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$$Df = [0.911]$$

الف) $f(n) = \sqrt{\log \frac{n+1}{n}} \Rightarrow \log \frac{n+1}{n} > 0 \Rightarrow \frac{n+1}{n} > 1 \Rightarrow n > \frac{1}{n} \Rightarrow n > 1$
 $D_f = (\frac{1}{n}, \frac{1}{n}] \cup (1, +\infty)$

ب) $f(n) = \log \frac{1}{4 + \sqrt{n} - |n|} \Rightarrow \frac{1}{4 + \sqrt{n} - |n|} > 0 \Rightarrow 4 + \sqrt{n} - |n| > 0 \Rightarrow 4 + \sqrt{n} - n > 0$
 $4 + \sqrt{n} - n > 0 \Rightarrow n^2 - \sqrt{n} - 4 < 0 \Rightarrow (n - \frac{1}{2})^2 < \frac{17}{4} \Rightarrow n \in (\frac{1}{2}, \frac{17}{2})$
 $D_f = (-\frac{1}{2}, \frac{17}{2})$

$y = \sqrt{\frac{n+1}{n+b}} + a \Rightarrow D_y = (\frac{1}{n+b}, +\infty) \Rightarrow \frac{n+1}{n+b} + a > 0$
 $\frac{n+1}{n+b} + a > 0 \Rightarrow n+1 + a(n+b) > 0 \Rightarrow (a+1)n + a(b+1) > 0$
 $n+b \neq 0 \Rightarrow n > -b \Rightarrow b > -n$
 $a = -1 \leftarrow a + \frac{1}{n}$

$y = \sqrt{f(n) - n + 1} ; f(n) = \begin{cases} 2n+1; [n] > 1 \Rightarrow n > 0 \star \\ \frac{1}{n+1}; [n] < 1 \Rightarrow n < 0 \star \star \end{cases}$
 $n > 0 \Rightarrow y = \sqrt{2n+1 - n + 1} = \sqrt{n+2} \Rightarrow n > -2 \Rightarrow n > 0 \star$
 $n < 0 \Rightarrow y = \sqrt{\frac{1}{n+1} - n + 1} = \sqrt{\frac{1 - n(n+1)}{n+1}} \Rightarrow 1 - n(n+1) > 0 \Rightarrow n^2 + n - 1 < 0 \Rightarrow n \in (-\frac{1+\sqrt{5}}{2}, \frac{-1+\sqrt{5}}{2})$

$y = \frac{2n^3 + 3n^2 + 11n + 3}{(n^2 + n + 1)^2} \Rightarrow \Delta = b^2 - 4ac = 9 - 4 \cdot 1 \cdot 3 = -3 < 0$
 $\Delta < 0 \Rightarrow \frac{2n^3 + 3n^2 + 11n + 3}{(n^2 + n + 1)^2} > 0 \Rightarrow 2n^3 + 3n^2 + 11n + 3 > 0$
 $2n^3 + 3n^2 + 11n + 3 > 0 \Rightarrow n > -\frac{1}{2}$
 $D_y = \mathbb{R} - \{-\frac{1}{2}\} \leftarrow n \neq -\frac{1}{2}$

$y = \sqrt{1 - \log(2n-a)} ; D_y = (b, c) \Rightarrow 1 - \log(2n-a) > 0 \Rightarrow 1 > \log(2n-a)$
 $1 > \log(2n-a) \Rightarrow 10 > 2n-a \Rightarrow a > 2n-10$
 $D_y = \frac{a}{2} \leq n \leq a + \frac{a}{2} \Rightarrow \frac{a}{2} \leq n \leq \frac{3a}{2}$
 $a > 0 \Rightarrow \frac{a}{2} > 0 \Rightarrow a > 0$