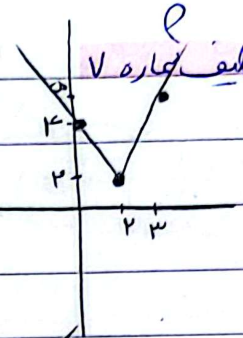
تکلیف شماره ۷ — دنیا جمشیدی — پایه یازدهم تجربی



(۱)

الف) $y = x + |2x - 4|$

$x < 2 \rightarrow x + 4 - 2x = 4 - x$ $\quad \rightarrow 2$

$x \geq 2 \rightarrow x + 2x - 4 = 3x - 4$

$R_f = [2, +\infty)$

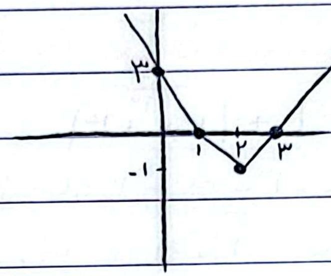
ب) $y = |x - 2| + |x - 1| - |x|$

$x = 0 \rightarrow 3$

$x = 1 \rightarrow 0$

$x = 2 \rightarrow -1$

$x = 3 \rightarrow 0$



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

(۲)

$|3x - 3| - |x + 2| = k$

$x < -2 \rightarrow 3 - 3x - (-x - 2) = 5 - 2x = k$

$-2 < x < 1 \rightarrow 3 - 3x - x - 2 = 1 - 4x = k$

$x > 1 \rightarrow 3x - 3 - x - 2 = 2x - 5 = k$

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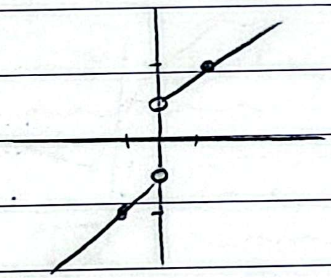
(۳)

الف) $y = x + \frac{x}{|x|}$

$x < 0 \rightarrow y = x - 1$

$x > 0 \rightarrow y = x + 1$

$D_f = \mathbb{R} - \{0\}$

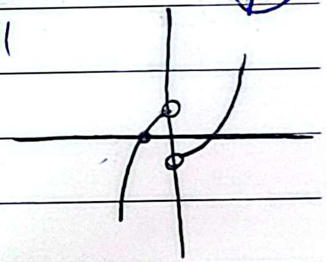


ب) $y = x|x| - \frac{x}{|x|}$

$x < 0 \rightarrow 1 - x^2$

$x > 0 \rightarrow x^2 - 1$

$D_f = \mathbb{R} - \{0\}$



s.a.m

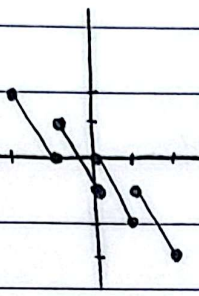
الف) $y = [x] - 2x$

$-2 \le x < -1 \rightarrow -2x - 2$

$-1 \le x < 0 \rightarrow -2x - 1$

$0 \le x < 1 \rightarrow -2x$

$1 \le x < 2 \rightarrow 1 - 2x$



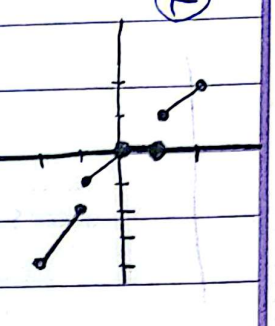
ب) $y = [x]\,|x|$

$-2 \le x < -1 \rightarrow 2x$

$-1 \le x < 0 \rightarrow x$

$0 \le x < 1 \rightarrow 0$

$1 \le x < 2 \rightarrow x$



④

⑤

الف) $3x - [3x] \rightarrow Rf = [0, 1)$

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

ج) $y = x - 5\left[\frac{x}{5}\right] = 5\left(\frac{x}{5} - \left[\frac{x}{5}\right]\right) \Rightarrow Rf = [0, 5)$

د) $y = [2x] - 2x \quad 0 \le 2x - [2x] < 1 \quad 0 \ge [2x] - 2x > -1$

$Rf = (-1, 0]$

⑥

الف) $-\sqrt{13} \le 3\sin x + 2\cos x \le \sqrt{13}$

$Rf = [-\sqrt{13}, \sqrt{13}]$

ب) $-\sqrt{25} \le 4\sin x - 3\cos x \le \sqrt{25}$

$Rf = [-5, 5]$

s.a.m

ج) $y = [3\sin x + 4\cos x]$

$-\sqrt{3^2+4^2} \leq 3\sin x + 4\cos x \leq \sqrt{3^2+4^2}$

$\sqrt{3^2+4^2} \simeq 4/0$ $\quad Rf = \{-4, -3, -2, -1, \dots 4\}$

ح) $\sqrt{\cos x - 3\sin x}$

$-\sqrt{4} \leq \cos x - 3\sin x \leq \sqrt{4}$ $\quad Rf = [0, \sqrt[4]{4}]$

(۷)

الف) $y = \sin^2 x + 3\sin x + 2$

↑ → 4

↓ → 0

$\frac{-b}{2a} = \frac{-3}{2} \to -\frac{1}{4}$

$Rf = [-\frac{1}{4}, 4]$

ب) $y = 3\sin^2 x + 3\sin x + 2$

↑ → 7

↓ → 1

$\frac{-b}{2a} = -\frac{3}{4} \to \frac{7}{8}$

$Rf = [\frac{7}{8}, 7]$

(۸)

الف) $y = \sin^2 x + \underbrace{4\cos^2 x}_{4(1-\sin^2 x)} \Rightarrow \sin^2 x + 4 - 4\sin^2 x = 4 - 3\sin^2 x$

$Rf = [1, 4]$

ب) $y = \frac{2\cot x}{1+\cot^2 x} = \frac{2\cot x}{\frac{1}{\sin^2 x}} = \frac{2\cot x}{1} \times \sin^2 x = 2\sin\cos = \sin 2x$ s.a.m

$Rf = [-1, 1]$

⑨

الف) $y = \sin^6 x + \cos^6 x$, $\frac{1}{4} \le \sin^6 x + \cos^6 x \le 1$ $K = 3$

$R_f = [\frac{1}{4}, 1]$

ب) $y = [\sin^8 x + \cos^8 x]$ $K = 4$

$\frac{1}{8} \le \sin^8 + \cos^8 \le 1$

$R_f = \{0, 1\}$

⑩

الف) $y = \frac{2x^2 + 7x - 4}{x + 4}$

$2x^2 + 7x - 4 = yx + 4y$

$2x^2 + (7 - y)x - 4y - 4 = 0$

$\Delta = 49 + y^2 - 14y - 8(-4y - 4)$

$y^2 + 49 - 14y + 32y + 32 = y^2 + 18y + 81 \ge 0$

$(y + 9)^2 \ge 0$ همواره برقرار $\Leftarrow R_f = \mathbb{R}$

ب) $y = \frac{x^3 - 1}{x - 1} = \frac{(x-1)(x^2 + x + 1)}{(x-1)}$ $\rightarrow y_{min} = \frac{-\Delta}{4a} = \frac{3}{4}$ $x \ne 1$

$\Delta = 1 - 4 = -3$ $R_f = [\frac{3}{4}, +\infty) - \{3\}$

s.a.m