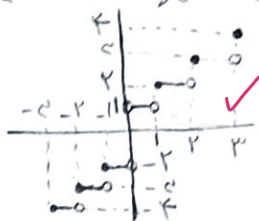


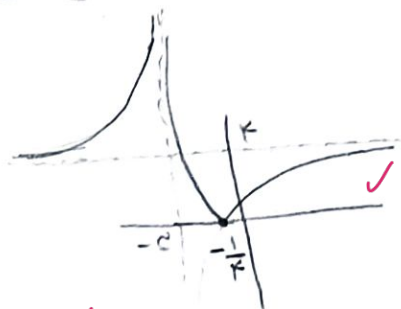
الف) $0 \leq \sin^2 x \leq 1$ $-1 \leq 2 \sin^2 x - 1 \leq 1$ $R_f = [-1, 1]$ (2)

ب) $-1 \leq \cos^2 x \leq 1$ $-1 \leq 2 \cos^2 x - 1 \leq 1$ $R_g = [-1, 1]$ (2)

$\begin{cases} [2x] - 1 & x \leq 0 \\ [2x] + 1 & x > 0 \end{cases}$



1, 1, 5

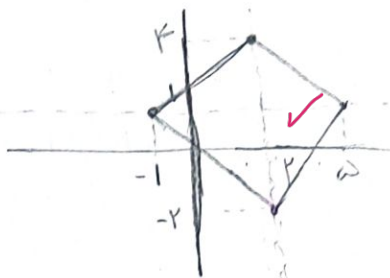


(2) - 2

(2) - 2

(2) - 2

$y = -2x + 1$ $x \geq 2, y \geq 1$
 $y = 2x - 1$ $x \geq 2, y < 1$
 $y = -x$ $x < 2, y < 1$
 $y = x + 1$ $x < 2, y \geq 1$



الف) $(\sqrt{x + \frac{1}{x}})^2 + 2\sqrt{x + \frac{1}{x}}$ $\begin{matrix} +\infty & \rightarrow & +\infty \\ -1 & \rightarrow & 3 \\ \sqrt{x} & \rightarrow & 2 + 2\sqrt{x} \end{matrix}$

$R_f = [2 + 2\sqrt{2}, +\infty)$

(1) - 2

فقط ب؟

$\frac{-9 \times 10}{2 \times d} + 90 = \sqrt{V}$

$a = 1$ $2b + c = 0$ $b = 1$ $c = -2$
 $c + b + c = 1$

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

$f(x) = \frac{x(x-2)(2x+1)}{x+1} = x^2 - 2x \rightarrow x_{min} = \frac{2}{2} = 1$

$y_{min} = -1 \Rightarrow c = -1$

$x^2 - 2x = \lambda$ $x^2 - 2x - \lambda = 0$ $(x-1)(x+1) = 0$
 $x = 1$ $x = -1$
 $\Rightarrow \{a, b\} = \{-1, 1\}$

$f(\frac{1}{-1}) = f(-1) = \boxed{-1}$

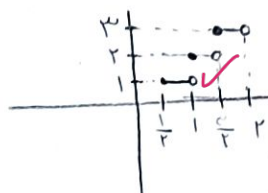
$(x-1)^2 = x^2 - 2x + 1 = x^2 + ax^2 + bx - 1$
 $\Rightarrow a = -2, b = 1$

$-7 \leq x \leq 12$
 $-1 \leq x - 2 \leq 10$

$R_f = [-1, 10]$

(2) - 10

$y = 1$ $1 > x \geq \frac{1}{2}$
 $y = 2$ $\frac{1}{2} > x \geq 1$
 $y = 2$ $2 > x \geq \frac{1}{2}$



سه پارچه

$$ب) y = (3 - \sin u)(1 + \sin u) = -\sin^2 u + \boxed{2\sin u} + 3$$

$$\begin{cases} \sin u = -1 \rightarrow y = 0 \\ \sin u = 1 \rightarrow y = 4 \\ \sin u = \frac{-b}{2a} = 1 \rightarrow y = 4 \end{cases} \Rightarrow R_f = [0, 4]$$

۷- با توجه به دامنه، زیر رادیکال یک خط با شیب مثبت بوده یعنی $a=0$ است و نقطه $(2,0)$ هم در معادله خط صدق می‌کند...

$$\begin{cases} (2,0) \rightarrow 2b + c = 0 \\ (2,1) \rightarrow 2b + c = 1 \end{cases} \rightarrow b = 1, c = -2$$

$$g(u) = \sqrt{u^2 + 4} \rightarrow \left. \text{ext} \right|_2^0 \Rightarrow R_g = \sqrt{[4, +\infty)} = [2, +\infty)$$