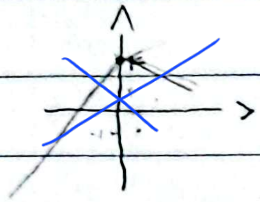
حسین طاهر

11,5

1) الف = $y = x + |2x - 4|$

$$y = \begin{cases} x + 2x - 4 \to x \geq 2 \Rightarrow 3x - 4 \\ 4 \to x = 0 \\ x - 2x + 4 \to x < 2 \Rightarrow -x + 4 \end{cases} \Rightarrow R_f = R$$

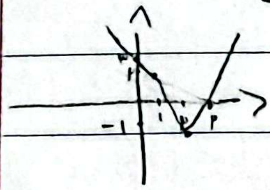
$R = [2, +\infty)$



1

ب = $y = |x - 2| + |x - 1| - |x|$

$$y = \begin{cases} x - 2 + x - 1 - x & x > 2 \Rightarrow x - 3 \\ -x + 2 + x - 1 - x & 1 \leq x < 2 \Rightarrow -x + 1 \\ & 0 \leq x < 1 \Rightarrow -3x + 3 \\ -x + 2 - x + 1 + x & x < 0 \Rightarrow -x + 3 \end{cases} \quad R_f = R$$



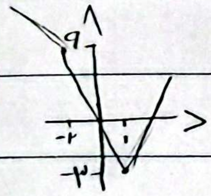
$R = [-1, +\infty)$

2) $x < -2 \to$ عبارت منفی

$k = -3$ ← معادله ۲ جواب دارد

$|3x - 3| = -(3x - 3) = -3x + 3, \; |x + 2| = -(x + 2) = \dots$

$f(x) = -3x + 3 - (-x - 2) = -2x + 5$



$-2 \leq x < 1 \Rightarrow -3x + 3 - (x + 2) = -4x + 1$

$x \geq 1 \Rightarrow$ عبارت مثبت

$3x - 3 - (x + 2) = 2x - 5$

2

3) الف = $x + \dfrac{x}{|x|}$

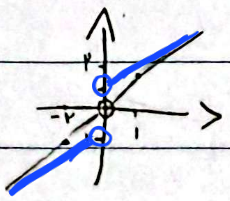
$|x| = x \Rightarrow \dfrac{x}{|x|} = \dfrac{x}{x} = 1 \quad \Leftarrow x > 0$

$y = x + 1$

$|x| = -x \Rightarrow \dfrac{x}{|x|} = \dfrac{x}{-x} = -1 \quad x < 0$ if

$y = x - 1$

1



if $x = 0$ تن

SEVIL

حسین مرادی

۵) الف = $3x - [3x]$ $R_f = [0, 1)$ ۱,۵

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

ج = $x - 5\left[\frac{x}{5}\right] =$ ~~$R_f = R$~~ $[0, 5)$

د = $[2x] - 2x = R_f = (-1, 0]$

۶) الف = $\frac{3\sin x + 2\cos x}{\sqrt{9+4}}$ $= [-\sqrt{13}, \sqrt{13}]$ ۰,۵

ب = $[-5, 5]$

ج = $\left[\left[-\sqrt{7}, \sqrt{7}\right]\right]$ $-3, -2, -1, 0, 1, 2$ و $\{-6, -5, \dots, 5\}$

$\frac{17}{4}$ $-\frac{9}{4} + 2 + \frac{3}{2}$

د = $[0, \sqrt{5}]$ $\frac{9}{4} + \frac{9 \times 2}{3 \times 2} + 2$

۷) الف = $\sin x = \frac{-b}{2a} = \frac{-3}{2}$ $f\left(-\frac{3}{2}\right) = -\frac{5}{4}$ غلط

$\sin x = 1 \Rightarrow 6$ max $[-\frac{5}{4}, 6]$ ~~$-\frac{5}{4}$~~ 0

۱ $1 - 3 + 2 \Leftarrow \sin x = -1 \Rightarrow 0$

ب = $\sin x = \frac{-b}{2a} = \frac{-3}{4}$ $f\left(-\frac{3}{4}\right)$

$\sin x = 1 \Rightarrow$ ~~9~~ $\Rightarrow$ max $[\frac{7}{8}, 9]$

$\sin x = -1 \Rightarrow 0$

۸) الف = $y = \sin^2 x + 4\cos^2 x$

۱,۵ $1 + 3\cos^2 x \Rightarrow [1, 4]$

$[0, 3]$

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

SEVIL

حمیق سردلری

۹) الف = $\frac{1}{4} \le \sin^4 x + \cos^4 x \le 1$ $[\frac{1}{4}, 1]$ (۲)

ب = $2^{-3} = \frac{1}{8} \le \sin^8 x + \cos^8 x \le 1$ $[\sin^8 x + \cos^8 x] = \{0, 1\} \Rightarrow$

$R_f = \{0, 1\}$

۱۵) الف = $R = \mathbb{R} - \{-9\}$ (۵) ×

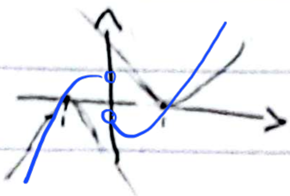
ب × $R = [\frac{3}{4}, +\infty)$

۳) ب = $y = x|x| - \frac{x}{|x|}$

if $x > 0 \Rightarrow |x| = x , \frac{x}{|x|} = 1 \Rightarrow y = x^2 - 1$

if $x < 0 \Rightarrow |x| = -x , \frac{x}{|x|} = -1 \Rightarrow y = -x^2 + 1$

$x = 0 \Rightarrow$ ن =

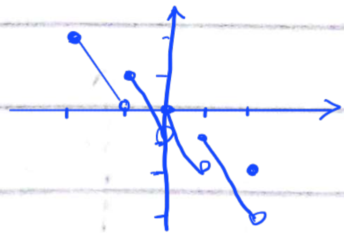


۴) الف (۱) = if $[x] = -2$ $-2 \le x < -1$ $y = -2 - 2x$

if $[x] = -1$ $-1 \le x$ $y = -1 - 2x$

if $[x] = 0$ $0 \le x < 1$ $y = -2x$

if $[x] = 1$ $1 \le x \le 2$ $y = 1 - 2x$



ب = if $[x] = -2$ $-2 \le x < -1$ $y = -2|x| = -2(-x) = 2x$

if $[x] = -1$ $-1 \le x < 0$ $y = -1|x| = -1(-x) = x$

if $[x] = 0$ $0 \le x < 1$ $y = 0$

if $[x] = 1$ $1 \le x \le 2$ $y = |x| = x$