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فصل اول

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$$f_g = \{(-1, 2), (0, 1), (1, 0), (1, 1)\} \quad \sqrt{1-u^2} \xrightarrow{\varepsilon_1 < u < 1} 1-u^2$$

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$$(1-u^2) \rightarrow R_f = (-\infty, 1] \rightarrow \sqrt{1-u^2} \rightarrow [-1, 1]$$

$$f = \{(-1, 0), (0, 1), (1, 0)\} \rightarrow f_f = \{(-1, 0), (0, 1), (1, 0)\}$$

$$f_g - f_f = \{(-1, 2), (0, 1), (1, 0)\} \rightarrow R_f = \{2, 1, 0\}$$

$$x+y+z=11$$

$$1) f(x) = x-1 \rightarrow x=3 \quad y=2$$

$$R = [2, +\infty)$$

$$D_f = [3, +\infty)$$

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$$g(x) = \frac{1}{x}x+3 \quad D_g = (-\infty, 3] \quad R_g = (-\infty, 3]$$

$$R_f \cup R_g = (-\infty, 2] \cup [2, +\infty)$$

$$2) -\frac{x^2}{r} + x + 3 > \frac{r}{r} \rightarrow -\frac{x^2}{r} + x > -\frac{r}{r} + \frac{x^2}{r} - \frac{r}{r} <$$

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$$x^2 - 2x - 3 < 0 \rightarrow (x+1)(x-3) < 0 \rightarrow \frac{-1}{+1-1} \quad (-1, 3)$$

$$\sqrt{b-a} = \sqrt{2} = 1$$

$$3) y = |x-1| + |x-3| + |x-2|$$

$$\begin{matrix} x=1 & y=2 \\ x=2 & y=2 \\ x=3 & y=2 \end{matrix} \rightarrow \min$$

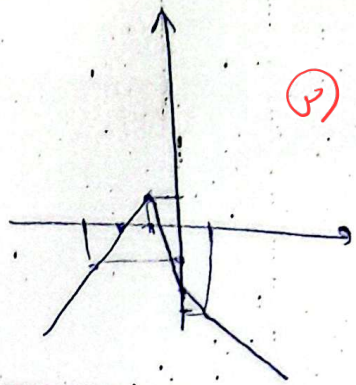
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$$\begin{cases} 1 \leq x < 2 & -x+4 \\ 2 \leq x < 3 & x-1 \\ x=3 & 2x-1 \\ x < 1 & -2x+1 \end{cases}$$

$$2) \quad u \begin{cases} \rightarrow c \\ \rightarrow -1 \end{cases}$$

$$\begin{cases} u > 0 \rightarrow -u-c \\ -1 \leq u \leq 0 \rightarrow -\varepsilon - c \\ u < -1 \rightarrow u+c \end{cases}$$

$$R_f = (-\infty, 1]$$



$$3) \quad uy+y = u^c + \varepsilon u + M \rightarrow u^c + (\varepsilon - y)u + (M - y) = 0$$

$$\Delta \geq 0 \quad (\varepsilon - y)^2 - \varepsilon(M - y) \geq 0 \rightarrow \varepsilon^2 + y^2 - 1.0y - \varepsilon M + \varepsilon y \geq 0$$

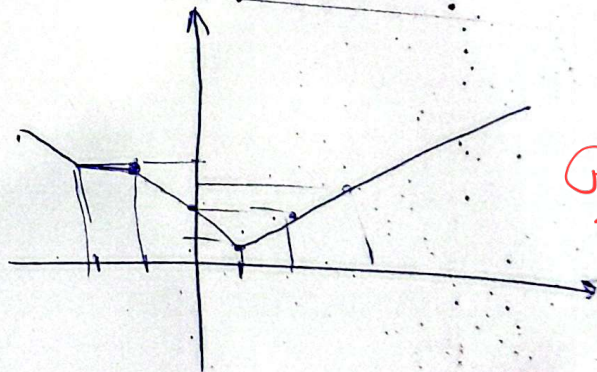
$$\rightarrow y^2 - 4y + c^2 - 2M \geq 0$$

$$4y - 1.0 + c^2 M \leq 0 \rightarrow \varepsilon \geq M$$

$$M = \varepsilon \rightarrow \frac{u + \varepsilon u + \varepsilon}{u + 1} \equiv \varepsilon + \frac{\varepsilon}{u+1} \rightarrow \frac{u-1}{u} \rightarrow \{1, 0, 2\}$$

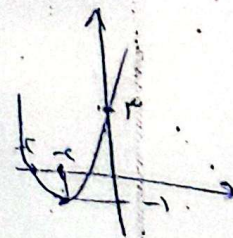
$$4) \quad f(u) = \begin{cases} u+c & u > 1 \\ u^c - \varepsilon u + c & 0 \leq u \leq 1 \\ |u|+c & u < 0 \end{cases}$$

$$R = [1, +\infty)$$



$$1) \quad f(u) = \begin{cases} u^c + \varepsilon u + \mu & u \leq 0 \\ [cu] - cu & u > 0 \\ -1 \leq [cu] - cu \leq 0 \rightarrow (-1, 0] \end{cases}$$

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



$$9) \quad a+b-\sqrt{cm+\mu}$$

$$cm+\mu \geq 0 \rightarrow cm \geq -\mu$$

$$ab = -4$$

$$b = -1/8 \rightarrow \sqrt{0} = a$$

$$D = [b, +\infty)$$

$$IR - \{-\infty, 0\}$$

$$b = -1/8$$

(5)

$$1.) \quad f(u) = c\sqrt{u+1} + c\sqrt{1-u} = \sqrt{2u+2} + \sqrt{2-2u}$$

$$g(u) = -c\sqrt{u+1} - 2\sqrt{1-u} + \sqrt{c+c\sqrt{1-u}}$$

$$y = \frac{f(u) - cg(u)}{4} \rightarrow 4\sqrt{u+1} + 4c\sqrt{1-u} - 4\sqrt{c+c\sqrt{1-u}} \quad (5)$$

$$y = \sqrt{u+1} + c\sqrt{1-u} - \sqrt{c+c\sqrt{1-u}} \Rightarrow -1 \leq u \leq 1$$

$$u = -1 \rightarrow y = \sqrt{c}$$

$$u = 1 \rightarrow y = c$$

$$u = c \rightarrow y = 1$$

$$R_f = [c, \sqrt{c}]$$