محمدعماد دعوتی ایلی / دوازدهم ریاضی A

١٥٫٥

۱-

الف) $y = 2(\underbrace{\frac{x}{2} - [\frac{x}{2}]}_{[0,1)})^2 \Rightarrow R_f = [0,4)$ ✓

٢

ب) $y = \log_2 x + 4 \Rightarrow -1 \le \log_2 \le 1 \Rightarrow 3 \le \log_2 x + 4 \le 5$

$3 \le \log y \le 5 \Rightarrow 10^3 \le y \le 10^5 \Rightarrow R_f = [10^3, 10^5]$ ✓

۲- ٠٫٥

$x^2 \to 0 \Rightarrow y = \pm\frac{2}{3}$ $\quad y \ge 0$

$x^2 \to \infty \Rightarrow y = 1$ $\quad \Rightarrow R_f = [-\frac{2}{3}, \frac{2}{3}] \cup (1,+\infty)$

$R_f = [0, \frac{2}{3}] \cup (1,+\infty)$

$\frac{5}{3}$

$\Rightarrow a+b+c = -\frac{2}{3} + \frac{2}{3} + 1 = \boxed{1}$

۳-

الف) $f(x) = t^2 + 2t \Rightarrow ext \Big|_{-1}^{-1} \Rightarrow R_t = [-1,+\infty)$ ١

$\to min = \sqrt{2}$

$\Rightarrow 0 \le \sqrt{x+\frac{1}{x}} \to 0 \le x + \frac{1}{x} \to 0 \le \frac{x^2+1}{x}$

$- \quad \overset{0}{\underset{\text{ت ن}}{|}} \quad + \quad \Rightarrow R_f = (0,+\infty)$ $\quad R_f = [2+2\sqrt{2}, +\infty)$

ب) $3 + 3\sin x - \sin x - \sin^2 x \to -\sin^2 x + 2\sin x + 3$

$\sin x = -1 \to -1 - 2 + 3 = 0$

$\sin x = 1 \to -1 + 2 + 3 = 4$ $\quad \Rightarrow R_f = [0,4]$ ✓

$\sin x = \frac{-b}{2a} = \frac{-2}{-2} = 1 \Rightarrow -1 + 2 + 3 = 4$

۴- ٢

$D_f = [1,9]$

$\to x=1 \to y = 29/3 \qquad \to x = 2 \to y = 28/3$

$\to x=3 \to 27/3 \qquad \to x = 4 \to y = 26/3$

$\to x=5 \to y = 25/3 \qquad \to x = 6 \to y = 24/3$

$\to x=7 \to y = 23/3 \qquad \to x = 8 \to y = 22/3$

$x=9 \to y = 21/3$ ✓

$\Rightarrow \frac{21+22+23+24+25+26+27+28+29}{3}$

$= \frac{225}{3} = \boxed{75}$ ✓

۵- ١٫٧٥

$a = 0 \to f(x) = 2\sqrt{bx + c} \to f(2) = 0$

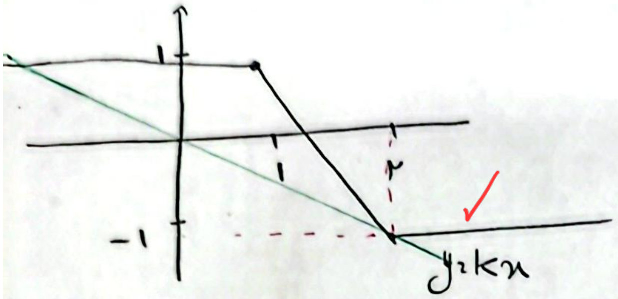
$\to f(3) = 1$

$\begin{cases} 2b + c = 0 \\ 3b + c = 1 \end{cases} \to b = 1, c = -2$ ✓

$\Rightarrow g(x) = 2\sqrt{x^2 + 4} \Rightarrow R_g = [4,+\infty)$

$R_g = [2, +\infty)$

۶- ٢



$\Rightarrow y = -\frac{1}{2}x \Rightarrow k = -1/2$ ✓

۷- ١٫٧٥

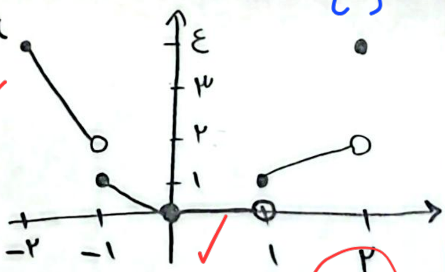
الف) $-2 \le x < -1 \to -2x \qquad R_f = [0,4] - \{2\}$

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

$0 \le x < 1 \to 0$ ✓

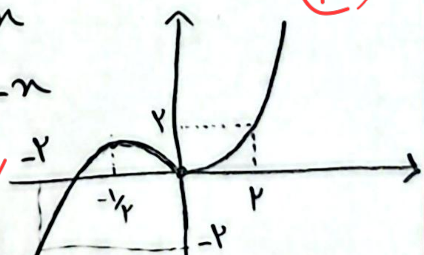
$1 \le x < 2 \to x$

$x = 2 \to 4$



ب) $x \ge 0 \to x^2 - x$

$x < 0 \to -x^2 - x$ ✓

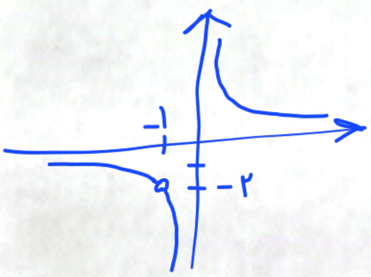


$\Rightarrow R_f = [-2, 2]$ ✓

۸- ١٫٥

$y = \frac{2x+2}{x^2+x} \to \frac{2(x+1)}{x(x+1)} \to y = \frac{2}{x}$ ✓ $\to x \ne -1$ ✓ به شرطی که

$\Rightarrow R_y = R - \{2, -2\} \Rightarrow a + b = 2 - 2 = \boxed{0}$



$R_f = \mathbb{R} - \{a, -2\}$

$a + b = -2$

$\square \to \begin{cases} min \to 0 \to 1 \\ max \to \infty \to 1 \end{cases}$

$$f(x) = \frac{(\sqrt{x}-1)(\sqrt{x}-1)}{(\sqrt{x}-1)(\sqrt{x}-1)} = \frac{\sqrt{x}-1}{\sqrt{x}-1}$$ ✓ ① -۹

مرد $\frac{a\square+b}{c\square+d}$

$\square = \sqrt{x}$

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

$D_f : \mathbb{R} - \{\frac{c}{a}\} \to \boxed{\mathbb{R} - \{1\}}$

-۱۰

$$f(x) = \frac{(x+1)(x-1)(x+1)}{(x+1)(x-1)} = x+1$$

$x \neq \pm 1$

$\Rightarrow D_f : \mathbb{R} - \{1, -1\} \to 1 + \boxed{\mathbb{R}}$ ✓ ✓ ۲