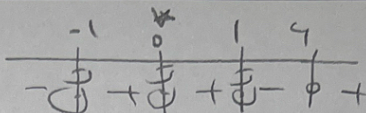
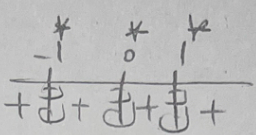


الف) $\frac{x^2-4x}{x^2-x} \geq 0 \quad \frac{x(x-4)}{x(x^2-1)} \geq 0$ 

$D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$

ب) $\frac{x^3-x^2}{x^3-x} \geq 0 \quad \frac{x^2(x^2-1)}{x(x^2-1)} \geq 0$ 

$D_f = \mathbb{R} - \{0, 1\}$

الف) $x + |x| > 0 \rightarrow |x| > -x \rightarrow D_f = \mathbb{R}^+_{\neq 0} = (0, +\infty)$

ب) $x|x| > 0 \quad (+) \quad D_f = \mathbb{R}^+_{\neq 0} = (0, +\infty)$

الف) $2 - [x] > 0 \rightarrow [x] < 2 \rightarrow x < 2 \quad D_f \Rightarrow (-\infty, 2)$

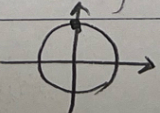
ب) $2 - [x] > 0 \rightarrow [x] < 2 \rightarrow x < 2 \quad D_f \Rightarrow (-\infty, 2)$

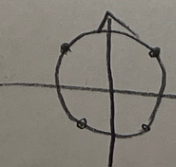
الف) $[x - \frac{1}{3}] + [x + \frac{2}{3}] \geq 0 \rightarrow [x + \frac{2}{3} - 1] + [x + \frac{2}{3}] \geq 0 \rightarrow [x + \frac{2}{3}] - 1 + [x + \frac{2}{3}] \geq 0 \Rightarrow 2[x + \frac{2}{3}] \geq 1 \rightarrow [x + \frac{2}{3}] \geq \frac{1}{2} \rightarrow x + \frac{2}{3} \geq 1 \rightarrow x \geq \frac{1}{3}$

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

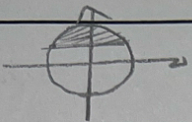
ب) $[x - \frac{1}{3}] + [-x + \frac{1}{3}] \geq 0 \xrightarrow{a \in \mathbb{Z}} a \in \mathbb{Z} \quad [a] + [-a] = 0 \rightarrow x - \frac{1}{3} \in \mathbb{Z} \rightarrow D_f = \{x \mid x = \frac{1}{3} + n, n \in \mathbb{Z}\}$

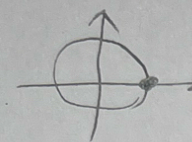
$\nexists a \notin \mathbb{Z} \quad [a] + [-a] = -1$

الف) $\sin x \neq 1 \quad D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$ 

ب) $\sin^2 x \neq \frac{1}{4} \quad \sin x \neq \pm \sqrt{\frac{1}{4}}$ 

$D_f = \mathbb{R} - \{k\pi + \frac{\pi}{6}, k\pi + \frac{5\pi}{6}\}$

الف) $\sin u \geq \frac{1}{2}$  $\frac{\pi}{6} \leq u \leq \frac{5\pi}{6}$ $D_f = \{2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}\}$

ب) $\cos u \geq 1$  $-1 \leq \cos u \leq 1$ $D_f = \{2k\pi\}$

الف) $-1 \leq |u-2| \leq 1 \rightarrow |u-2| \leq 1 \rightarrow |u| \leq 3 \rightarrow -3 \leq u \leq 3$
 $|u-2| \geq 1 \rightarrow |u| \geq 3 \rightarrow -3 \leq u \leq 3$
 $D_f = \{-3, -2\} \cup \{2, 3\}$

ب) $-1 \leq u^2 + u + 1 \leq 1 \Rightarrow u^2 + u \leq 0$ $u(u+1)$ $\frac{-1 \quad 0}{+1 \quad -1 \quad +}$
 $u^2 + u + 1 \geq -1 \Rightarrow u^2 + u + 2 \geq 0$ $\frac{-1 \quad -1}{+1 \quad 0 \quad +}$
 $(u+1)(u+2)$

الف) $u-2 > 0 \rightarrow u > 2$ $1 - \log_2(u-2) > 0$ $u-2 \leq 9$
 $u \leq 11$ $D_f = (2, 11]$

$u^3 - u > 0 \rightarrow u(u^2 - 1) > 0$ $\frac{-1 \quad 0 \quad 1}{-1 \quad +1 \quad -1 \quad +1}$
 $D_f = (-1, 0) \cup (1, +\infty)$

الف) $u^n \neq -1$ $D_f = \mathbb{R}$

ب) $u^n \neq 1 \rightarrow u \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$

ج) $u^n \neq 2 \rightarrow u \neq \log_2^{\frac{1}{n}} \rightarrow D_f = \mathbb{R} - \{\log_2^{\frac{1}{n}}\}$

د) $u^n \neq 3 \rightarrow u \neq \log_3^{\frac{1}{n}} \rightarrow D_f = \mathbb{R} - \{\log_3^{\frac{1}{n}}\}$

الف) $u_m \in W-1 \rightarrow u \in \frac{W-1}{f}$ $D_f = \{u | u = \frac{k-1}{f}, k \in W\}$
 $u_{m+1} \in W$

ب) $\frac{u_m - 2}{u_m - a} \in W \rightarrow u_m - 2 = f(u_m - a) \rightarrow u_m - f(u_m) = +2 - af$

$u = \frac{+2 - af}{f - fu} \rightarrow D_f = \{u | u = \frac{af - 2}{fk - f}, k \in W\}$