

کیمیاء اصنافی یازدهم دفتر A تالیف شماره ۳

① الف $x-1$ به مجموع ضرایب صفر

$$2x^2 + 4x - 3 \rightsquigarrow \underbrace{(x-1)}_1 \underbrace{(2x-1)}_{-\frac{1}{2}} \underbrace{(x+3)}_{-3} \quad D_f = R - \left\{ -3, \frac{1}{2} \right\}$$

ب $x+1$ به مجموع ضرایب توان اندک مثل صفر

$$2x^2 + 7x + 2 \rightsquigarrow \underbrace{(x+1)}_{-1} \underbrace{(2x+1)}_{-\frac{1}{2}} \underbrace{(x+2)}_{-2} \quad D_f = R - \left\{ -2, -\frac{1}{2}, -1 \right\}$$

② الف $x-1$ به $x^2 - x + 1$

$$\underbrace{(x-1)}_1 \underbrace{(x^2 - x + 1)}_{\Delta < 0} \quad D_f = R - \{1\}$$

ب) $\sqrt{x+3} \rightarrow (-\infty)$

$$x^2 - 2x^2 + 2x - 1 \rightsquigarrow \underbrace{(x-1)}_{(1)} \underbrace{(x^2 - x + 1)}_{\Delta < 0}$$

(+ مثبت)

$$D_f = (-\infty, -3] \cup (1, +\infty)$$

③ $x^2 - 4|x-1| - 2x + 4 = 0$ صدق نشود!

$x \geq 1$ ① $x^2 - 4(x-1) - 2x + 4 = 0 \rightsquigarrow x^2 - 6x + 8 = 0 \rightsquigarrow \frac{(x-2)(x-4)}{2} = 0$

$x < 1$ ② $x^2 - 4(-x+1) - 2x + 4 = 0 \rightsquigarrow x^2 + 2x = 0 \rightsquigarrow \frac{x(x+2)}{-2} = 0$

$$D_f = R - \{-3, 0, 2, 4\}$$

④ الف $\sqrt{-x} - 2 \rightsquigarrow [-x] - 2 \geq 0 \rightsquigarrow [-x] \geq 2 \rightarrow -x \geq 2, x \leq -2 \quad D_f = (-\infty, -2]$

ب $[x]^2 - 2[x] - 3 \neq 0 \rightsquigarrow \underbrace{[x] = 3}_{\frac{3}{2}} \text{ یا } \underbrace{[x] = -1}_{-\frac{1}{2}}$

$[x] = 3 \rightarrow 3 \leq x < 4 \quad [x] = -1 \rightarrow -1 \leq x < 0$

$R = ([-1, 0) \cup [3, 4)) \quad \text{یا} \quad (-\infty, -1) \cup [0, 2) \cup [4, +\infty)$

⑤ الف $\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0 \rightsquigarrow 2\left[x + \frac{1}{x}\right] - 1 \geq 0 \quad \left[x + \frac{1}{x}\right] \geq \frac{1}{2}$

$x + \frac{1}{x} \geq 1 \rightsquigarrow x \geq \frac{1}{x} \rightsquigarrow \left[\frac{1}{x}, +\infty\right)$

ب $\sqrt{\left[x - \frac{1}{x}\right] + \left[\frac{1}{x} - x\right]} \rightsquigarrow [x] + [-x] \text{ if } x \in \mathbb{Z}, 0 \text{ if } x \notin \mathbb{Z}$

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

⑥ الف $\frac{\cos}{\sin} + 1$

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$\tan \neq -1$

تائولات تقریب لغده

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تائولات = -1

$R = \left\{ k\pi, k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right\}$



ب $\sqrt{1 - 4\sin^2 x} \rightsquigarrow 1 - 4\sin^2 x \geq 0 \rightsquigarrow 1 \geq 4\sin^2 x \rightarrow \sin^2 x \leq \frac{1}{4} \rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$

$\left[-\frac{\pi}{4}, \frac{\pi}{4}\right] \cup \left[\frac{3\pi}{4}, \frac{5\pi}{4}\right]$

⑤ الف) $r \sin x - 1 \geq 0 \rightsquigarrow \sin x \geq \frac{1}{r}$  $\left[\frac{\pi}{r}, \frac{\pi}{r}\right] \cup \left[2k\pi + \frac{\pi}{r}, 2k\pi + \frac{\pi}{r}\right]$

ب) $1 - r \cos x \geq 0 \rightsquigarrow \cos x \leq \frac{1}{r}$  $\left[\frac{\pi}{r}, \frac{\pi}{r}\right] \cup \left[2k\pi + \frac{\pi}{r}, 2k\pi + \frac{\pi}{r}\right]$

⑥ الف) $\arcsin(x^r + rx + 1) \rightsquigarrow -1 \leq x^r + rx + 1 \leq 1$

$-1 \leq x^r + rx + 1 \rightsquigarrow 0 \leq x^r + rx + 2 \quad (x+1)(x+r) \quad \frac{-r-1}{1} \quad \frac{-r-1}{1}$

$x^r + rx + 1 \leq 1 \rightsquigarrow x^r + rx \leq 0 \quad \frac{x(x+r)}{-r} \leq 0 \quad \frac{-r}{1} \quad \frac{-r}{1}$

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

ب) $-1 \leq \sqrt{a-rx} \leq 1 \quad ()^r \quad 0 \leq a-rx \leq 1 \rightsquigarrow -a \leq -rx \leq -r \rightsquigarrow \frac{x}{r} \geq \frac{r}{r}$

$r \leq x \leq r \rightsquigarrow D_f = [r, r]$

⑦ الف) $y = \log_r \left(\frac{1 - \log_r x}{r} \right) \rightsquigarrow \begin{cases} x > 0 \\ 1 - \log_r x > 0 \quad \log_r x < 1 \rightsquigarrow x < r \\ 0 < x < r \quad \text{بـ} \quad (0, r) \end{cases}$

ب) $y = \log_r \left(\frac{1 - \log_r \frac{x}{r}}{\frac{1}{r}} \right) \rightsquigarrow \begin{cases} x > 0 \\ 1 - \log_r \frac{x}{r} > 0 \rightsquigarrow \log_r \frac{x}{r} < 1 \rightsquigarrow \frac{x}{r} < r \rightsquigarrow x < r^2 \\ \left(\frac{1}{r}, +\infty \right) \end{cases}$

⑧ الف) $\sqrt{\frac{rx-x}{r}} \geq 0 \rightsquigarrow \frac{rx-x}{r} \geq 0 \rightsquigarrow \frac{x(r-1)}{r} \geq 0 \rightsquigarrow x(r-1) \geq 0 \rightsquigarrow x \geq 0 \rightsquigarrow D_f = [0, r]$

ب) $\frac{rx+w}{rx+r} \in W \rightsquigarrow rx+w \in rxW + rW \rightsquigarrow rx - rxW \in rW - w \rightsquigarrow x(r-rW) \in rW - w$

$x \in \frac{rW-w}{r-rW} \rightsquigarrow \left\{ x \mid x = \frac{rW-w}{r-rW}, r \in W \right\}$