حنیف صفدریان ۱۷٫۲۵

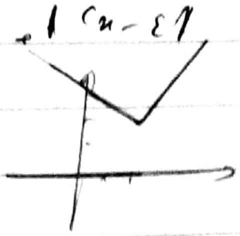
۱- الف) $y = x + |2x - 4|$

۳

$\overset{2}{\overline{\quad\quad\quad|\quad\quad\quad}}$

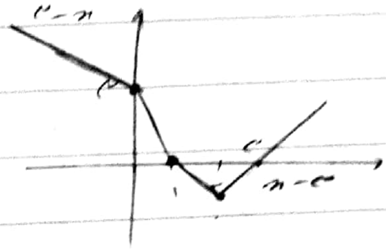
$4 - x \qquad x + 2x - 4$

$1\frac{2}{3} \qquad 3x - 4$



$R_f = [2, +\infty)$

ب) $|x - 2| + |x - 1| - |x| =$



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

۲- ۱

$(|3x - 3| - |x + 2|)^2 = k^2$

$(3x - 3)^2 + (x + 2)^2 - 2(3x - 3)(x + 2) = 9x^2 + 9 - 18x + x^2 + 4 + 4x$

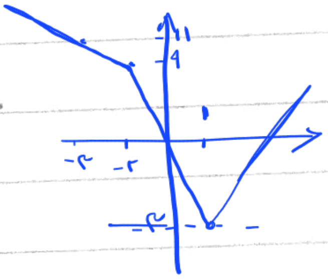
$- 6x^2 - 12x + 6x + 12 = 4x^2 - 20x + 25 = k^2$

$((2x - 5))^2 = k^2$

[illegible]

$k = 2x - 5$ یا $x = 5 - 2x$

$k = -3$

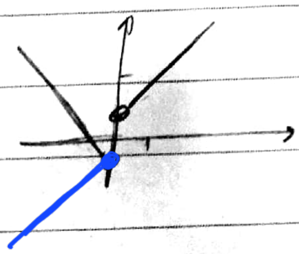


۳- ۱٫۷۵

الف) $y = x + \frac{x}{|x|}$

$\overset{0}{\overline{\quad\quad|\quad\quad}}$

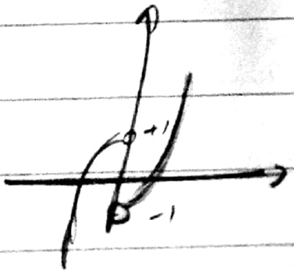
$x - 1 \qquad x + 1$



ب) $y = x|x| - \frac{x}{|x|}$

$\overset{0}{\overline{\quad\quad|\quad\quad}}$

$-x^2 + 1 \qquad x^2 - 1$



[illegible]

۴-

الف) $y = [x] - 2x$

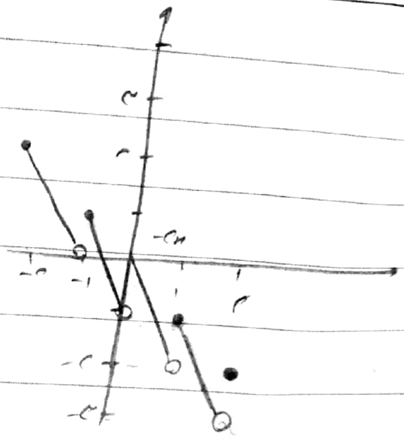
$0 \le x < 1 \quad y = -2x$

$1 \le x < 2 \quad y = 1 - 2x$

$x = 2 \quad y = 2 - 2x$

$-1 \le x < 0 \quad y = -2x - 1$

$-2 \le x < -1 \quad y = -2x - 2$



ب) $y = x[x]$

$0 \le x < 1 \to y = 0$

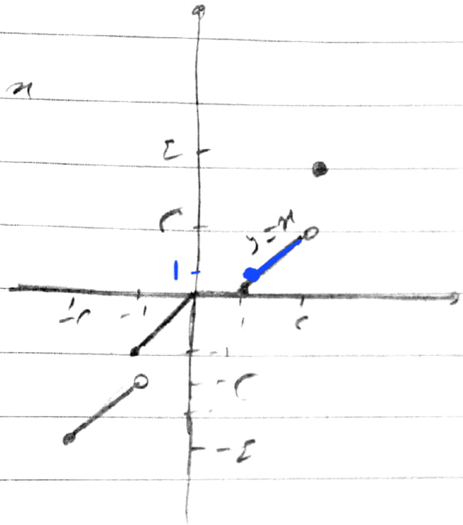
$1 \le x < 2 \to y = x$

$x = 2 \to y = 2x$

و

$-1 \le x < 0 \to y = x$

$-2 \le x < -1 \to y = 2x$



۱,۷۵

۵-

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

۲

ب) $y = 4x - 4[x] \qquad R_f = [0,4)$

$4(x - [x])$

$0 \le x - [x] < 1 \xrightarrow{\times 4} 0 \le 4(x - [x]) < 4$

ج) $y = x - 5[\frac{x}{5}] \to y = 5(\frac{x}{5} - [\frac{x}{5}])$

$0 \le \frac{x}{5} - [\frac{x}{5}] < 1 \xrightarrow{\times 5} 0 \le 5(\frac{x}{5} - [\frac{x}{5}]) < 5$

$R_f = [0,5)$

د) $y = [2x] - 2x \qquad R_f = (-1, 0]$

۶-

الف) $y = 3\sin_x + 4\cos_x \qquad -\sqrt{25} \le 3\sin_x + 4\cos_x \le \sqrt{25}$

۲

$-\sqrt{a^2+b^2} \le a\sin_x + b\sin_y \le \sqrt{a^2+b^2} \qquad R_f = [-\sqrt{25}, \sqrt{25}]$

حسین اصغرزادن

۶-

ج) $y = ۴\sin x - ۳\cos x$

$۴\sin x + (-۳)\cos x$

$R_y = [-۵, ۵]$

ه) $y = [۲\sin x + ۵\cos x]$ $R_y = \{-۶, -۵, -۴, -۳, -۲, -۱, ۰, ۱, ۲, ۳, ۴, ۵\}$

$-\sqrt{۲۹} \le ۲\sin x + ۵\cos x \le \sqrt{۲۹} \to [-\sqrt{۲۹}, \sqrt{۲۹}]$

د) $y = \sqrt{\cos x - ۲\sin x} = [۰, \sqrt[۴]{۵}]$

$[-\sqrt{۵}, \sqrt{۵}]$

۷-

الف) $y = \sin^2 x + ۲\sin x + ۳$ $\xrightarrow{۱} ۶$ max

$\xrightarrow{-۱} ۲$ min $R_f = [۲, ۶]$

$\sin x$ تقارن رأس $= \frac{-۲}{۲} = -\frac{b}{۲a}$ [illegible]

(۵)

ب) $y = ۲\sin^2 x + ۳\sin x + ۲$ $\xrightarrow{\sin x = ۱} = ۷$ max

$\xrightarrow{\sin x = -۱} y = ۱$ min

$R_f = [\frac{۷}{۸}, ۷]$

$\sin x = -\frac{b}{۲a} = -\frac{۳}{۴} \to ۲ \times \frac{۹}{۱۶} - \frac{۹}{۴} + ۲ = \frac{۷}{۸}$

۸-

الف) $y = \sin^2 x + ۴\cos^2 x \longrightarrow y = ۳\cos^2 x + ۱ \xrightarrow{-۱}$ min ۴

$\xrightarrow{۱} ۴$

$\underbrace{\sin^2 x + \cos^2 x}_{۱} + ۳\cos^2 x$

$۰ = -\frac{b}{۲a} \to ۱$

(۵)

$R_f = [۱, ۴]$

ب) $y = \frac{۲\cot x}{\underbrace{۱ + \cot^2 x}_{\frac{۱}{\sin^2 x}}} = \frac{\frac{۲\cos x}{\sin x}}{\frac{۱}{\sin^2 x}} = \underbrace{۲\cos x \sin x}_{\frac{۱}{۲}\sin ۲x} = \sin ۲x$

$R_f = [-۱, ۱]$

محاسبه برد

۹- الف) $y = \underbrace{\sin^4 x + \cos^4 x}_{a}$ $= 1-\frac{1}{2}\sin^2 2x$ ≤ 1

$\frac{1}{2} \leq a \leq 1$ $R_f = [\frac{+1}{2}, 1]$ ۱٫۵

ب) $y = [\sin^8 x + \cos^8 x] = \{\cancel{0}\}$

$[\frac{1}{8}, 1]$ $\{0, 1\}$

۱۰- الف) $y = \frac{2x^2+7x-4}{x+4} = \frac{(x+4)\cancel{(x-\frac{1}{2})}^{2x-1}}{(x+4)} = x-\frac{1}{2}$ ۱٫۲۵

$x \notin -4$ $R_y = \mathbb{R} - \{\cancel{-\frac{9}{2}}\}$ -9

ب) $y = \frac{x^3-1}{x-1} = \frac{(x-1)(x^2+x+1)}{(x-1)} = x^2+x+1$ ۰٫۵

رأس $\left| \begin{array}{l} -\frac{b}{2a} = -\frac{1}{2} \\ \frac{3}{4} \end{array} \right.$ $R_f = (-\infty, \frac{3}{4}] - \{\cancel{3}\}$

$x \notin +1$