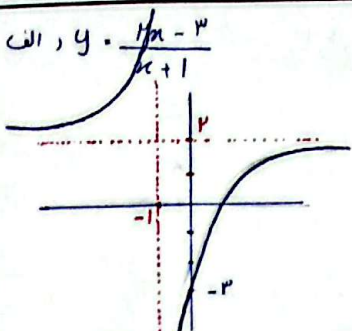
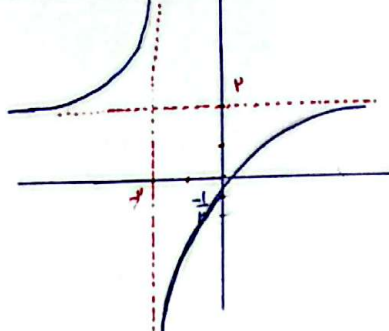
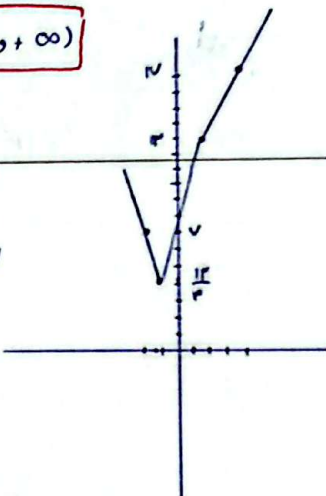


الف	$y = x^3 - 3x^2 + 3x - 1 + 1 = (x-1)^3 + 1 \rightarrow y-1 = (x-1)^3 \rightarrow \sqrt[3]{y-1} + 1 = x$ $\hookrightarrow y = \mathbb{R}$	۱
ب	$y = \frac{1}{x^2 - 2x} \rightarrow yx^2 - 2yx - 1 = 0 \rightarrow \Delta \geq 0 \rightarrow 4y^2 + 4 \geq 0$ $\frac{-1}{+1-1+}$ $y = (-\infty, -1] \cup [0, +\infty)$	
الف	$x^2 - 4x + 10 \rightarrow \min = -\frac{b}{2a} = 2 \rightarrow \text{if } x = 2 \rightarrow y = 4 \rightarrow y = [4, +\infty)$	۲
ب	$y = -x^2 + 4x + 3 \rightarrow \max = -\frac{b}{2a} = 3 \rightarrow \text{if } x = 3 \rightarrow y = 12 \rightarrow y = (-\infty, 12]$	
ج	$y = \sqrt{x^2 - 4x - 3} \rightarrow \min = -\frac{b}{2a} = 2 \rightarrow \text{if } x = 2 \rightarrow y = -5 \rightarrow y = [0, +\infty)$	
د	$y = \sqrt{4x - x^2} \rightarrow \max = -\frac{b}{2a} = 3 \rightarrow \text{if } x = 3 \rightarrow y = 9 \rightarrow y = [0, 3]$	
الف	$y = x^3 - 5x^2 + 2x + 1 \rightarrow y = \mathbb{R}$	۳
ب	$y = x^4 - 4x^3 + 3x^2 + 2 \rightarrow y = \mathbb{R}$	
ج	$y = \sqrt{x^4 - 4x^3 + 5x^2 + 1} = \sqrt{1\mathbb{R}} = y = [0, +\infty)$	
د	$y = (x^5 - 4x^3 + 3x + 1)^2 = (1\mathbb{R})^2 = y = [0, +\infty)$	
الف	$y = \frac{3x+1}{x-2} \rightarrow y = \mathbb{R} - \{\frac{a}{c}\} = y = \mathbb{R} - \{3\}$	۴
ب	$y = \frac{2x+1}{x+1} \rightarrow y = \mathbb{R} - \{2\}$	
الف	$y = \sqrt{\frac{2x+5}{x+1}} \rightarrow y = \sqrt{\mathbb{R} - \{2\}} \rightarrow y = [0, +\infty) - \{\sqrt{2}\}$	۵
ب	$y = \sqrt{\frac{2x+1}{2-x}} \rightarrow y = \sqrt{\mathbb{R} - \{2\}} \rightarrow y = [0, +\infty)$	

الف , $y = \frac{1}{x-1} - \frac{1}{x+1}$ 	ب , $y = \frac{1}{x+1}$ 	6	
الف , $y = \sin x + \frac{1}{\sin x} \rightarrow y = (-\infty, -1] \cup [1, +\infty)$ ب , $y = \frac{x^2+1}{x^2} = 1 + \frac{1}{x^2} \rightarrow y = (-\infty, -1] \cup [1, +\infty)$ ج , $y = \frac{\sqrt{x^2+1}}{\sqrt{x}} = \sqrt{1 + \frac{1}{x}} \rightarrow y = (-\infty, -1] \cup [1, +\infty)$ د , $y = \sqrt{x} + \frac{1}{\sqrt{x}} \rightarrow y = [1, +\infty)$		7	
الف , $y = x^2 + \frac{1}{x^2} + 3 - 3 = [\frac{1}{x^2}, +\infty) - 3 = [\frac{1}{x^2}, +\infty) = y$ if $x \rightarrow 0 \rightarrow \frac{1}{x^2} \rightarrow +\infty$ ب , $\frac{x^2+1}{\sqrt{x^2+1}} = \sqrt{x^2+1} + \frac{1}{\sqrt{x^2+1}} \rightarrow y = [\frac{1}{\sqrt{2}}, +\infty)$			8
$y = x-1 + x+1$ Graph showing the function is V-shaped with a minimum at (0, 2).			9
الف , $y = x-1 - x+1$ Graph showing the function is V-shaped with a minimum at (0, -2). $y = [-2, +\infty)$		الف , $y = x-1 + x+1$ Graph showing the function is V-shaped with a minimum at (0, 2). $y = [2, +\infty)$	10