

19.5

1 (الف) $\sqrt{\frac{n^2 - 4n}{n^3 - n}} = \frac{n(n-4)}{n(n^2-1)} = \frac{n(n-4)}{n(n-1)(n+1)} \geq 0$ (1)

3 $\frac{-1}{-} \frac{0}{+} \frac{1}{+} \frac{4}{+}$ $\rightarrow (-1, 1) \cup [4, +\infty) - \{0\}$

5 (ب) $\sqrt{\frac{n^3 - n^2}{n^3 - n}} = \frac{n^2(n-1)}{n(n^2-1)} = \frac{n^2(n-1)(n+1)}{n(n+1)(n-1)} \geq 0$ 1.5

7 $\frac{-1}{+} \frac{0}{+} \frac{1}{+}$ $\mathbb{R} - \{-1, 0, 1\}$

9 (الف) $y = \frac{n+1}{\sqrt{n+|n|}}$ $\rightarrow n+|n| > 0 \rightarrow n > -|n|$ $\mathbb{R}^+$ (2) ✓

11 (ب) $y = \frac{1}{\sqrt{n+|n|}}$ $\rightarrow n+|n| > 0$ $\mathbb{R}^+$

13 (الف) $y = \sqrt{2-[n]} \geq 0 \rightarrow 2-[n] \geq 0 \rightarrow [n] \leq 2 \rightarrow n < 3$ $(-\infty, 3)$ (3) ✓

15 (ب) $\frac{1}{\sqrt{2-[n]}}$ $\rightarrow 2-[n] > 0 \rightarrow [n] < 2 \rightarrow n < 2$ $(-\infty, 2)$

17 (الف) $y = \sqrt{[n-\frac{1}{\mu}] + [n+\frac{1}{\mu}]} \rightarrow [n-\frac{1}{\mu}] + [n+\frac{1}{\mu}] \geq 0$ (4) ✓

18 $[n-\frac{1}{\mu} + 1] + [n+\frac{1}{\mu}] \geq 1 \rightarrow 2[n+\frac{1}{\mu}] \geq 1 \rightarrow [n+\frac{1}{\mu}] \geq \frac{1}{2}$

20 $[n+\frac{1}{\mu}] \geq 1 \rightarrow n+\frac{1}{\mu} \geq 1 \rightarrow n \geq \frac{1}{\mu} \rightarrow [\frac{1}{\mu}, +\infty)$ ✓



ب) $y = \sqrt{\left[n - \frac{1}{n}\right] + \left[-n + \frac{1}{n}\right]}$, $\left[n - \frac{1}{n}\right] + \left[-\left(n - \frac{1}{n}\right)\right] \geq 0$ 1

if $a \in \mathbb{Z}$ $[a] + [-a] = 0$ 2

if $a \notin \mathbb{Z}$ $[a] + [-a] = -1$ $\rightarrow n - \frac{1}{n} \in \mathbb{Z} \rightarrow D_f = \left\{n \mid n = k + \frac{1}{k}, k \in \mathbb{Z}\right\}$ 4

الف) $y = \frac{r}{\sin x - 1}$ $\rightarrow \sin x \neq 1$ $\rightarrow \sin x \neq 1$ 5

$R = \left\{2k\pi + \frac{\pi}{2}\right\}$ 6

ب) $y = \frac{r}{r \sin^2 x - 1}$ $\rightarrow r \sin^2 x - 1 \neq 0 \rightarrow r \sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{r}$ 8

$R = \left\{\frac{k\pi}{r} + \frac{\pi}{r}\right\}$ 9

الف) $y = \sqrt{r \sin x - 1}$ $\rightarrow r \sin x - 1 \geq 0 \rightarrow \sin x \geq \frac{1}{r}$ 10

$R = \left[2k\pi + \frac{\pi}{r}, 2k\pi + \frac{\pi}{r}\right]$ 11

ب) $y = \sqrt{\cos x - 1}$ $\rightarrow \cos x - 1 \geq 0 \rightarrow \cos x \geq 1$ 12

$[2k\pi, 2k\pi]$ 13

$-1 \leq \cos y \leq 1$ 14

الف) $\cos y = |x| - r \rightarrow -1 \leq |x| - r \leq 1 \rightarrow r \leq |x| \leq r+1$ 15

$r \leq |x| \rightarrow x \geq r \cup x \leq -r \rightarrow (-\infty, -r] \cup [r, +\infty)$ 16

$|x| \leq r+1 \rightarrow -r-1 \leq x \leq r+1 \rightarrow [-r-1, r+1]$ 18

ب) $y = \arcsin(x^2 + 3x + 1)$ $\rightarrow -1 \leq x^2 + 3x + 1 \leq 1$ 19

$\rightarrow x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0 \rightarrow (x+2)(x+1) \geq 0$ 20

$\rightarrow x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0$ 21

1 $\frac{-2}{+ \phi} - \frac{-1}{- \phi} +$ (1) ✓ $\frac{-3}{+ \phi} - \frac{0}{- \phi} +$ (2)

2 $(-\infty, -2] \cup [-1, +\infty)$ $(-\infty, -3] \cup [0, +\infty)$

3 $\cap$

4 $[-3, -2] \cup [-1, 0]$ ✓

5 (الف) $y = \sqrt{2 - \log_{\mu}(n-2)}$ ① $n-2 > 0 \rightarrow n > 2$ ② $\log_{\mu}^{n-2} \leq 2 \rightarrow n-2 \leq 9 \rightarrow n \leq 11$ (A)

6 ① و ② $n \rightarrow 2 < n \leq 11 \rightarrow (2, 11]$ (B) ✓

8 (ب) $y = \log(n^3 - n) \rightarrow n^3 - n > 0 \rightarrow n(n-1)(n+1) > 0$

9 $\frac{-1}{+} - \frac{1}{-} + \frac{1}{-} - \frac{1}{+} +$ $D_f = (-1, 0) \cup (1, +\infty)$

11 (الف) $y = \frac{3}{f^n + 1} \rightarrow f^n + 1 \neq 0 \rightarrow f^n \neq -1$ (R) (A)
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13 (ب) $y = \frac{3}{f^n - 1} \rightarrow f^n - 1 \neq 0 \rightarrow f^n \neq 1 \rightarrow n \neq 0 \rightarrow \mathbb{R} - \{0\}$

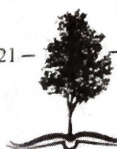
15 (ج) $y = \frac{3}{f^n - 2} \rightarrow f^n - 2 \neq 0 \rightarrow f^n \neq 2 \rightarrow \mathbb{R} - \{\log_f^{+2}\}$ (B) ✓

17 (د) $y = \frac{3}{f^n - 3} \rightarrow f^n - 3 \neq 0 \rightarrow f^n \neq 3 \rightarrow n \neq \log_f^3$
 $\mathbb{R} - \{\log_f^3\}$

19 (الف) $y = (f^n + 1)!$ $f^n + 1 \in \mathbb{N} \rightarrow f^n \in \mathbb{N} - 1 \rightarrow n \in \frac{\mathbb{N} - 1}{f}$ (A)

20 $D_f = \{n \mid n = \frac{k-1}{f}, k \in \mathbb{N}\}$ (B) ✓

21 (ب) $y = \left(\frac{3n-2}{3n-5}\right)!$ $\frac{3n-2}{3n-5} \in \mathbb{N} \rightarrow \frac{-3n+2}{3n-5} = \frac{-\omega n + 2}{3\omega - 5} = \frac{\omega n - 2}{3\omega - 5}$
 $D_f = \{n \mid n = \frac{\omega k - 2}{3k - 5}, k \in \mathbb{N}\}$



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