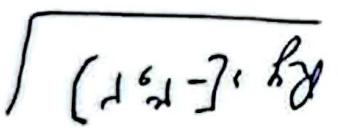
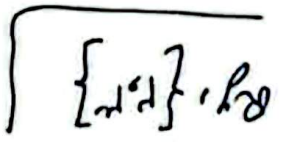
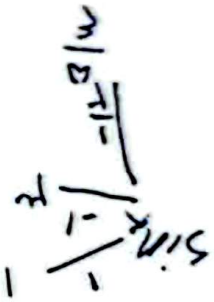


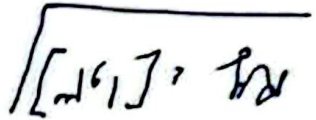
$$\sqrt{\{n_i\}} \cdot \rho$$



$$[21], \text{ by}$$



$\frac{41}{18}$



11. 72069

① الف) $y, \frac{|x+1|}{|x-2|} \rightarrow y|x+1| - y|x-2| \rightarrow (y-1)|x+1| + 2y+1 \rightarrow |x+1| + \frac{2y+1}{y-1} \rightarrow \frac{2y+1}{y-1} \geq 0 \rightarrow \frac{-1}{+1-1} \rightarrow$

$R_y: (-\infty, -\frac{1}{2}] \cup (1, +\infty)$

ب) $y, \frac{x^2+1}{|x|} \rightarrow |x|y, x^2+1 \rightarrow x^2 - |x|y + 1 \geq 0 \rightarrow x, \frac{y \pm \sqrt{y^2-4}}{2}$
 $R_y: (-\infty, -2] \cup [2, +\infty)$

② $y, \frac{x^2+2x-2}{x+3} \rightarrow x^2y + 2xy - 2x - 2y \rightarrow x^2 + (2-y)x - 2-2y$
 $x, \frac{y-2 \pm \sqrt{(2-y)^2 - 4(-2-2y)}}{2} \rightarrow y^2 - 4y + 4 + 16 + 16y \geq 0 \rightarrow y^2 + 12y + 20 \geq 0$
 $(y+2)(y+10) \geq 0 \rightarrow R_y: (-\infty, -2] \cup [-10, +\infty)$

③ $f(x) = \frac{x^2-x+\frac{1}{x}}{x^2-x+1} \rightarrow x^2y - x^2y + y, x^2-x+\frac{1}{x} \rightarrow (y-1)x^2 + (1-y)x + y - \frac{1}{x} \geq 0$
 $x, \frac{y-1 \pm \sqrt{(1-y)^2 - 4(y-\frac{1}{x})}}{2} \rightarrow y^2 - 2y + 1 - 4y + 4 \geq 0 \rightarrow y^2 - 6y + 5 \geq 0 \rightarrow (y-1)(y-5) \geq 0 \rightarrow R_y: [1, 5]$

④ الف) $y, \sqrt{-x^2+4x-1} \rightarrow \frac{-b}{2a} = 1 \rightarrow R_y: \sqrt{(-1, 3)} = [1, \sqrt{3}]$

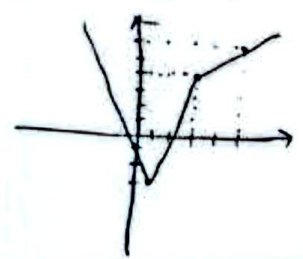
ب) $y, \sqrt{2x^2-11x} \rightarrow \frac{-b}{2a} = \frac{11}{4} \rightarrow R_y: \sqrt{[-11, +\infty)} = [-\frac{11}{2}, +\infty)$

⑤ الف) $y, \log(x^2-x+1) \rightarrow R_y: (-\infty, +\infty)$
 ب) $y, \log_p(\frac{x^2+1}{x}) \rightarrow R_y: \log_p(-\infty, -2] \cup [2, +\infty) = [1, +\infty)$

⑥ الف) $y, |2x-2| - |x-3|$

x	-1	2	5
y	-1	-2	4

 $R_y: [-2, +\infty)$



ب) $y, |x-3| + |x+1|$

x	-2	-1	2	4
y	4	2	2	6

 $R_y: [2, +\infty)$



⑦

x	-1	2
y	-1	-2

 $R_y: [-2, +\infty)$

$x+1 < 1 \rightarrow x < -\frac{1}{2}$
 $x+1 > 1 \rightarrow x > 0$
 $R_y: (-\infty, -\frac{1}{2}] \cup [0, +\infty)$

