یازدهم دهم C

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Date No

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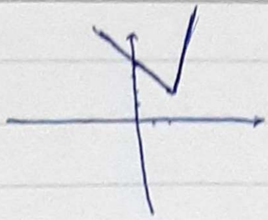
الف) $y = x + |2x - 4|$

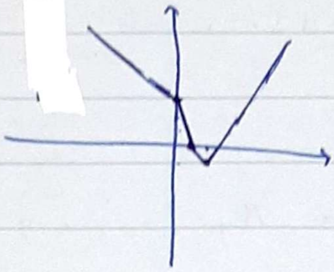


$\rightarrow R_f = [2, +\infty)$

$$\begin{cases} 3x-4 & ; x \geq 2 \\ -x+4 & ; x \leq 2 \end{cases}$$

ب) $y = |x-2| + |x-1| - |x|$

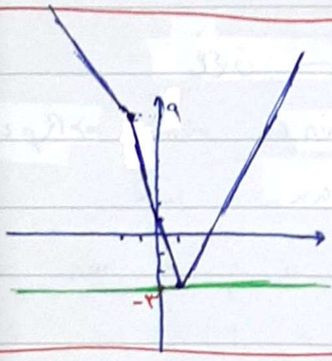
$$\begin{cases} -x+3 & ; x \leq 0 \\ -3x+3 & ; 0 \leq x \leq 1 \\ -x+1 & ; 1 \leq x \leq 2 \\ x-3 & ; 2 \leq x \end{cases}$$



$\Rightarrow R_f = [-1, +\infty)$

۲- $\overbrace{|3x-3| - |x+2|}^{A} = k$

$$\begin{cases} -2x+5 & ; x \leq -2 \\ -4x+1 & ; -2 \leq x \leq 1 \\ 2x-5 & ; 1 \leq x \end{cases}$$

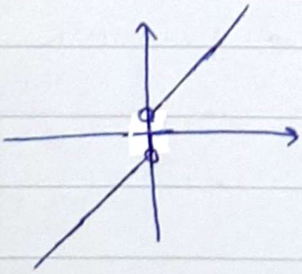


چون $A = k$ یک ریشه دارد ← خط $y = k$ بر نمودار مماس

$\rightarrow k = -3$

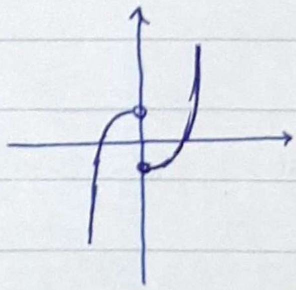
۳- الف) $y = x + \frac{x}{|x|}$

$x \neq 0 \begin{cases} x+1 & ; x > 0 \\ x-1 & ; x < 0 \end{cases}$



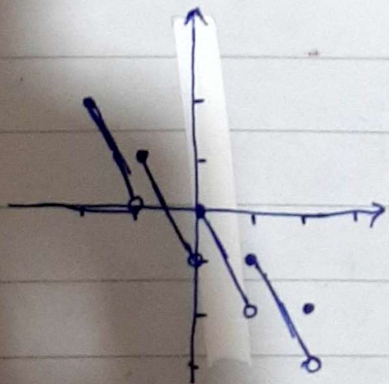
ب) $y = x|x| - \frac{x}{|x|}$

$x \neq 0 \begin{cases} x^2-1 & ; x > 0 \\ -x^2+1 & ; x < 0 \end{cases}$

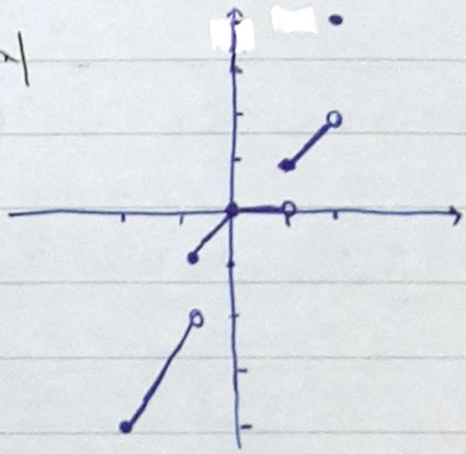


۴- الف) $y = [x] - 2x$

$[-2, 2]$



ب) $y = [x]|x|$



۵- الف) $y = 3x - [3x] \Rightarrow R_f = [0, 1)$

ب) $y = 4x - 4[x] \Rightarrow y = 4(x - [x]) \Rightarrow R_f = [0, 4)$

ج) $y = x - a\left[\frac{x}{a}\right] \Rightarrow y = a\left(\frac{x}{a} - \left[\frac{x}{a}\right]\right) \Rightarrow R_f = [0, a)$

د) $y = [3x] - 3x \Rightarrow y = -1 \times [3x] \Rightarrow R_f = (-1, 0]$

۶- الف) $y = 3\sin x + 2\cos x \Rightarrow R_f = [-\sqrt{13}, \sqrt{13}]$

ب) $y = 4\sin x - 3\cos x \Rightarrow R_f = [-5, 5]$

ج) $y = \left[\underbrace{2\sin x + 4\cos x}_{A}\right] \Rightarrow -\sqrt{29} \leq A \leq \sqrt{29} \Rightarrow R_f = \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$

د) $y = \sqrt{\cos x - 2\sin x}$

$-\sqrt{5} \leq \cos x - 2\sin x \leq \sqrt{5} \Rightarrow R_y = [0, \sqrt[4]{5}]$

۷- الف) $y = \sin^2 x + 3\sin x + 2$

$\sin x = -\frac{3}{2} \Rightarrow$ غ ق ق

$\sin x = -1 \Rightarrow y = 0$ min $\Rightarrow R_f = [0, 6]$

$\sin x = 1 \Rightarrow y = 6$ max

ب) $y = 3\sin^2 x + 3\sin x + 2$

$\sin x = -\frac{3}{4} \Rightarrow y = \frac{7}{8}$ min

$\sin x = -1 \Rightarrow y = 1$

$\sin x = 1 \Rightarrow y = 7$ max

$\Rightarrow R_f = \left[\frac{7}{8}, 7\right]$

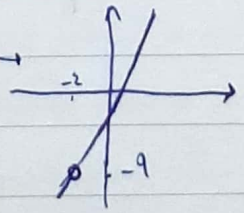
۸- الف) $y = \sin^2 x + 4\cos^2 x = \underbrace{3\cos^2 x}_{[0,3]} + 1 \Rightarrow R_f = [1, 4]$

ب) $y = \frac{2\cot x}{1 + \cot^2 x} = \frac{2\cos x}{\sin x} \times \sin^2 x = 2\cos x \sin x = 2 \times \frac{1}{2} \times \sin 2x \Rightarrow R_f = [-1, 1]$

۹- الف) $y = \sin^6 x + \cos^6 x \rightarrow R_f = \left[\frac{1}{4}, 1\right]$

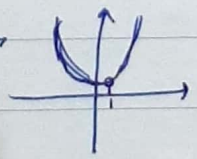
ب) $y = [\sin^8 x + \cos^8 x] \rightarrow \underbrace{1^{\frac{1}{8}}}_{1} \leq \sqrt[8]{\sin^8 x + \cos^8 x} \leq 1 \Rightarrow R_f = \{0, 1\}$

۱۰- الف) $y = \frac{3x^2 + 7x - 6}{x + 3} = \frac{(3x - 2)(x + 3)}{(x + 3)} = 3x - 2$



$\Rightarrow R_f = \mathbb{R} - \{-9\}$

ب) $y = \frac{x^3 - 1}{x - 1} = \frac{(x^2 + x + 1)(x - 1)}{(x - 1)} = x^2 + x + 1$



$\rightarrow R_f = \mathbb{R}$