

الف) $P(x) = x^3 + 3x^2 - 11x + 11 \neq 0$
 $P(1) = 0$

$$\begin{array}{r} x^3 + 3x^2 - 11x + 11 \quad | x-1 \\ \underline{x^3 + 3x^2 - 11x + 11} \\ 0x^3 + 0x^2 + 0x + 0 \\ 0 \end{array}$$

$P(x) = (x-1)(x^2 + 4x - 11) =$
 $(x-1)(x+1)(x+11) \neq 0$
 $\Rightarrow D_f = \mathbb{R} - \{1, -1, -11\}$

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ب) $Q(x) = x^3 + 9x^2 + 10x + 11 \neq 0$
 $Q(-1) = 0$

$$\begin{array}{r} x^3 + 9x^2 + 10x + 11 \quad | x+1 \\ \underline{x^3 + 9x^2 + 10x + 11} \\ 0x^3 + 0x^2 + 0x + 0 \\ 0 \end{array}$$

$Q(x) = (x+1)(x^2 + 8x + 11) =$
 $(x+1)(x+1)(x+11) \neq 0$
 $\Rightarrow D_f = \mathbb{R} - \{-1, -11, -1\}$

الف) $P(x) = x^3 - 4x^2 + 4x - 1 \neq 0$
 $P(1) = 0$

$$\begin{array}{r} x^3 - 4x^2 + 4x - 1 \quad | x-1 \\ \underline{x^3 - 4x^2 + 4x - 1} \\ 0x^3 + 0x^2 + 0x + 0 \\ 0 \end{array}$$

$P(x) = (x-1)(x^2 - 3x + 1) \neq 0$
 $\Delta = 1 - 4 < 0$
 $\Rightarrow D_f = \mathbb{R} - \{1\}$

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ب) $P(x) = x^3 - 4x^2 + 4x - 1 \neq 0$

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

$x \mid \begin{array}{c} -1 \\ + \end{array} \begin{array}{c} 1 \\ - \end{array} \begin{array}{c} 1 \\ + \end{array}$

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

$x^2 - \omega|x-1| - 4x + \omega \neq 0$

اگر $x \geq 1 \Rightarrow x^2 - \omega(x-1) - 4x + \omega \neq 0 \Rightarrow x^2 - \omega x + \omega - 4x + \omega = x^2 - 4x + 2\omega = (x-2)(x-2) \neq 0$
 $1 < x < \omega \Rightarrow \boxed{x \neq 2, \omega}$

اگر $x < 1 \Rightarrow x^2 - \omega(-(x-1)) - 4x + \omega = x^2 + \omega x - \omega - 4x + \omega = x^2 + \omega x = x(x + \omega) \neq 0$
 $-3, 0 < 1 \Rightarrow \boxed{x \neq 0, -\omega}$

$D_f = \mathbb{R} - \{-3, 0, 2, \omega\}$

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الف) $|4x+1| - |x+3| \neq 0 \Rightarrow |4x+1| \neq |x+3| \Rightarrow |4x+1|^2 \neq |x+3|^2 \Rightarrow$

$16x^2 + 8x + 1 \neq x^2 + 6x + 9 \Rightarrow 15x^2 - 2x - 8 \neq 0 \quad (4x+4)(x-2) \neq 0$

$\Rightarrow x \neq 2, x \neq -\frac{4}{3} \Rightarrow D_f = \mathbb{R} - \{2, -\frac{4}{3}\}$

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ب) $|4x+1| - |x+3| \geq 0 \Rightarrow |4x+1| \geq |x+3| \Rightarrow 16x^2 + 8x + 1 \geq x^2 + 6x + 9$

$15x^2 - 2x - 8 \geq 0 \Rightarrow (3x+4)(x-2) \geq 0$

$D_f = (-\infty, -\frac{4}{3}] \cup [2, +\infty)$

الف) $x > 0, 1 - \log_{\frac{x}{11}} > 0$

$\Rightarrow \log_{\frac{x}{11}} < 1 \Rightarrow x < 11 \Rightarrow D_f = (0, 11)$

ب) $x > 0, 1 - \log_{\frac{x}{11}} > 0$

$\Rightarrow \log_{\frac{x}{11}} < 1 \Rightarrow x > (\frac{1}{11})^1 = \frac{1}{11} \Rightarrow D_f = (\frac{1}{11}, +\infty)$

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$$2x-1 > 0$$

$$\boxed{x > \frac{1}{2}}$$

$$\log_{\omega} 2x-1 > 0 \Rightarrow 2x-1 > \omega^0 = 1 \Rightarrow \boxed{x > 1}$$

$$\log_{\omega} 2x-1 > 0 \Rightarrow \log_{\omega} 2x-1 \leq (\omega, \omega)^0 = 1 \Rightarrow 2x-1 \leq \omega^1 = \omega \Rightarrow 2x \leq \omega+1 \Rightarrow \boxed{x \leq \frac{\omega+1}{2}}$$

$$\Rightarrow D_f = (1, \frac{\omega+1}{2}]$$

$$\text{الف) } 2\cos x + 1 > 0 \quad \cos x > -\frac{1}{2}$$

$$D_f = (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3})$$



$$\text{ب) } \frac{x-1}{x+1} > 0$$

$$\log_{\omega} \frac{x-1}{x+1} \geq 0$$

$$\Rightarrow \frac{x-1}{x+1} \geq 1$$

$$\frac{x-1}{x+1} - 1 \geq 0 \Rightarrow \frac{x-1-x-1}{x+1} \geq 0$$

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

$$\Rightarrow x+1 < 0$$

$$(x < -1)$$

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

$$g(x) = (x+2)x^2 + ax + b \geq 0$$

اگر (x) و سری باشد یا به ازای دو بازه یا به ازای یک بازه کراندار غنبت می شود



از آنجایی که یک بازه داده شده کراندار نیست پس (x) و سری نیست و یک تابع خطی است

$$a+2=0$$

$$\Rightarrow a = -2$$

$$g(x) = -2x + b \geq 0 \Rightarrow x \leq \frac{b}{2} \Rightarrow D_f = (-\infty, \frac{b}{2}] = (-\infty, 2] \Rightarrow \frac{b}{2} = 2$$

$$\Rightarrow \boxed{b=4}$$

$$x^2 + 4x + 4 - m^2 \geq 0 \quad \forall x \in \mathbb{R}$$

$$\Rightarrow \Delta \leq 0 \Rightarrow f - f(2-m^2)(1) \leq 0 \Rightarrow f \leq f(2-m^2) \Rightarrow 1 \leq 2-m^2 \Rightarrow m^2 \leq 1$$

$$\Rightarrow -1 \leq m \leq 1$$

$$\max(m) - \min(m) = 1 - (-1) = \boxed{2}$$

$$f-x^2 \geq 0 \Rightarrow 2 \geq x \geq -2$$

$$\left. \begin{aligned} [x] + [x] &= \begin{cases} 0 & x \in \mathbb{Z} \\ -1 & x \notin \mathbb{Z} \end{cases} \\ [x] + [-x] + 1 &\neq 0 \end{aligned} \right\} \Rightarrow D_f = \mathbb{Z} \cap [-2, 2] = \{-2, -1, 0, 1, 2\}$$

$$\boxed{5 \text{ عدد}}$$