الف) $x^2 = y+a \to x = \pm\sqrt{y+a}$ $\quad y+a \geq 0 \to y \geq -a$ $\quad R_f = [-a, +\infty)$

ب) $x^3 = y-1 \to x = \sqrt[3]{y-1}$ $\quad R_f = \mathbb{R}$ $\quad$ سوال ①

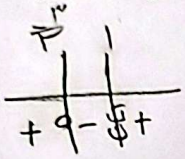
الف) $y = x^2 - 4x + 4 \to y = (x-2)^2 + 2 \to y-2 = (x-2)^2 \to \sqrt{y-2} + 1 = x$

$R_f = [2, +\infty) \Leftarrow y-2 \geq 0 \to y \geq 2$

ب) $y = x^2 - 5x + 1 \to y = (x-2,5)^2 - 6,25 \to y + 0,25 = (x-2,5)^2 \to \sqrt{y+6,25} + 2,5 = x$

سوال ② $\quad R_f = [-6,25, +\infty) \Leftarrow y \geq -6,25$

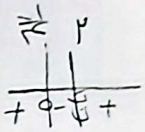
الف) $yx^2 - 2y = x^2 + 3 \to x^2(y-1) = 2y+3 \to x^2 = \frac{2y+3}{y-1} \to x = \pm\sqrt{\frac{2y+3}{y-1}}$



$2y+3 = 0$
$2y = -3$
$y = \frac{-3}{2}$

$R_f = \mathbb{R} - (\frac{-3}{2}, 1]$

ب) $y|x| - 2y = 2|x| + 1 \to |x|(y-2) = 2y+1 \to |x| = \frac{2y+1}{y-2}$

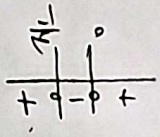


$2y+1 = 0$
$2y = -1$
$y = \frac{-1}{2}$

$R_f = \mathbb{R} - (\frac{-1}{2}, 2]$ $\quad$ سوال ③

سوال ④) $\frac{1}{x(x-2)} = y \to \underset{a}{y}x^2 \underset{b}{-2y}x \underset{c}{-1} = 0$ $\quad \Delta = b^2 - 4ac = 4y^2 + 4y \geq 0$

$4y(4y+1) \geq 0$



0 $\quad -\frac{1}{4}$

$R_f = \mathbb{R} - (\frac{-1}{4}, 0)$

الف) $x_{min} = \frac{-b}{2a} = \frac{4}{2} = 2$ $\quad y_{min} = -5$ $\quad R_f = [-5, +\infty)$

سوال ⑤

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

الف) $x_{min} = \frac{-b}{2a} = \frac{4}{2} = 2,-5$ $\quad R_f = [0, +\infty)$

سوال ⑥

ب) $2,14$ $\quad R_f = [0, \sqrt{14}]$

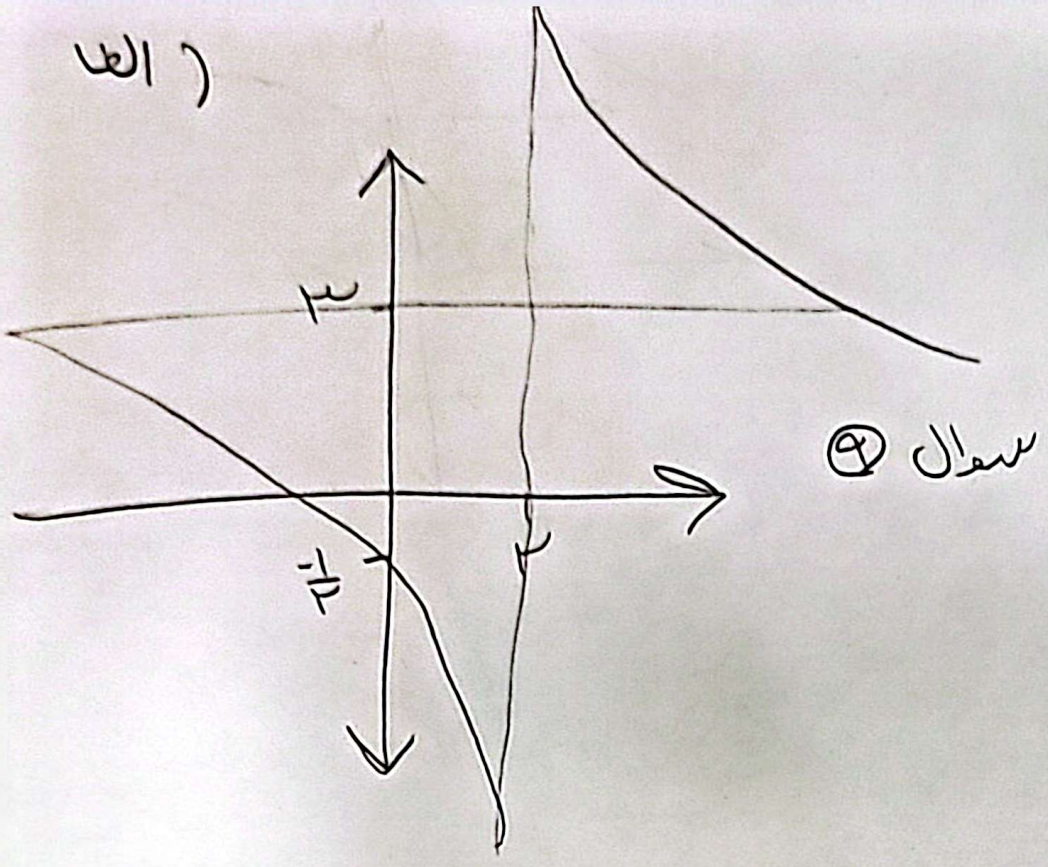
الف) $\mathbb{R}$ $\quad$ ب) $[0, +\infty)$ $\quad$ سوال ⑦

الف) تابع ثابت $\quad R_f = \mathbb{R} - \{3\}$ $\quad$ ب) $\mathbb{R}^+ - \{2\} = (0, +\infty) - \{2\}$

سوال ⑧

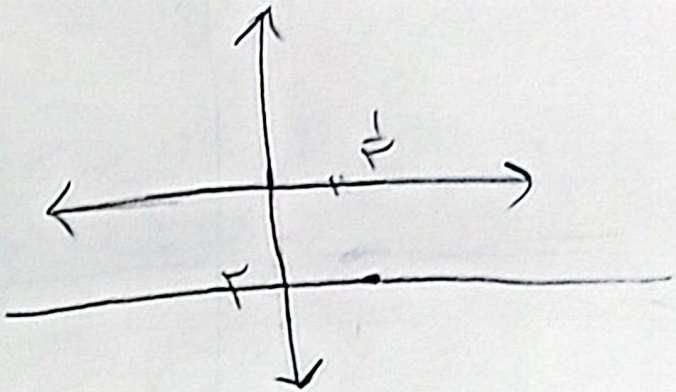
الف) نمودار دختر B نقطه ها

الف)



سوال ۹

ب)



$$\frac{2(2x-1)}{-(2x-1)} = \{-2\} = R_f$$

الف) $R_f = [2, +\infty)$

ب) $\sqrt[3]{x+\frac{1}{x}}$

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