

الف) $y = \sqrt{\frac{x^2-4x}{x^3-x}}$ $D_f = (-1, 1) \cup [4, +\infty)$ $\checkmark$ $19, 175$

ب) $y = \sqrt{\frac{x^3-x^2}{x^3-x}}$

$y = \frac{x(x-4)}{x(x-1)(x+1)}$ $\frac{-1}{-} \frac{0}{+} \frac{1}{+} \frac{4}{-} \frac{+}{+}$ $\checkmark$ 175

$y = \frac{x^2 \times x \times x \times (x-1)(x+1)}{x(x+1)(x-1)}$ $\frac{-}{+} \frac{0}{+} \frac{1}{+} \frac{4}{+}$ $D_f = \mathbb{R} - \{-1, 0, 1\}$

الف) $y = \frac{x+1}{\sqrt{x+|x|}}$ $\checkmark$ $\textcircled{2}$

ب) $y = \frac{1}{\sqrt{x|x|}}$

$x+|x| > 0$ $\checkmark$ $\textcircled{2}$ $D_f = \mathbb{R}^+$

$x|x| > 0$ $\checkmark$ $\textcircled{2}$ $D_f = \mathbb{R}$

الف) $y = \sqrt{2-[x]}$ $\checkmark$ $\textcircled{2}$

$2-[x] \geq 0$

$[x] \leq 2$

$D_f = (-\infty, 3)$

ب) $y = \frac{1}{\sqrt{2-[x]}}$

$2-[x] > 0$

$[x] < 2$

$D_f = (-\infty, 2)$

الف) $y = \sqrt{\left[x + \frac{2}{3}\right] + \left[x - \frac{1}{3}\right]}$ $\checkmark$ $\textcircled{2}$

$\left[x + \frac{2}{3}\right] + \left[x - \frac{1}{3}\right] \geq 0$

$2\left[x + \frac{2}{3}\right] \geq 1$

$\left[x + \frac{2}{3}\right] \geq \frac{1}{2}$

$D_f = \left[\frac{1}{3}, +\infty\right)$

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الف) $y = \frac{2}{\sin x - 1}$ $\checkmark$ $\textcircled{2}$

$\sin x \neq 1$

$D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$

ب) $y = \frac{2}{2\sin^2 x - 1}$

$\sin^2 x \neq \frac{1}{2}$

$\sin x \neq \pm \frac{1}{\sqrt{2}}$

$\sin x \neq \pm \frac{\sqrt{2}}{2}$

$D_f = \mathbb{R} - \left\{\pm k\pi + \frac{\pi}{4}\right\}$

الف) $y = \sqrt{1 - \sin x}$ $1 - \sin x \geq 0$ $\sin x \leq 1$  $D_f = [2k\pi - \frac{\pi}{2}, 2k\pi + \frac{\pi}{2}]$	ب) $y = \sqrt{\cos x - 1}$ $\cos x \geq 1$ $D_f = \{2k\pi\}$	6		
الف) $\cos y = x - 2$ $-1 \leq \cos y \leq 1$ $D_f = [-2, -1] \cup [1, 2]$	ب) $y = \arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1$ $x^2 + 3x + 1 \leq 1$ $x^2 + 3x \leq 0$ $x(x + 3) \leq 0$ $D_f = [-3, -1] \cup [0, 1]$	7		
الف) $y = \sqrt{2 - \log_3(x-2)}$ $2 - \log_3(x-2) \geq 0$ $\log_3(x-2) \leq 2$ $x - 2 \leq 9$ $x \leq 11$ $D_f = (2, 11]$	ب) $y = \log(x^2 - x)$ $x(x-1)(x+1) > 0$ $D_f = (-1, 0) \cup (1, +\infty)$	8		
الف) $y = \frac{3}{e^x + 1}$ $e^x \neq -1$ $x \neq \log_e^{-1}(-1)$ $D_f = \mathbb{R}$	ب) $y = \frac{3}{e^x - 1}$ $e^x \neq 1 \Rightarrow x \neq 0$ $D_f = \mathbb{R} - \{0\}$	ج) $y = \frac{3}{e^x - 2}$ $e^x \neq 2 \Rightarrow x \neq \log_e 2$ $D_f = \mathbb{R} - \{\frac{1}{e}\}$	د) $y = \frac{3}{e^x - 3}$ $e^x \neq 3 \Rightarrow x \neq \log_e 3$ $D_f = \mathbb{R} - \{\log_e 3\}$	9
الف) $y = (x+1)!$ $x+1 \in \mathbb{N}$ $x \in \frac{\mathbb{N}-1}{1}$ $D_f = \{x \mid x = k-1, k \in \mathbb{N}\}$	ب) $y = \left(\frac{x-2}{x-1}\right)!$ $\frac{x-2}{x-1} \in \mathbb{N}$ $x-2 \in \mathbb{N}$ $x \in \frac{\mathbb{N}-1}{1}$ $D_f = \{x \mid x = \frac{r-1}{r-2}, r \in \mathbb{N}\}$		10	

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$$f(x) = \sqrt{\underbrace{\left[x - \frac{1}{r}\right]}_a + \left[-x + \frac{1}{r}\right]}$$

$$[a] + [-a] \geq 0$$

$$\forall a \in \mathbb{Z} \Rightarrow x - \frac{1}{r} \in \mathbb{Z}$$

$$x \in \mathbb{Z} + \frac{1}{r}$$

$$D_f = \left\{ x \mid x = k + \frac{1}{r}, k \in \mathbb{Z} \right\}$$