

$$\frac{x(x-2)}{x(x-1)(x+1)} \geq 0$$

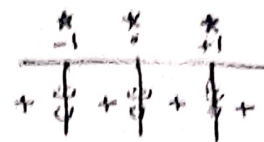


$$D_f = (-1, 0) \cup (0, 1) \cup (1, 2)$$

(الف)

✓

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

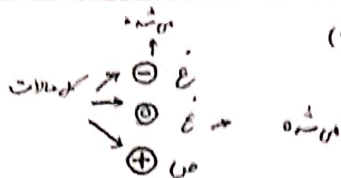


$$D_f = \mathbb{R} - \{-1, 0, 1\}$$

(ب)

۱

$$x + |x| > 0$$

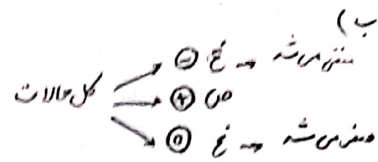


$$D_f = \mathbb{R}^+$$

(الف)

✓

$$x|x| > 0$$



$$D_f = \mathbb{R}^+$$

(ب)

۲

$$x - [x] \geq 0$$

$$\Rightarrow [x] \leq x \Rightarrow x < x+1$$

⇓

$$D_f = (-\infty, 1)$$

(الف)

✓

$$x - [x] > 0$$

$$\Rightarrow [x] < x \Rightarrow x < x+1$$

⇓

$$D_f = (-\infty, 1)$$

(ب)

۳

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

$$x \left[x - \frac{1}{x}\right] \geq -1 \quad \left[x - \frac{1}{x}\right] \geq -\frac{1}{x}$$

$$x - \frac{1}{x} \geq 0 \quad x > \frac{1}{x} \Rightarrow$$

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

(الف)

✓

$$x - \frac{1}{x} \in \mathbb{Z}$$

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

(ب)

۴

$$\sin x - 1 \neq 0$$

$$\sin x \neq 1$$



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

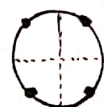
(الف)

✓

$$r \sin^2 x - 1 \neq 0$$

$$r \sin^2 x \neq 1$$

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



$$D_f = \mathbb{R} - \left\{k\pi + \frac{\pi}{2}, k\pi + \frac{3\pi}{2}\right\}$$

(ب)

$$r \sin x = 1 \Rightarrow$$

$$r \sin x \geq 1 \quad \sin x \geq \frac{1}{r}$$



$$D_f = \left[r k \pi + \frac{\pi}{r}, r k \pi + \frac{\pi}{r} \right]$$

(P) ✓

$$\cos x = 1 \Rightarrow$$

$$\cos x \geq 1 \Rightarrow \begin{cases} \cos x > 1 \notin \\ \cos x = 1 \end{cases}$$



$$D_f = \{ r k \pi \}$$

$$-1 \leq |x| \leq 1$$

$$r \leq |x| \leq r$$

$$-r \leq x \leq -r$$

$$r \leq x \leq r$$

$$\Rightarrow D_f = [-r, -r] \cup [r, r]$$

(P) ✓

$$-1 \leq x^r + r x + 1 \leq 1$$

$$-1 \leq x^r + r x + 1 \leq 1$$

$$-1 \leq (x+1)(x+r) \leq 1$$

$$D_f = [-r, -r] \cup [-1, 0]$$

$$x - r > 0 \quad x > r$$

$$r - \log(x-r) \geq 0 \Rightarrow \log(x-r) \leq r$$

$$x - r \leq e^r$$

$$x \leq r + e^r$$

$$\Rightarrow D_f = (r, r + e^r]$$

(P) ✓

$$x^r - x > 0$$

$$x(x+1)(x-1) > 0$$

$$x < -1 \quad -1 < x < 1 \quad x > 1$$

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

$$D_f = \mathbb{R}$$

(P) ✓

$$e^x - 1 \neq 0 \Rightarrow e^x \neq 1 \Rightarrow x \neq 0$$

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

$$e^x - r \neq 0 \quad e^x \neq r \quad x \neq \frac{1}{r}$$

$$D_f = \mathbb{R} - \left\{ \frac{1}{r} \right\}$$

$$e^x - r \neq 0 \quad e^x \neq r \quad x \neq \log_e r$$

$$D_f = \mathbb{R} - \log_e r$$

$$f(x+1) \in W$$

$$f(x) \in W-1$$

$$x \in \frac{W-1}{r}$$

$$D_f = \left\{ x \mid x \in \frac{W-1}{r}, k \in W \right\}$$

(P)

(P)

$$\frac{f(x)-r}{f(x)-a} \in W \Rightarrow f(x)-r = r x W - a W$$

$$f(x)-r W x = r - a W \Rightarrow x = \frac{r-a W}{r-r W}$$

$$D_f = \left\{ x \mid x = \frac{a k - r}{r k - r}, k \in W \right\}$$