

الف) $2x^3 - 20x^2 + 31x - 15 \neq 0$

$$\frac{2x^3 - 20x^2 + 31x - 15}{2x^3 - 20x^2} = \frac{x-1}{2x^2 - 14x + 15}$$

$$\frac{-14x^2 + 31x - 15}{-14x^2 + 14x} = \frac{(x-1)(x-10)(x-6)}{15x - 15}$$

$$D = \mathbb{R} - \left\{ 1, \frac{10}{3}, \frac{6}{5} \right\}$$

ب) $x^3 - x^2 - 11x - 6 \neq 0$

$$\frac{x^3 - x^2 - 11x - 6}{x^3 - x^2} = \frac{x-1}{x^2 - 11x - 6}$$

$$\frac{-11x - 6}{-11x - 6} = \frac{(x+1)(x-4)}{(x+2)}$$

$$D = \mathbb{R} - \left\{ -1, \frac{4}{3}, \frac{-2}{3} \right\}$$

الف) $x^2 - 2x + 1 \neq 0$

$$x^2 - 2x + 1 = (x-1)^2 \neq 0$$

$$x \neq 1$$

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الف) $x \cos x - 1 \neq 0$

$$\cos x \neq \frac{1}{x}$$

ب) $x \sin x + 1 \neq 0$

$$\sin x \neq -\frac{1}{x}$$

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الف) $x(x-1)(x-2) > 0$

ب) $(x-1)(x-2) < 0$

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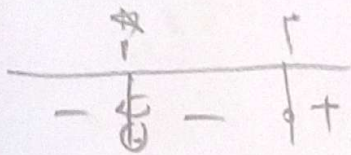
الف) $\frac{(x-1)(x-2)}{x-3} < 0$

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

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الف) $\frac{(n-1)(n-3)}{(n-1)(n^2+n+1)}$



$D_f = [3, +\infty)$

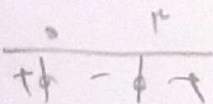
ب)

$D = \mathbb{R} - \{\pm 1\}$

$(x+1)(x-1) \neq 0$

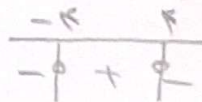
الف) $x^2 - 3x > 0$

$x(x-3) > 0$



$D = (-\infty, 0) \cup (3, +\infty)$

ب) $(x-m)(x+n) > 0$



$|m| > 2, |n| > 2$

$|m| > 2, |n| \neq 2$

$m > 2, n \neq \pm 2$

$m < -2, n \neq \pm 2$

$D = \{(-\infty, -m) \cup (n, \infty)\} - \{\pm 2\}$

ج) $\frac{(x-1)(x-2)}{x-3} > 0$

$1 < m < 0, 1 < n < 1, 9 \neq x$

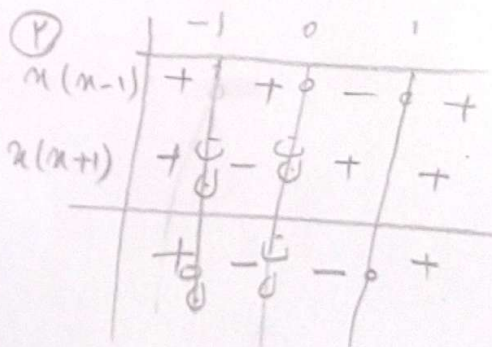
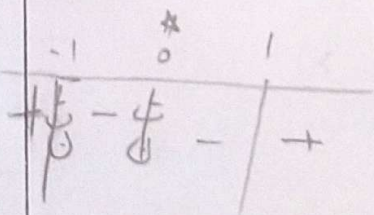
$D = (1, 9) - \{9\}$

$> (x-v)(x-u) > 0$

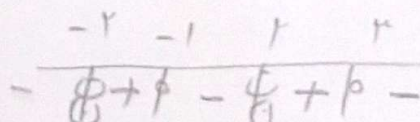
$(v-x)(x+u) > 0$

$m > 0, m \neq 1, D = (-\infty, v] \cup (u, \infty) - \{1\}$

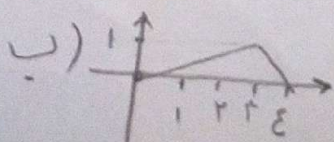
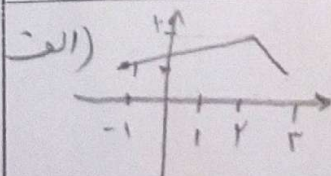
① $\frac{x(x-1)}{x(x+1)}$



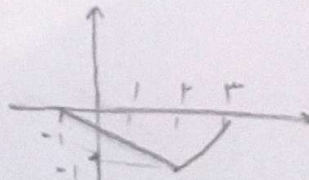
$y = \sqrt{\frac{x-f(x)}{f(x)}} \rightarrow -1, 3$



$D = (-2, -1] \cup (1, 3]$



ج)



د)

