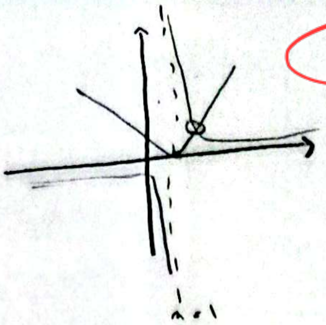
1)

15,75

5

$\frac{1}{x-1} = |x-1|$



$x=1$

2) الف) $\left|\frac{2x-1}{x}\right|<2$ $\qquad -2<\frac{2x-1}{x}<2$ $\qquad \frac{2x-1}{x}<2 \to$

$\frac{-1}{x}<0 \qquad x>0$ I $\qquad 0<\frac{2x-1+2x}{x} \qquad \frac{\cancel{2x}-1-\cancel{2x}}{x}<0$

ب) $\left|\frac{x-2}{2x+1}\right|>1$ $\qquad 0<\frac{4x-1}{x}$ $\qquad$ II $\qquad I\cap II \to x>\frac{1}{4}$

1,75

$\frac{x-2}{2x+1}>1 \to \frac{x-2-2x-1}{2x+1}>0 \to \frac{-x-3}{2x+1}>0$ $\qquad -3 \quad -\frac{1}{2}$

$(-3, -\frac{1}{2})$

$\cup$

$\frac{x-2}{2x+1}<-1$

$\frac{x-2+2x+1}{2x+1} = \frac{3x-1}{2x+1}<0 \to$ $\qquad -\frac{1}{2} \quad \frac{1}{3}$ $\qquad (-\frac{1}{2}, \frac{1}{3})$

$\to (-3, \frac{1}{3}) - \{-\frac{1}{2}\}$

3) $x^2<|x+4| \qquad |x-\alpha|<\beta \qquad \alpha=?$

$x^2<x+4 \to x^2-x-4<0$ $\qquad -\beta<x-\alpha<\beta$

$(x-3)(x+2) \qquad -2<x<3 \qquad -\beta+\alpha<x<\beta+\alpha$

$-x+4<x^2$ $\qquad -\beta+\alpha=-2$

$0<x^2-x-4 \to x^2+x+4<0$ $\qquad \alpha+\beta=3$

$2\alpha=1$

$\beta=\frac{5}{2} \qquad \boxed{\alpha=\frac{1}{2}}$

5

4) $y=|x+1|-|2x|+|x-2|$

min $\to -1$ $\qquad -1+3=2$

$x=0 \to 2x+3 \to 3$ max

صفرها $\begin{cases} x=-1 \\ x=0 \\ x=2 \end{cases}$ $\quad -x-1+2x+\cancel{2x}-1 \quad \cancel{x}+1+2x+\cancel{2x} \quad x+1-2x+\cancel{2x} \quad x+1-2x+\cancel{x}-2$

$1 \quad 2x+3 \quad -2x+4 \quad -1$

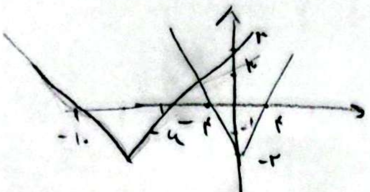
5

$y' = |\frac{1}{2}x| - 2$ $\quad |\frac{1}{2}x+4| - 1 = |\frac{1}{2}x| - 2$ $\quad |\frac{1}{2}x| - 2 = 0$

(۵

حالت دوم

$\to |\frac{1}{2}x+4| - 1$



$|\frac{1}{2}x|$

$|\frac{1}{2}x+4| - 1 = 0$

$-\frac{1}{2}x - 4 - 1 = -\frac{1}{2}x - 2$ $\quad -5 = -2$ ✗

$\frac{1}{2}x + 4 - 1 = -\frac{1}{2}x - 2$ $\quad x = -3$ $\quad \boxed{x=-5}$

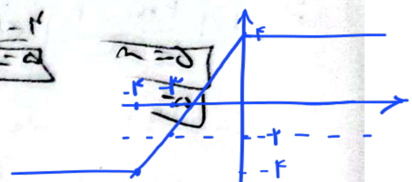
$\frac{1}{2}x + 4 - 1 = \frac{1}{2}x - 2$

$|\frac{1}{2}x+4| - 1 = 0$

$|\frac{1}{2}x+4| = 1$ $\quad \frac{1}{2}x + 4 = 1 \to \frac{1}{2}x = -3 \to x = -6$

$\frac{1}{2}x + 4 = -1 \longrightarrow \frac{1}{2}x + 4 = -1 \to x = -10$

$y' = |\frac{1}{2}x+2| - 1 = y$



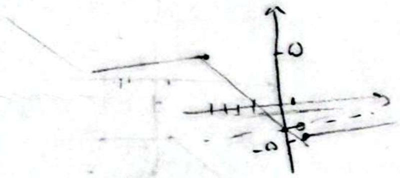
$x = -5$ $\quad x = -3$

$|x+4| - |x| = -2$

(۶ برد توابع

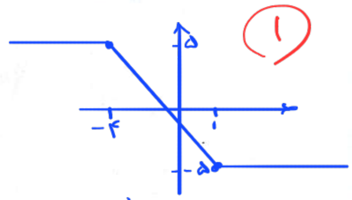
$f(x) = [|1-x| - |x+4|]$

$1 - x + x + 4 = 5$ $\quad 1 - x - x - 4 = -2x + 5$ (?) $\quad x - 1 - x - 4 = -5$



$\longrightarrow R(f) = [-5, 5]$ $\quad \longrightarrow [R(f)] = [-5, 5]$

(۱



$R_f = \{-5, -4, \dots, 4, 5\}$

ب) $f(x) = \frac{1}{x} - [\frac{x+1}{x}]$ $\quad x - [x]$ $\quad x \in \mathbb{Z}$

$\frac{1}{x} - [\frac{1}{x} + 1] \to \frac{1}{x} - [\frac{1}{x}] \to 0 \leq \frac{1}{x} - [\frac{1}{x}] < 1 \to 1 \leq \frac{1}{x} - [\frac{1}{x}] + 1 < 2 \to R_f = [1, 2)$

$f(x) = \frac{1}{x} - [\frac{1}{x}] - 1 \to R_f = [-1, 0)$

(۷

الف) $y = [-2x] - 1$ $\quad x \in (-1, 1)$

$-1 < x < 1$ $\quad +2 > -2x > -2$ $\quad 0 \leq -2x < 1 \to 0 - 1 = -1$

$-2 < 2x < 2$ $\quad -2 < -2x < -1 \to -2 - 1 = -3$ $\quad 1 \leq -2x < 2 \to 1 - 1 = 0$

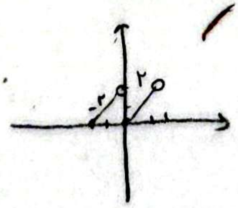
$\frac{1}{2} > x > 0 \to -1 \leq -2x < 0 \to -1 - 1 = -2$

ب) $y = x - 2[\frac{x}{2}]$ $\quad x \in (-2, 2)$

$-2 < x < 2 \to -1 < \frac{x}{2} < 1$

$-1 < \frac{x}{2} < 0 \to x + 2$ $\quad -2 < x < 0$

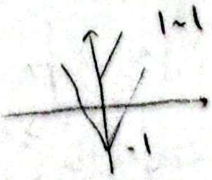
$0 < \frac{x}{2} < 1 \to x$ $\quad 0 < x < 2$

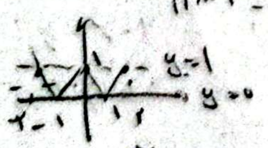


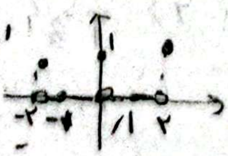
(۸ صعودی

الف) $y = [||x| - 1|]$ $\quad x \in [-2, 2]$

$||x| - 1|$ $\quad |x| - 1$

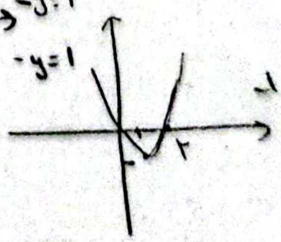




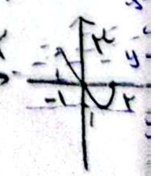


اعداد ذات ←

ب) $y = [x^2 - 2x]$ $\quad x \in [-1, 2]$



$-1 < x < 2$



$\frac{2}{2} = 1$ $\quad x = 1$, $y = -1$

$x(x - 2) = 0$ $\quad x = 0$, $x = 2$

Scanned with CamScanner

$b - [a] = ۲/۴$

$a + [b] = ۳/۲$

$a + b = ?$

$b = ○/۴$

$a = □/۲$

$۰/۲ + ۲○/۴ = ۴/۶$

$۲○/۴ = ۴/۶$

$○ = ۳ \longrightarrow \boxed{b = ۳/۴}$

$۳/۴ - [a] = ۲/۴$

$[a] = ۱ \Rightarrow ۲ \; □/۲ = \boxed{۱/۲}$

$a + b = ۱/۲ + ۳/۴ = ۴/۶$

۱۰) الف

$(۱+\sqrt{۲})^۴ + (۱-\sqrt{۲})^۴ = ۱۹۸$

$\frac{۱}{۱+\sqrt{۲}} * \frac{۱-\sqrt{۲}}{۱-\sqrt{۲}} = \frac{۱-\sqrt{۲}}{-۱} = \boxed{\sqrt{۲}-۱}$

$(۱+\sqrt{۲})^۴$ جزء صحیح ؟

$(۱+\sqrt{۲})^۴ = t$

$t + \frac{۱}{t} = ۱۹۸ \rightarrow \frac{t^۲+۱}{t} = ۱۹۸ \longrightarrow t^۲ - ۱۹۸t + ۱ = ۰$ ۰/۵

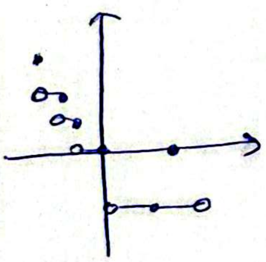
$\Delta = (۱۹۸)^۲ - ۴(۱)$

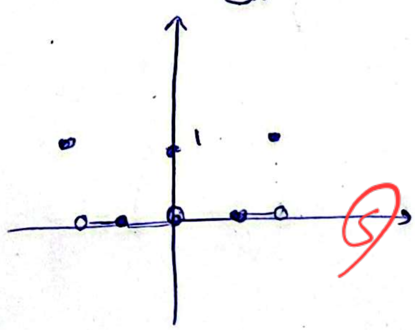
$(۱+\sqrt{۲})^۴ = \frac{۱۹۸ \pm \sqrt{۳۹۲۰۰}}{۲} = \frac{۱۹۸ \pm ۴\sqrt{۲۴۵۰}}{۲} \simeq ۱۹۷/۵$ جزء صحیح $\sqrt[۴]{۱۹۷/۵} \simeq ۱ + \sqrt{۲}$

$۲/...$

$\xrightarrow{\text{جزء صحیح}} \boxed{۲}$

ب





۲

سوال ۸ :

۱۰)

$[(۱+\sqrt{۲})^۴] = [۱۹۸ - (۱-\sqrt{۲})^۴]$

$= [(۱+\sqrt{۲})^۴] = ۱۹۸ + [\underbrace{-(۱-\sqrt{۲})^۴}_{۰^-}] = ۱۹۸ - ۱ = ۱۹۷$

$۰ < (۱-\sqrt{۲})^۴ < ۱$