

کرمینا کبیر

الف) $x = y + \omega \rightarrow x \leq \sqrt{y + \omega} \rightarrow y + \omega \geq 0 \rightarrow y \geq -\omega$ $R_f = [-\omega, +\infty)$ (3)

ب) $x = y - 1 \rightarrow x \leq \sqrt{y - 1}$ $R_f = [1, +\infty)$

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الف) $(x-2)^2 + 2 = y \rightarrow (x-2)^2 \leq y-2 \rightarrow x = \pm \sqrt{y-2} + 2 \rightarrow y-2 \geq 0 \rightarrow y \geq 2$ $R_f = [2, +\infty)$ (4)

ب) $y \leq (x - \frac{1}{x})^2 - \frac{1}{x} \rightarrow (x - \frac{1}{x})^2 \geq y + \frac{1}{x} \rightarrow x \pm \sqrt{y + \frac{1}{x}} \geq \frac{1}{x} \rightarrow y + \frac{1}{x} \geq 0 \rightarrow y \geq -\frac{1}{x}$ $R_f = [-\frac{1}{x}, +\infty)$

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الف) $x^2 + 3 = y \rightarrow x^2 = y - 3 \rightarrow x = \pm \sqrt{y-3}$ $R_f = (-\infty, -\frac{3}{4}] \cup (1, +\infty)$ (5)

ب) $|x| + 1 = y \rightarrow |x| = y - 1 \rightarrow |x| \leq y - 1 \rightarrow |x| = \frac{1-y}{y-1} \rightarrow \frac{-1}{y-1} \leq \frac{y-1}{y-1} \rightarrow \frac{-1}{y-1} \leq 1$ $R_f = (-\infty, \frac{1}{2}] \cup (1, +\infty)$

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الف) $1 = yx^2 - 4xy + yx^2 - 4yx - 1 = 0 \rightarrow x = \frac{4y \pm \sqrt{(4y)^2 - 4(-1)(y)}}{2y} = \frac{4y \pm \sqrt{16y^2 + 4y}}{2y} = \frac{4y \pm 2\sqrt{4y^2 + y}}{2y} = \frac{2y \pm \sqrt{4y^2 + y}}{y}$ $R_f = (-\infty, \frac{1}{2}] \cup (0, +\infty)$ (6)

الف) $x_{\min} = \frac{-b}{2a} = \frac{4}{2} = 2 \rightarrow y_{\min} = 9 - 18 + 2 = -7$ $R_f = [-7, +\infty)$ (7)

ب) $x_{\max} = \frac{-b}{2a} = \frac{-4}{2} = -2 \rightarrow y_{\max} = -4 + 18 + 2 = 16$ $R_f = (-\infty, 16]$

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الف) $x_{\min} = \frac{-b}{2a} = \frac{4}{2} = 2 \rightarrow y_{\min} = 9 - 18 + 2 = -7$ $R_f = \sqrt{[-7, +\infty)} = [0, +\infty)$ (8)

ب) $x_{\max} = \frac{-b}{2a} = \frac{-4}{2} = -2 \rightarrow y_{\max} = -4 + 18 + 2 = 16$ $R_f = \sqrt{[-\infty, 16]} = [0, \sqrt{16}]$

الف) $R_f = (R) \rightarrow$ $\frac{1}{x} \leq \sqrt{x} \rightarrow x \geq 0$

ب) $R_f = \sqrt{x} \rightarrow x \geq 0$

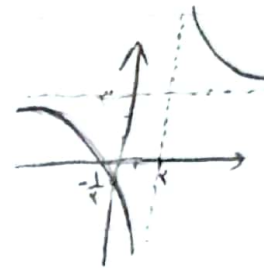
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الف) $R_f = [R - \frac{1}{2}, R - \frac{1}{2}]$

ب) $R_f = \sqrt{R - \frac{1}{2}} \leq \sqrt{R - \frac{1}{2}} \rightarrow [0, +\infty) - \frac{1}{2}$

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(الف) $y \leq \frac{a}{c} = 3$: معانب افق
 $= 2$: معانب قائم
 $x \leq 0 \rightarrow y \leq \frac{1}{x}$



(4)

(ب) $y = \frac{4x-2}{1-2x} = \frac{2(2x-1)}{1-2x} = -2$



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(الف) $y = \cos^2 x + \frac{1}{\cos^2 x} \rightarrow \cos^2 x > 0 \rightarrow R_f = [2, +\infty)$

(10)

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(ب) $y = \sqrt[3]{x + \frac{1}{x}} \rightarrow R_f = \sqrt[3]{(-\infty, -2] \cup [2, +\infty)} = (-\infty, \sqrt[3]{-2}] \cup [\sqrt[3]{2}, +\infty)$

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