

الف)  $x^3 - 10x^2 + 31x - 15 \neq 0 \rightarrow (2x-5)(2x-3)(x-1) \rightarrow R - \left\{ \frac{5}{2}, \frac{3}{2}, 1 \right\}$

ب)  $3x^3 - x^2 - 11x - 4 \rightarrow (x+1)(3x^2 - 4x - 4) \rightarrow R - \left\{ 2, -1, -\frac{2}{3} \right\}$

الف)  $\sqrt{3-2x} \geq 0 \rightarrow 3-2x \geq 0 \rightarrow 3 \geq 2x \rightarrow x \leq \frac{3}{2} \left\{ D_f = x \leq \frac{3}{2} \right\}$   
 $x - \sqrt{3-2x} \neq 0 \rightarrow x \neq \sqrt{3-2x} \rightarrow x^2 \neq 3-2x \rightarrow x \neq 1$

ب)  $\sqrt{3x-2} \geq 0 \rightarrow 3x-2 \geq 0 \rightarrow 3x \geq 2 \rightarrow x \geq \frac{2}{3} \left\{ D_f = x \geq \frac{2}{3} \right\}$   
 $x - \sqrt{3x-2} \neq 0 \rightarrow x \neq \sqrt{3x-2} \rightarrow x^2 \neq 3x-2 \rightarrow x \neq 1, 2$

الف)  $2(\cos x - 1) \neq 0 \rightarrow 2\cos x \neq 1 \rightarrow \cos x \neq \frac{1}{2} \rightarrow D_f = R - \left\{ 2k\pi - \frac{\pi}{3}, 2k\pi + \frac{\pi}{3} \right\}$

ب)  $2\sin x + 1 \neq 0 \rightarrow 2\sin x \neq -1 \rightarrow \sin x \neq -\frac{1}{2} \rightarrow D_f = R - \left\{ 2k\pi - \frac{\pi}{6}, 2k\pi + \frac{7\pi}{6} \right\}$

ج)  $\cot = \frac{\cos}{\sin} \rightarrow \cot x \neq 0 \rightarrow \cot x \neq 1 \rightarrow \cos \neq 0 \text{ و } \sin \neq 0 \rightarrow D_f = R - \left\{ \frac{k\pi}{2} + \frac{\pi}{2}, \frac{k\pi}{2} \right\}$

د)  $f \sin^2 x - 3 \neq 0 \rightarrow f \sin^2 x \neq 3 \rightarrow \sin^2 x \neq \frac{3}{f} \rightarrow \sin x \neq \pm \frac{\sqrt{3}}{f} \rightarrow D_f = R - \left\{ k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right\}$

الف)  $x^2 - 5x + 6 > 0 \rightarrow (x-3)(x-2) > 0 \rightarrow \frac{2}{+} \frac{3}{-} \frac{+}{+} \rightarrow D_f = (-\infty, 2) \cup (3, +\infty)$

ب)  $x^2 - 6x + 5 < 0 \rightarrow (x-5)(x-1) < 0 \rightarrow \frac{1}{+} \frac{5}{-} \frac{+}{+} \rightarrow D_f = (1, 5)$

ج)  $x^2 + 6x + 5 > 0 \rightarrow (x+5)(x+1) > 0 \rightarrow \frac{-5}{+} \frac{-1}{-} \frac{+}{+} \rightarrow D_f = (-\infty, -5] \cup [-1, +\infty)$

د)  $x^2 - 7x + 6 \leq 0 \rightarrow (x-6)(x-1) \leq 0 \rightarrow \frac{1}{+} \frac{6}{-} \frac{+}{+} \rightarrow D_f = [1, 6]$

الف)  $\frac{x^2 - 3x + 2}{x-5} < 0 \rightarrow \frac{(x-1)(x-2)}{x-5} < 0 \rightarrow \frac{1}{+} \frac{2}{+} \frac{5}{-} \frac{+}{+} \rightarrow D_f = (-\infty, 1) \cup (2, 5)$

ب)  $\frac{x^2 - 1}{x^2 - 6x + 5} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-5)(x+1)} \geq 0 \rightarrow \frac{-1}{+} \frac{1}{-} \frac{5}{-} \frac{+}{+} \rightarrow D_f = (-\infty, -1] \cup (5, +\infty)$



$$\sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \geq 0 \quad \frac{(x-3)(x-1)}{x^2-1} \quad \frac{1}{-1} \frac{3}{-1} \rightarrow D_f = [3, +\infty)$$

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$$\sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \quad D_f = \mathbb{R} - \{-1, 1\} \quad \text{ب) } x \neq 1 \rightarrow x^2 \neq 1 \rightarrow x^2 - 1 \neq 0 \rightarrow \text{فقط خارج نباید باشد}$$

$$x^2 - 3x > 0 \rightarrow \frac{0}{+1} \frac{3}{-1} \rightarrow (-\infty, 0) \cup (3, +\infty) \quad \text{الف)}$$

$$4 - x^2 > 0 \rightarrow (4+x)(4-x) > 0 \quad \frac{-4}{+1} \frac{4}{-1} \rightarrow (-4, 4) \quad \text{ب)}$$

$$|x| > 2 \rightarrow x > 2, x < -2 \rightarrow |x| - 2 = 1 \rightarrow |x| \neq 3 \rightarrow x \neq 3, x \neq -3$$

$$D_f = (-\infty, -2) \cup (3, +\infty) - \{3, -3\}$$

قسمت ج پایین معنی

$$\frac{x^2 - x}{x^2 + x} \rightarrow \frac{1}{+1} \frac{0}{-1} \frac{1}{+1} \quad \text{روشن سریع}$$

(روشن آبی آبی)

|                           |   |   |   |
|---------------------------|---|---|---|
|                           | - | 0 | + |
| $\frac{x^2 - x}{x^2 + x}$ | + | 0 | - |
| $\frac{x^2 + x}{(x)}$     | + | - | + |
| $(x)$                     | + | - | + |

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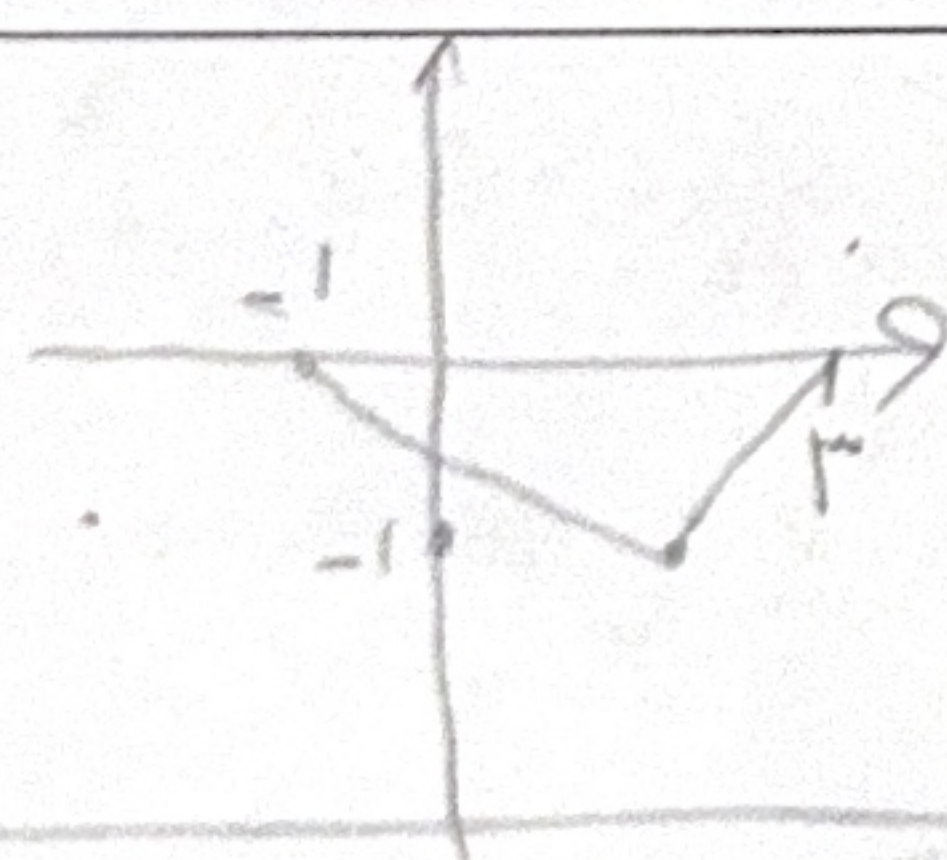
$$\frac{x - f(x)}{f(x)} \rightarrow \frac{-2}{+1} \frac{1}{-1} \frac{2}{+1} \frac{3}{-1} \rightarrow (-\infty, -2) \cup [1, 2) \cup [3, +\infty)$$

$$x^2 - 11x + 28 \rightarrow (x-7)(x-4) \quad \frac{4}{+1} \frac{7}{-1}$$

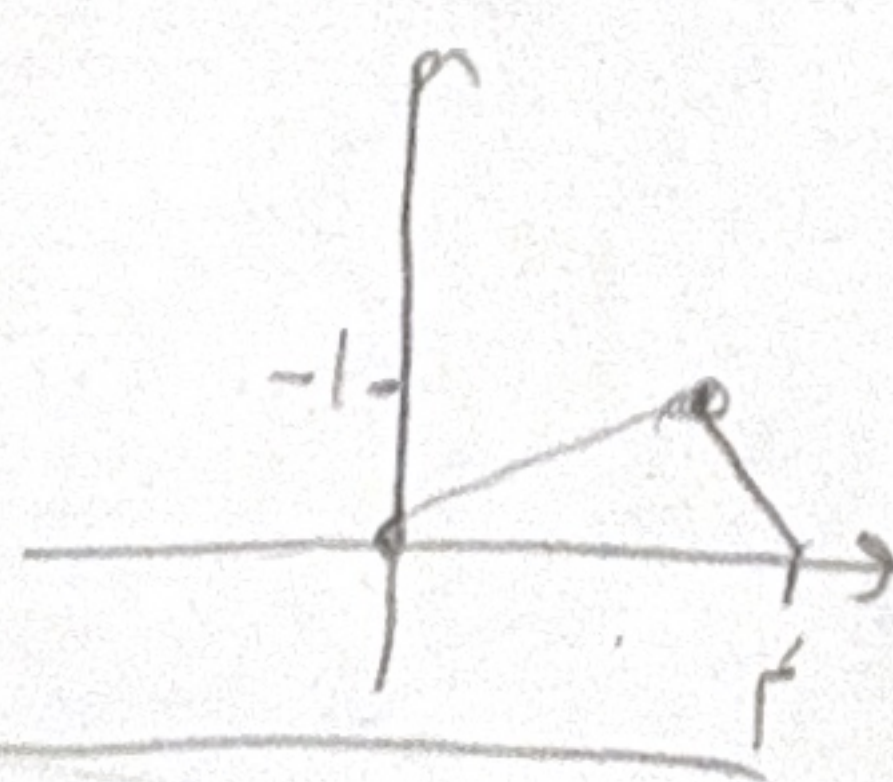
$$x \neq 1, x > 0, 4 - x^2 > 0 \rightarrow 4 > x > -4 \rightarrow D_f = (0, 4] - \{1\}$$

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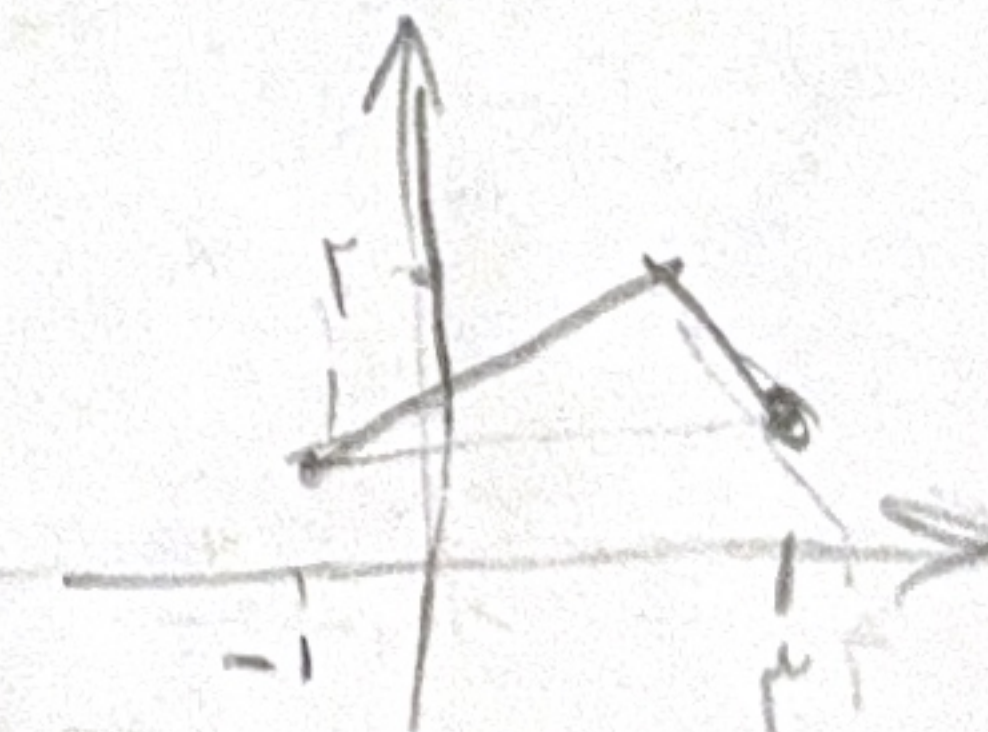
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(ج)



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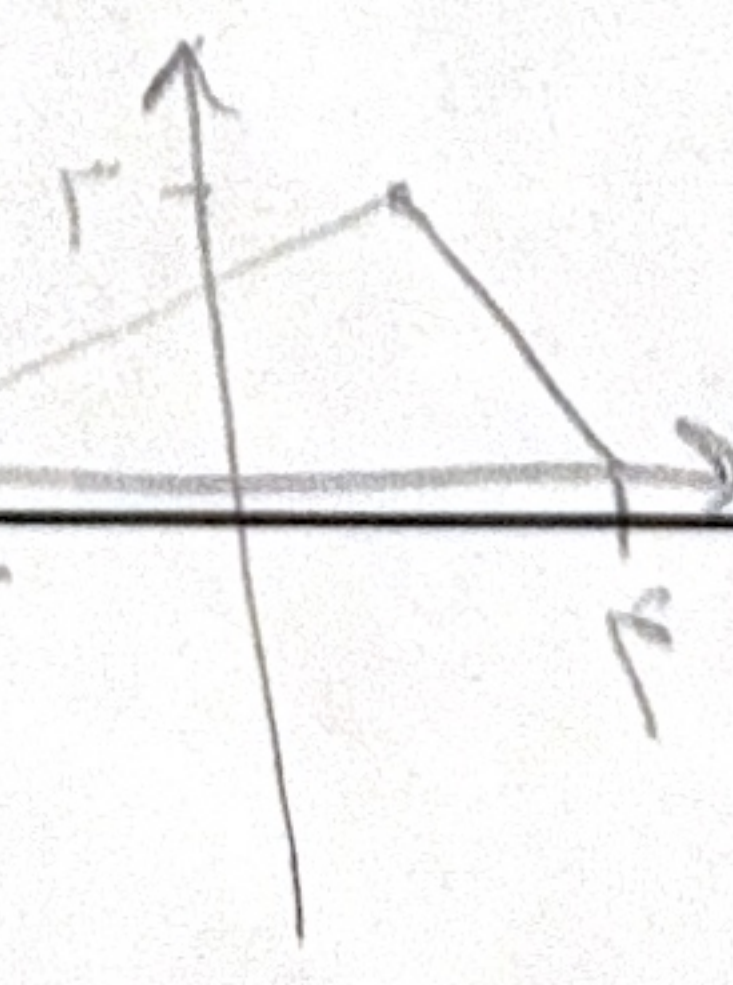
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$$10 - x \neq 1 \rightarrow x \neq 9$$

$$10 - x > 0 \rightarrow 10 > x \quad P_f = [4, 10) - \{9\}$$

$$\frac{x^2 - 7x + 12}{x - 2} \rightarrow \frac{(x-3)(x-4)}{x-3}$$

$$\frac{4}{-1} \frac{3}{+1}$$



(د)