

|                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                           |  |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|
| الف) $f(n)+2$                                                                                                                                                                                                                       |  | ب) $2f(n)$                                                                                                                                                                                                                                                                                                                |  | ۱ |
| ج) $f(n-1)$                                                                                                                                                                                                                         |  | د) $-f(n)$                                                                                                                                                                                                                                                                                                                |  |   |
| الف) $n^2-4n+4 \geq 0$<br>$n^2-4n+4 = (n-2)(n-2)$<br>$n-2=0 \Rightarrow n=2$<br>$n-2 < 0 \Rightarrow n < 2$<br>$n-2 > 0 \Rightarrow n > 2$<br>+ 2 - 2 +<br>$(-\infty, 2) \cup (2, +\infty)$                                         |  | ب) $n^2-4n+4 \leq 0$<br>$n^2-4n+4 = (n-1)(n-3)$<br>$n-1=0 \Rightarrow n=1$<br>$n-3=0 \Rightarrow n=3$<br>$n-1 < 0 \Rightarrow n < 1$<br>$n-3 > 0 \Rightarrow n > 3$<br>+ 1 - 3 +<br>$(1, 3)$                                                                                                                              |  | ۲ |
| ج) $n^2+4n+4 \geq 0$<br>$(n+1)(n+1)$<br>$n+1=0 \Rightarrow n=-1$<br>$n+1 < 0 \Rightarrow n < -1$<br>$n+1 > 0 \Rightarrow n > -1$<br>- 1 - 1 +<br>$(-\infty, -1] \cup [-1, +\infty)$                                                 |  | د) $n^2-4n+4 \leq 0$<br>$n^2-4n+4 = (n-1)(n-3)$<br>$n-1=0 \Rightarrow n=1$<br>$n-3=0 \Rightarrow n=3$<br>$n-1 < 0 \Rightarrow n < 1$<br>$n-3 > 0 \Rightarrow n > 3$<br>+ 1 - 3 +<br>$[1, 3]$                                                                                                                              |  | ۳ |
| الف) $\frac{n^2-2n+2}{n-1} \leq 0$<br>$\frac{(n-1)(n-1)}{n-1}$<br>$n-1=0 \Rightarrow n=1$<br>$n-1 < 0 \Rightarrow n < 1$<br>$n-1 > 0 \Rightarrow n > 1$<br>+ 1 - 1 +<br>$(-\infty, 1) \cup (1, +\infty)$                            |  | ب) $\frac{n^2-1}{n^2-4n+4} \geq 0$<br>$\frac{(n+1)(n-1)}{(n-1)(n-3)}$<br>$n-1=0 \Rightarrow n=1$<br>$n-3=0 \Rightarrow n=3$<br>$n-1 < 0 \Rightarrow n < 1$<br>$n-3 > 0 \Rightarrow n > 3$<br>+ 1 - 3 +<br>$(-\infty, -1] \cup (1, +\infty)$                                                                               |  | ۴ |
| الف) $\sqrt{\frac{n^2-1}{n^2-n}} \geq 0$<br>$\frac{n^2-1}{n^2-n} \geq 0$<br>$n^2-1=0 \Rightarrow n=1$<br>$n^2-n=0 \Rightarrow n(n-1)=0 \Rightarrow n=0, 1$<br>- 1 0 +<br>+ 1 - 1 +<br>$(-\infty, -1) \cup (0, 1) \cup (1, +\infty)$ |  | ب) $\sqrt{\frac{n^2-1}{n^2-4n+4}} \geq 0$<br>$\frac{n^2-1}{n^2-4n+4} \geq 0$<br>$(n^2-1)(n^2-4n+4) \geq 0$<br>$(n-1)(n+1)(n-1)(n-3) \geq 0$<br>$(n-1)^2(n+1)(n-3) \geq 0$<br>$n-1=0 \Rightarrow n=1$<br>$n+1=0 \Rightarrow n=-1$<br>$n-3=0 \Rightarrow n=3$<br>+ 1 - 3 +<br>$(-\infty, -1] \cup (1, 3) \cup (3, +\infty)$ |  | ۵ |
| الف) $y = \sqrt{2-\sqrt{2-n}}$<br>$2-n \geq 0 \Rightarrow n \leq 2$<br>$2-\sqrt{2-n} \geq 0 \Rightarrow \sqrt{2-n} \leq 2$<br>$2-n \leq 4 \Rightarrow n \geq -2$<br>$-2 \leq n \leq 2$<br>$[-2, 2]$                                 |  | ب) $y = \sqrt{2-\sqrt{2-n}}$<br>$2-n \geq 0 \Rightarrow n \leq 2$<br>$2-\sqrt{2-n} \geq 0 \Rightarrow \sqrt{2-n} \leq 2$<br>$2-n \leq 4 \Rightarrow n \geq -2$<br>$-2 \leq n \leq 2$<br>$[-2, 2]$                                                                                                                         |  |   |

|                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                 |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p>الف) <math>y = \sqrt{5-2x^2}</math> <math>5-2x^2 \geq 0</math> <math>2x^2 \leq 5</math><br/> <math>2x^2 \leq 5 \Rightarrow \sqrt{2} \leq x \leq \sqrt{5} \Rightarrow [-\sqrt{5}, \sqrt{5}]</math></p>                                                                                                                                            | <p>ب) <math>y = \sqrt{3 n -4}</math> <math>3 n -4 \geq 0</math><br/> <math>3 n  \geq 4 \Rightarrow  n  \geq \frac{4}{3} \Rightarrow n \geq \frac{4}{3}</math><br/> <math>(-\infty, -\frac{4}{3}] \cup [\frac{4}{3}, +\infty)</math></p>                                         | <p>٤</p>  |
| <p>الف) <math>y = \sqrt{\frac{ n +1}{ n -3}}</math> <math> n -3 \neq 0</math> <math> n  \neq 3</math><br/> <math>n \neq \pm 3 \Rightarrow \mathbb{R} - \{\pm 3\}</math></p>                                                                                                                                                                         | <p>ب) <math>y = \sqrt{\frac{\sqrt{n+1}}{\sqrt{n}-3}}</math> <math>n \geq 0</math><br/> <math>\sqrt{n}-3 \neq 0 \Rightarrow \sqrt{n} \neq 3 \Rightarrow n \neq 9</math><br/> <math>[0, +\infty) - \{9\}</math></p>                                                               | <p>٥</p>  |
| <p>الف) <math>y = \frac{\sin n}{\cos n - 1}</math> <math>\cos n - 1 \neq 0</math><br/> <math>\cos n \neq 1 \Rightarrow \cos n \neq \frac{1}{1}</math><br/> <math>\bigoplus</math> <math>0, 2\pi, \dots \Rightarrow \mathbb{R} - \{2k\pi \pm \frac{\pi}{2}\}</math></p>                                                                              | <p>ب) <math>y = \frac{\cos n + 1}{\sin n + 1}</math> <math>\sin n + 1 \neq 0</math><br/> <math>\sin n \neq -1 \Rightarrow \sin n \neq -\frac{1}{1}</math><br/> <math>\mathbb{R} - \{2k\pi - \frac{\pi}{2}, 2k\pi - \frac{3\pi}{2}\} \bigoplus</math></p>                        | <p>٨</p>  |
| <p>الف) <math>y = \frac{\tan n + 1}{\cot n - 1}</math> <math>\tan n = \frac{\sin n}{\cos n}</math> <math>\cos n \neq 0</math><br/> <math>\cot n = \frac{\cos n}{\sin n}</math> <math>\sin n \neq 0</math><br/> <math>\cot n - 1 \neq 0 \Rightarrow \cot n \neq 1</math><br/> <math>\mathbb{R} - \{k\pi, k\pi + \frac{\pi}{2}\} \bigoplus</math></p> | <p>ب) <math>y = \frac{\sin n + 1}{\sin n - 3}</math> <math>\sin n - 3 \neq 0</math><br/> <math>\sin n \neq 3 \Rightarrow \sin n \neq \frac{3}{1}</math><br/> <math>\sin n \neq \pm \frac{\sqrt{3}}{2}</math> <math>\bigoplus \mathbb{R} - \{k\pi \pm \frac{\pi}{6}\}</math></p> | <p>٩</p>  |
| <p>الف) <math>y = \sqrt{5-2 n }</math> <math>5-2 n  \geq 0</math><br/> <math>2 n  \leq 5 \Rightarrow  n  \leq \frac{5}{2} \Rightarrow -\frac{5}{2} \leq n \leq \frac{5}{2}</math><br/> <math>[-\frac{5}{2}, \frac{5}{2}]</math></p>                                                                                                                 | <p>ب) <math>y = \sqrt{\frac{ n }{ n }}</math> <math>\frac{ n }{ n } \geq 0</math> <math> n  \neq 0</math><br/> <math> n  \neq 0 \Rightarrow n \neq 0 \Rightarrow \mathbb{R} - \{0\}</math></p>                                                                                  | <p>١٠</p> |