

Amir

$$\textcircled{1} (a-r)x^r + ax + b \geq 0 \Rightarrow \frac{a-r}{-r} \Rightarrow a-r=0 \Rightarrow a=r$$

$$(0-r)x^r + ax + b = rx + b$$

$$x=3 \quad 4+b=0 \Rightarrow \boxed{b=-4}$$

$$\textcircled{2} D_f = \mathbb{R} \Rightarrow \Delta < 0 \Rightarrow 2 - 4(r-m^2) < 0 \Rightarrow 2 - 4 + 4m^2 < 0$$

$$\Rightarrow m^2 < 1 \Rightarrow -1 < m < 1 \Rightarrow 1 - (-1) = 2$$

$$\Delta = 0 \Rightarrow m = 1, -1$$

$$\textcircled{3} \textcircled{a} \quad 2 - x^2 \geq 0 \Rightarrow -x^2 \leq -2 \Rightarrow x^2 \leq 2 \Rightarrow D_f = [-\sqrt{2}, \sqrt{2}]$$

$$\textcircled{b} \quad [n] + [-n] + 1 \neq 0 \Rightarrow [n] + [-n] \neq -1 \Rightarrow n \notin \mathbb{Z} \Rightarrow \text{no } x$$

$$\begin{array}{c} \bullet \bullet \bullet \\ -1 \quad -1 \quad -1 \\ \bullet \bullet \bullet \\ 1 \quad 1 \quad 1 \end{array}$$

$$\left[\begin{array}{c} \bullet \bullet \bullet \\ -1 \quad -1 \quad -1 \\ \bullet \bullet \bullet \\ 1 \quad 1 \quad 1 \end{array} \right] \Rightarrow x \in \mathbb{Z} \Rightarrow \text{no } x$$

$$\textcircled{4} \textcircled{a} \quad x^2(x+3) \geq 0 \Rightarrow \frac{-3}{-1} \Rightarrow D_f = [-3, +\infty)$$

$$\textcircled{b} \quad \frac{(x^2-1)(x^2-2x^2)}{x^2-1} = \frac{(x-1)(x+1)(x^2)(x-2)}{(x-1)(x^2+1+x)}$$

$$\Rightarrow \frac{-1}{+} \quad \frac{+}{-} \quad \frac{+}{-} \quad \frac{+}{+} \Rightarrow D_f = (-\infty, -1] \cup [2, +\infty) \cup \{0\}$$

$$\textcircled{5} \textcircled{a} \quad |x-2| - 3 \geq 0 \Rightarrow |x-2| \geq 3 \Rightarrow x-2 \geq 3 \Rightarrow x \geq 5$$

$$\Rightarrow D_f = (-\infty, -1] \cup [5, +\infty) \quad x-2 \leq -3 \Rightarrow x \leq -1$$

$$\textcircled{b} \quad 2 - |x-2| \geq 0 \Rightarrow |x-2| \leq 2 \Rightarrow -2 \leq x-2 \leq 2 \Rightarrow -2 \leq x \leq 4 \Rightarrow [-2, 4]$$

$$\textcircled{6} \textcircled{a} \quad 1 - x/|x| \geq 0 \quad \text{or } 1 \vee -1 \vee -\infty \vee +\infty \Rightarrow [-\infty, +1]$$

$$\textcircled{b} \quad \sqrt{x-|x-2|} \neq 1 \Rightarrow x - |x-2| \neq 1$$

$$\textcircled{1} \quad x - |x-2| \geq 1 \Rightarrow |x-2| \leq x-1 \Rightarrow -x \leq x-2 \leq x-1 \Rightarrow x \geq 1$$

$$\textcircled{2} \quad x - |x-2| \neq 1 \Rightarrow |x-2| \neq x-1 \Rightarrow x \neq 1 \Rightarrow D_f = [1, 1] - \{1\} = \emptyset$$

$$\textcircled{7} \textcircled{a} \quad \cos x \neq 0 \Rightarrow D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$$

$$\textcircled{b} \quad \cos x \neq \frac{1}{4} \Rightarrow D_f = \mathbb{R} - \{2k\pi \pm \frac{\pi}{4}\}$$

$$\textcircled{A} \text{ i) } |2n+1| + |n+3| \rightarrow \sum n^2 + \sum n+1 + n^2 + 4n+9$$

$$\Rightarrow 2n^2 - 2n - 1 \neq 0 \Rightarrow n^2 - 2n - 2 \neq 0 \Rightarrow (n-4)(n+2) \neq 0 \Rightarrow R = \left\{ \frac{-2}{2}, \frac{4}{2} \right\}$$

$$\Rightarrow R = \{-1, 2\}$$

$$\text{ii) } |2n+1| - |n+3| \geq 0$$

$$\sum n^2 + \sum n+1 \geq n^2 + 4n+9 \Rightarrow 2n^2 - 2n - 1 \geq 0$$

$$D_f = (-\infty, -\frac{1}{2}] \cup [2, +\infty)$$

$$\textcircled{Q} \sqrt{\log \log_a^{(k-1)}}$$

$$2n-1 > 0 \Rightarrow n > \frac{1}{2}$$

$$\log_a^{(2n-1)} > 0 \Rightarrow 2n-1 > 1 \Rightarrow n > 1$$

$$\log_a^{(\log_a^{(2n-1)})} > 0$$

$$\left[\begin{array}{l} 0 < \log_a^{(2n-1)} \leq 1 \Rightarrow \log_a^{(2n-1)} \leq 1 \Rightarrow n \leq c \\ \Rightarrow 1 < 2n \leq c \end{array} \right.$$

$$\rightarrow [1, c]$$

$$\textcircled{10} \text{ i) } \cos n > \frac{-1}{2} \Rightarrow D_f = \left(\frac{\pi}{3}, \frac{5\pi}{3} \right)$$

$$\text{ii) } \frac{n-1}{n+1} > -\frac{1}{2} \Rightarrow \frac{-1}{2} < \frac{n-1}{n+1} \Rightarrow (-\infty, -1) \cup (1, +\infty)$$

$$\log \frac{n-1}{n+1} > 0 \Rightarrow \frac{n-1}{n+1} > 1 \Rightarrow \frac{n-1}{n+1} - \frac{n+1}{n+1} > 0 \Rightarrow \frac{-2}{n+1} > 0$$

$$\Rightarrow \frac{-2}{n+1} > 0 \Rightarrow (-\infty, -1) \Rightarrow D_f = (-\infty, -1)$$