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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <p>الف) <math>\frac{x(x-6)}{x(x^2-1)} \geq 0</math></p> <p><math>\frac{-1 \quad * \quad 1 \quad 6}{- \quad + \quad - \quad +}</math></p> <p><math>D_f = (-1, 0) \cup (0, 1) \cup [6, +\infty)</math></p>                                                                  | <p>ب) <math>\frac{x^3(x^2-1)}{x(x^2-1)} \geq 0</math></p> <p><math>\frac{-1 \quad * \quad 0 \quad 1}{+ \quad - \quad + \quad -}</math></p> <p><math>D_f = \mathbb{R} - \{-1, 0, 1\}</math></p>                                                                                                                                                                              | ۱ |
| <p>الف) <math>x +  x  &gt; 0</math></p> <p><math>\frac{0}{- \quad +}</math></p> <p><math>D_f = \mathbb{R}^+ \cup D_f = (0, +\infty)</math></p>                                                                                                                            | <p>ب) <math>x x  &gt; 0</math></p> <p><math>\frac{0}{- \quad +}</math></p> <p><math>D_f = \mathbb{R}^+ \cup D_f = (0, +\infty)</math></p>                                                                                                                                                                                                                                   | ۲ |
| <p>الف) <math>2 - [x] \geq 0</math><br/> <math>[x] \leq 2</math><br/> <math>D_f = (-\infty, 3)</math></p>                                                                                                                                                                 | <p>ب) <math>2 - [x] &gt; 0</math><br/> <math>[x] &lt; 2</math><br/> <math>D_f = (-\infty, 2)</math></p>                                                                                                                                                                                                                                                                     | ۳ |
| <p>الف) <math>[x - \frac{1}{3}] + [x + \frac{2}{3}] \geq 0 + 1</math><br/> <math>\Rightarrow [x + \frac{2}{3}] \geq 1</math><br/> <math>[x + \frac{2}{3}] \geq \frac{1}{3}</math><br/> <math>x \geq \frac{1}{3}</math><br/> <math>D_f = [\frac{1}{3}, +\infty)</math></p> | <p>ب) <math>[x - \frac{1}{3}] + [-x + \frac{1}{3}] \geq 0</math><br/> <math>\Leftrightarrow [-(x - \frac{1}{3})] + [x - \frac{1}{3}] \geq 0</math><br/> <math>[x] + [-x] \geq 0</math><br/> <math>\Rightarrow x - \frac{1}{3} \in \mathbb{Z} \Rightarrow x \in \mathbb{Z} + \frac{1}{3}</math><br/> <math>D_f = \{x \mid x = k + \frac{1}{3}, k \in \mathbb{Z}\}</math></p> | ۴ |
| <p>الف) <math>\sin x - 1 \neq 0</math><br/> <math>\sin x \neq 1</math><br/> <math>D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}</math></p>                                                                                                                                 | <p>ب) <math>1 - \sin^2 x \neq 0</math><br/> <math>\sin^2 x \neq 1</math><br/> <math>\sin x \neq \pm \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \pm \frac{\sqrt{2}}{2}</math><br/> <math>D_f = \mathbb{R} - \{k\pi + \frac{\pi}{4}\}</math></p>                                                                                                                   | ۵ |

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| <p>الف) <math>\sqrt{\sin x} - 1 \geq 0</math></p> $\sin x \geq \frac{1}{4}$ $2k\pi + \frac{\pi}{4} \leq x \leq 2k\pi + \frac{3\pi}{4}$ $D_f = [2k\pi + \frac{\pi}{4}, 2k\pi + \frac{3\pi}{4}]$                                        | <p>ب) <math>\cos x - 1 \geq 0</math></p> $\cos x \geq 1$ $-1 \leq \cos x \leq 1 \Rightarrow \cos x = 1$ $D_f = [2k\pi, 2k\pi + \frac{\pi}{2}]$                                                                                                                                        | 6  |
| <p>الف) <math>-1 \leq \cos y \leq 1</math></p> $-1 \leq  x  - 3 \leq 1$ $2 \leq  x  \leq 4$ $D_f = [-4, -2] \cup [2, 4]$                                                                                                              | <p>ب) <math>-1 \leq x^2 + 3x + 1 \leq 1</math></p> <p>① <math>0 \leq (x+1)(x+2) \Rightarrow \frac{-2}{-1} \leq x \leq \frac{-1}{-1}</math></p> <p>② <math>x(x+3) \leq 0 \Rightarrow \frac{-3}{-1} \geq x \geq \frac{0}{-1}</math></p> <p><math>D_f = [-3, -1] \cup [-1, 0]</math></p> | 7  |
| <p>الف) <math>2 - \log_3((x-2)) \rightarrow x-2 &gt; 0 \Rightarrow x &gt; 2</math></p> $2 - \log_3 x^2 \geq 0 \Rightarrow \log_3 x^2 \leq 2$ $\Rightarrow x-2 \leq 9 \Rightarrow x \leq 11 \Rightarrow 2 < x \leq 11$ $D_f = (2, 11]$ | <p>ب) <math>x^3 - x &gt; 0 \Rightarrow x(x-1)(x+1) &gt; 0</math></p> $D_f = (-1, 0) \cup (1, +\infty)$                                                                                                                                                                                | 8  |
| <p>الف) <math>x^n + 1 \neq 0</math></p> $x^n \neq -1$ <p>جواب صحیح است <math>\Rightarrow D_f = \mathbb{R}</math></p>                                                                                                                  | <p>ب) <math>x^n - 1 \neq 0</math></p> $x^n \neq 1$ $\Rightarrow x = 0 \quad D_f = \mathbb{R} - \{0\}$                                                                                                                                                                                 | 9  |
| <p>ج) <math>x^n - 2 \neq 0</math></p> $x^n \neq 2$ $\Rightarrow x \neq \frac{1}{2}$ $D_f = \mathbb{R} - \{\frac{1}{2}\}$                                                                                                              | <p>د) <math>x^n - 3 \neq 0</math></p> $x^n \neq 3$ $D_f = \mathbb{R} - \{\log_3 3\}$                                                                                                                                                                                                  | 10 |
| <p>الف) <math>y = (x+1)! \quad x+1 \in \mathbb{W}</math></p> $x \in \frac{\mathbb{W}-1}{1}$ $D_f = \{x \mid x = \frac{k-1}{1}, k \in \mathbb{W}\}$                                                                                    | <p>ب) <math>y = (\frac{x^2-2}{x-5})!</math></p> $\frac{x^2-2}{x-5} \in \mathbb{W} \Rightarrow x \in \frac{-5\mathbb{W}+2}{1\mathbb{W}-5}$ $\Rightarrow D_f = \{x \mid x = \frac{5k-2}{1k-5}, k \in \mathbb{W}\}$                                                                      | 11 |