

جواب سوال ۱

تعیین دامنه

مجموعه جواب

۱- $f(x) = \sqrt{(a-r)x^2 + ax + b} \quad [r, +\infty) \quad (a-r)x^2 + ax + b \geq 0$

$a-r=0 \rightarrow a=r \quad \downarrow \text{نویس}$
 $\Rightarrow rx + b \geq 0 \rightarrow 4 + b \geq 0$

$x=0$

$b = -4$

۲- $f(x) = \sqrt{x^2 + rx + r - m^2} \quad D \subset \mathbb{R}$

$1 - (-1) = |r|$

$\Delta \leq 0 \rightarrow r - f(r - m^2) \leq 0 \rightsquigarrow r - 1 + fm^2 \rightarrow f(m^2 - 1) \leq 0 \rightsquigarrow -1 \leq m \leq 1$

۳- $f(x) = \sqrt{r - x^2} \rightsquigarrow r - x^2 \geq 0 \rightarrow r \geq x^2 \rightarrow -r \leq x \leq r$

$[x] + [-x] + 1 \rightsquigarrow \neq 0$

① $D = \mathbb{Z}$

$1 \wedge r \rightarrow -r \leq x \leq r \rightsquigarrow \{-r, -1, 0, 1, r\} \Rightarrow [r, +\infty)$

۴- الف) $y = \sqrt{x^2 + rx^2} \quad x^2 + rx^2 \geq 0 \rightarrow x^2(x + r) \geq 0 \quad \frac{-r}{-1 + 1} \quad D_f \subset [-r, +\infty)$

ب) $y = \sqrt{\frac{(x^2 - 1)(x^2 - rx^2)}{x^2 - 1}} \rightsquigarrow \frac{(x-1)(x+1)x^2(x-r)}{(x-1)(x^2 + x + 1)} \quad \frac{-1}{+1 - 1 - 1 - 1} \quad \frac{x^2}{x^2} \quad \frac{r}{r}$

$D_f \subset (-\infty, -1] \cup \{0\} \cup [r, +\infty)$

۵- الف) $y = \sqrt{|x-r| - c} \quad |x-r| \geq r \quad \begin{cases} x-r \geq r \rightarrow x \geq 2r \\ x-r \leq -r \rightarrow x \leq -1 \end{cases} \quad D_f \subset (-\infty, -1] \cup [2r, +\infty)$

ب) $y = \sqrt{r - |r-x|} \quad r \geq |r-x| \rightarrow -r \leq r-x \leq r \rightarrow -4 \leq -x \leq 4 \rightarrow 4 \geq x \geq -4$

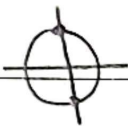
$D_f \subset [-4, 4]$

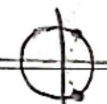
4- حل) $y = \sqrt{1-x|x|}$ $\oplus x \rightarrow \pm i \rightarrow 1-1=0 \checkmark$
 $\ominus \checkmark$ $D_f = (-\infty, 1]$
 $\odot \checkmark$

ب) $y = \frac{1}{\sqrt{r-|x-a|}-1}$ 1) $r-|x-a| \geq 0 \rightarrow r \geq |x-a| \rightarrow -r \leq x-a \leq r$
 $(r \leq x \leq r)$

2) $\sqrt{r-|x-a|}-1 \neq 0$

$x \neq r, v \leftarrow |x-a| \neq r \leftarrow \sqrt{r-|x-a|} \neq 1$ $D_f = [r, \infty) - \{r, v\}$
 $[r, r) \cup (r, v) \cup (v, \infty)$

5- حل) $y = \frac{\sin x - 1}{\cos x}$ $\cos x \neq 0$  $D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{\cos x}{r \cos x - 1}$ $r \cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{r}$ 
 $D_f = \mathbb{R} - \{k\pi + \frac{\pi}{r}, k\pi - \frac{\pi}{r}\}$

6- حل) $\frac{x+r}{|x+1|-|x+r|} \rightarrow \neq 0$ $\xrightarrow{\text{مقدار}}$
 $|x+1| \neq |x+r| \rightarrow x^2+1+rx \neq x^2+r+4x$

$rx^2+rx-r \neq 0 \rightarrow (x-r)(rx+r) \neq 0$

$D_f = \mathbb{R} - \{-\frac{r}{r}, r\}$ $\hookrightarrow x \neq r, -\frac{r}{r}$

ب) $y = \sqrt{|x+1|-|x+r|}$ $|x+1| \geq |x+r| \xrightarrow{\text{مقدار}}$
 $|x+1|^2 - (x+r)^2 \geq 0 \rightarrow rx^2+rx-r \geq 0 \rightarrow (x-r)(rx+r) \geq 0$

$D_f = (-\infty, -\frac{r}{r}] \cup [r, +\infty)$ $\frac{-\frac{r}{r}}{+1} - \frac{r}{+1}$



Mo Tu We Th Fr Sa Su



9- $f(x) = \sqrt{\log_a(x-1)}$

$\log_a(x-1) \geq 0 \Rightarrow x-1 \geq 1 \Rightarrow x \geq 2$

$\log_a(x-1) \leq 1 \Rightarrow x-1 \leq a \Rightarrow x \leq a+1$

$x > 1$

$1 < x \leq a+1$

1) $x-1 > 0 \Rightarrow x > 1$

$\log_a(x-1) \leq 1 \Rightarrow x-1 \leq a \Rightarrow x \leq a+1$

$D_f = (1, a+1]$

10- i) $y = \log(r \cos x + 1)$

$r \cos x + 1 > 0 \Rightarrow \cos x > -\frac{1}{r}$

$D_f = \left(rkr - \frac{r\pi}{r}, rkr + \frac{r\pi}{r} \right)$

ii) $y = \sqrt{\log \frac{x-1}{x+1}}$

$\frac{x-1}{x+1} \geq 0 \Rightarrow x \neq \pm 1$

$x > 1$

$x < -1$

$\log \left(\frac{x-1}{x+1} \right) \geq 0 \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow x-1 \geq x+1 \Rightarrow -2 \geq 0 \Rightarrow x < -1$

$D_f = (-\infty, -1)$