

الف) $x^2 = x + 5 \rightarrow x = \sqrt{x+5} \rightarrow Rf = \left[\frac{5}{4}, +\infty \right)$

ب) $x^3 = x - 1 \Rightarrow x = \sqrt[3]{x-1} \rightarrow Rf = R$

الف) $(x-2)^2 + 2 = x \rightarrow x-2 = (x-2)^2 \rightarrow$

$x = \pm \sqrt{x-2} + 2 \Rightarrow Rf = [2, +\infty)$
 $x-2 \geq 0 \rightarrow x \geq 2$

ب) $\frac{1}{2}x^2 - \frac{5}{6}x + \frac{1}{6} - x = 0 \rightarrow \Delta = (-\frac{5}{6})^2 - 4 \times \frac{1}{2} \times (\frac{1}{6} - x) \geq 0$
 $\frac{25}{36} - \frac{2}{3} + 2x \geq 0 \rightarrow 2x \geq \frac{11}{18} \rightarrow x \geq \frac{11}{36} = -\frac{11}{36}$

الف) $x(x^2-2) = x^2+3 \rightarrow x(x^2-x) = x^2+3 \rightarrow x(x^2-x-3) = 3$
 $x^2(x-1) = x^2+3 \rightarrow x^2 = \frac{x^2+3}{x-1} \rightarrow x = \sqrt{\frac{x^2+3}{x-1}}$

$\frac{x^2+3}{x-1} \geq 0 \rightarrow (-\infty, -1] \cup (1, +\infty)$

ب) $x|x| - 5x = 2|x| + 1 \rightarrow x|x| - 2|x| = 5x + 1 \rightarrow$
 $|x|(x-2) = 5x+1 \rightarrow |x| = \frac{5x+1}{x-2}$

$\frac{1}{x^2-5x} \rightarrow x(x^2-5x) = 1 \rightarrow x^2-5x = \frac{1}{x} \rightarrow x^3-5x^2-\frac{1}{x} = 0$

$\Delta \rightarrow (-5)^2 + \frac{4}{x} \geq 0 \rightarrow 25 + \frac{4}{x} \geq 0 \rightarrow \frac{4}{x} \geq -25 \rightarrow \frac{1}{x} \geq -\frac{25}{4}$
 $x \in (-\infty, -\frac{4}{25}] \cup (0, +\infty)$

الف) $\frac{-b}{2a} = \frac{4}{2} \rightarrow 2$ $\begin{cases} x_{min} = 3 \\ x_{min} = -7 \end{cases}$ $[-7, +\infty)$ c, b_{min}

ب) $\frac{-b}{2a} = \frac{-4}{2} = -2$ $\begin{cases} x_{max} = 2 \\ x_{max} = 4 \end{cases}$ $-4+8+2 \rightarrow 6$
 $(-\infty, 4] \leftarrow c, b_{max}$

الف) $\frac{b}{pa} \rightarrow \frac{q}{p} \rightarrow 3 \quad \begin{cases} x_{min} = 3 \\ J_{min} = a - 11t - \sqrt{v} \end{cases} \quad [E_v]$

$\sqrt{[-v, +\infty)} \rightarrow [0, +\infty)$

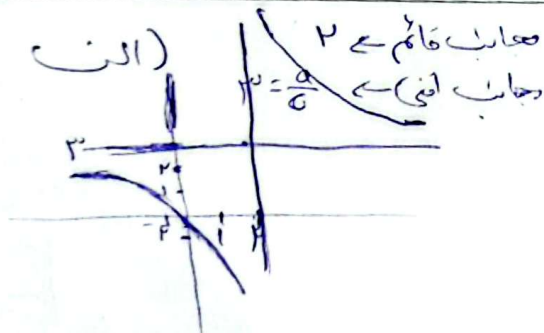
ب) $\frac{b}{pa} = \frac{-8}{-2} = 4 \quad \begin{cases} x_{max} = 4 \\ J_{max} = 16 \end{cases} \quad \sqrt{(-\infty, 16]} \rightarrow [0, \sqrt{16}]$

الف) $R_f = R$

ب) $R_f = [0, +\infty)$

الف) $R = \{3\}$

ب) $R = \{\sqrt[3]{x}\} \rightarrow R = \{2\}$



ب) $\frac{1}{p} \rightarrow -2 = \frac{q}{c}$
 $\frac{q}{c} \rightarrow -2 = \frac{q}{c}$
 $-2x - 2u \rightarrow -2x - 2u$
 $2x \times 1 = -2x - 2u$
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الف) $\frac{3}{\sqrt{x+1}} \rightarrow [2, +\infty)$
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ب) $\sqrt[3]{x+1} \rightarrow (-\infty, -2] \cup [2, +\infty)$