

الف) $y = \frac{|x+1|}{|x+2|}$ $|x| \geq 0$ $|x| = 0 \rightarrow \frac{1}{2}$ $\lim_{x \rightarrow +\infty} y = 1$ $(-\infty, \frac{1}{2}] \cup (1, +\infty)$

ب) $y = \frac{x^2+1}{|x|} = |x| + \frac{1}{|x|}$ $|x| + \frac{1}{|x|} \geq 2$ $R: [2, +\infty)$

$y = \frac{x^2+2x-2}{x+3} \Rightarrow y(x+3) = x^2+2x-2$ $x^2+(3-y)x+(-2-3y) = 0$

$x = \frac{y-3 \pm \sqrt{(y-3)^2+4(2+3y)}}{2}$ $y^2+1y+12 \geq 0$ $(y+2)(y+4) \geq 0$

$R: (-\infty, -4] \cup [-2, +\infty)$

$f(x) = \frac{x^2-x+\frac{1}{x}}{x^2-x+1}$ $D_f: \mathbb{R}$ $R_f: [0, 1)$

$f(x)x^2 - f(x)x + f(x) = x^2 - x + \frac{1}{x}$ $x = \frac{f(x)-1 \pm \sqrt{(f(x)-1)^2 - 4(f(x)-1)(f(x))}}{2}$

$(f(x)-1)x^2 - (f(x)-1)x + f(x) = \frac{1}{x}$

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الف) $y = \sqrt{-x^2+5x-1}$ $\frac{-b}{2a} = \frac{5}{-2} = -2.5$ $-5+1-1 = -5 \Rightarrow R: [0, \sqrt{3}]$

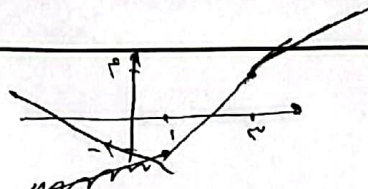
ب) $y = \sqrt{x^2-1}$ $\frac{-b}{2a} = \frac{1}{2} = 0.5$ $1-1 = 0 \Rightarrow R: [-2, +\infty)$

الف) $y = \log(x^2-x+1)$ $R: \mathbb{R} \xrightarrow{\log} R: \mathbb{R}$

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

الف) $y = |2n-2| - |n-3|$

ب) $y = |n-3| + |n+1|$ $R: [2, +\infty)$
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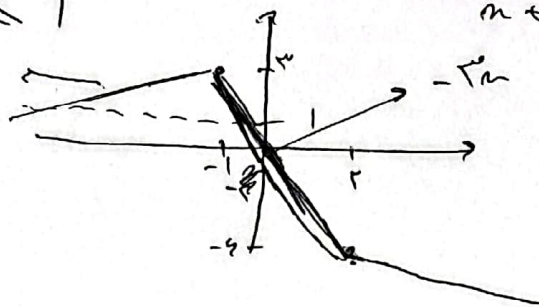


$R: [2, +\infty)$

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$|n-2| - |2n+2| \leq 1$

$-n+2+2n+2$
 $n+4$



$n+4 \leq 1 \quad n = -2$

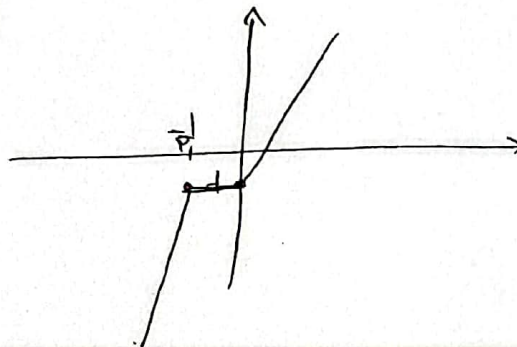
$-2n = 1$
 $n = -\frac{1}{2}$

$n \in (-\infty, -2] \cup$

$[-\frac{1}{2}, +\infty)$

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$y = 3n - |2n+1| + |n|$

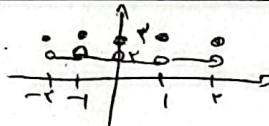


$R: \mathbb{R}$

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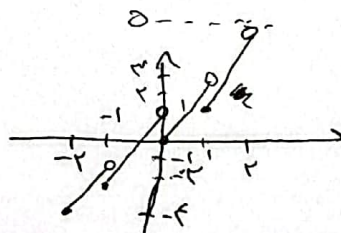
الف) $[n] + [3-n]$

$\rightarrow [n] + [-n] + 3$
 ≤ -1



ب) $y = 3n - [n]$

$-2 \leq n < -1 \quad 2n+2$
 $-1 \leq n < 0 \quad 2n+1$
 $0 \leq n < 1 \quad 3n$
 $1 \leq n < 2 \quad 2n-1$



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الف) $y = \sin^2 n - \sin n + 1$

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

$\frac{1}{4} - \frac{1}{2} + 1 = \frac{3}{4}$

$1 - 1 + 1 = 1 \quad R: (\frac{3}{4}, 1]$

$-1 + 1 + 1 = 1$

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ب) $y = \sin^2 n + \sin^2 n + 1$

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

$\frac{1}{16} + \frac{1}{16} + 1 = \frac{17}{16}$

$1 + 1 + 1 = 3$

$R: [\frac{17}{16}, 3]$