2 + 2x + 2 - m^2 \geq 0$

$\Delta = 2^2 - 4(1)(2-m^2) = 4 - 8 + 4m^2 = 4m^2 - 4 \leq 0 \rightarrow m^2 \leq 1 \rightarrow -1 \leq m \leq 1$

$\rightarrow$ اختلاف $\rightarrow 1 - (-1) = 2$

جواب: 2

۳. $f(x) = \sqrt{4-x^2} \rightarrow 4-x^2 \geq 0 \rightarrow x^2 \leq 4 \rightarrow -2 \leq x \leq 2$ اعداد $\rightarrow \{-2, -1, 0, 1, 2\}$

$[x] + [-x] + 1 \rightarrow [x] + [-x] + 1 \neq 0$ برای اعداد صحیح $\rightarrow \{-2, -1, 0, 1, 2\}$

جواب: 5

۴. الف) $y = \sqrt{x^3 + 3x^2} \rightarrow x^2(x+3) \geq 0 \rightarrow x+3 \geq 0 \rightarrow x \geq -3$

$\rightarrow x \geq -3 \rightarrow D = [-3 + \infty)$ جواب: $D = [-3 + \infty)$

ب) $y = \sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} \rightarrow \frac{(x-1)(x+1)(x^2-3x)}{(x-1)(x^2+x+1)} = \frac{x^2(x+1)(x-3)}{x^2+x+1} \rightarrow (x+1)(x-3) \geq 0$

$\rightarrow x \leq -1$ یا $x \geq 3$ و $x \neq 0$ $\rightarrow D = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$ جواب: $D = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$

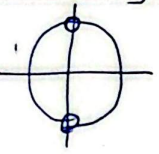
الف) $y = \sqrt{|x-2|-3} \rightarrow |x-2|-3 \geq 0 \rightarrow |x-2| \geq 3 \rightarrow x-2 \geq 3 \rightarrow x \geq 5$ یا $x-2 \leq -3 \rightarrow x \leq -1$ $\rightarrow D = (-\infty, -1] \cup [5, +\infty)$

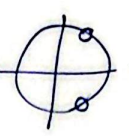
ب) $y = \sqrt{4-|2-x|} \rightarrow 4-|2-x| \geq 0 \rightarrow |2-x| \leq 4 \rightarrow -4 \leq 2-x \leq 4 \rightarrow -2 \leq x \leq 6$

$\rightarrow D = [-2, 6]$ جواب: $D = [-2, 6]$

الف) $y = \sqrt{1-x|x|} \rightarrow 1-x|x| \geq 0 \rightarrow x|x| \leq 1$ $\text{أول } |x|=x \rightarrow 1-x^2 \geq 0 \rightarrow -1 \leq x \leq 1$
 $|x| = -x \rightarrow \underline{D = (-\infty, 1]}$ $\rightarrow$ جواب

ب) $\frac{1}{\sqrt{3-|x-a|}-1} \rightarrow \sqrt{3-|x-a|} \neq 1 \rightarrow 3-|x-a| \neq 1 \rightarrow |x-a| \neq 2$
 $\rightarrow x \neq 3 \text{ و } x \neq 1 \rightarrow \underline{D = [1, 3) \cup (3, 5) \cup (5, 7]}$ $\rightarrow$ جواب

ج) $y = \frac{\sin^2 x - 1}{\cos x} \rightarrow \cos x \neq 0$  $\rightarrow \underline{D = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}}$

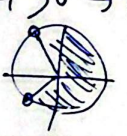
د) $\frac{\cos x}{2\cos x - 1} \rightarrow 2\cos x \neq 1 \rightarrow \cos x \neq \frac{1}{2}$  $\rightarrow \underline{D = \mathbb{R} - \{2k\pi \pm \frac{\pi}{3}\}}$

$y = \frac{x+3}{|x+1|-|x+3|} \rightarrow |x+1|-|x+3| \neq 0 \rightarrow (x+1)^2 \neq (x+3)^2 \rightarrow x^2+x+1 \neq x^2+6x+9$
 $|x+1|-|x+3| \rightarrow x^2-2x-1 \neq 0 \rightarrow x^2-2x-1 \neq 0 \rightarrow (x-4)(x+2) \neq 0$
 $\rightarrow x = \frac{-2 \pm \sqrt{4+4}}{2} = \frac{-2 \pm 2}{2} \rightarrow \underline{D = \mathbb{R} - \{-2, 4\}}$ $\rightarrow$ جواب

$y = \sqrt{|x+1|-|x+3|} \rightarrow |x+1|-|x+3| \geq 0 \rightarrow |x+1| \geq |x+3| \rightarrow x^2+x+1 \geq x^2+6x+9$
 $x = \frac{-2 \pm \sqrt{4+4}}{2} = \frac{-2 \pm 2}{2} \rightarrow \underline{D = (-\infty, -2] \cup [4, +\infty)}$ $\rightarrow$ جواب

$f(x) = \sqrt{\log_{\frac{1}{2}}(\log_{\frac{1}{2}}(x-1))}$ $\rightarrow x-1 > 0 \rightarrow x > 1$
 $0 < \log_{\frac{1}{2}}(x-1) < 1 \rightarrow x-1 < 1 \rightarrow x < 2 \rightarrow 1 < x < 2$
 $\rightarrow x-1 > 1 \rightarrow x > 2 \Rightarrow$
 $\underline{D = (1, 2]}$ $\rightarrow$ جواب

الف) $y = \log(2\cos x + 1) \rightarrow 2\cos x + 1 > 0 \rightarrow 2\cos x > -1 \rightarrow \cos x > -\frac{1}{2}$

 $\rightarrow \underline{D = (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3})}$
 ب) $y = \sqrt{\log \frac{x+1}{x-1}} \xrightarrow{\log \frac{x+1}{x-1} \geq 0} \frac{x+1}{x-1} \geq 1 \rightarrow \frac{x-1}{x+1} - 1 \geq 0 \rightarrow x < -1 \rightarrow \underline{D = (-\infty, -1)}$ $\rightarrow$ جواب