

$y = \sqrt{x^2 + 1} \rightarrow y^2 = x^2 + 1 \rightarrow y^2 - x^2 = 1$
 $\rightarrow m^2 = \frac{y+1}{y-1} \rightarrow m = \sqrt{\frac{y+1}{y-1}}$
 $R = (-\infty, -1] \cup (1, +\infty)$
 $m = 0 \rightarrow y = \frac{1}{-1} = -1$
 $m \rightarrow +\infty \rightarrow y = \frac{m^2}{m^2 - 1} \rightarrow y = \frac{1}{1 - \frac{1}{m^2}} \rightarrow y \rightarrow 1$
 $R = (-\infty, -1] \cup (1, +\infty)$

$y = \frac{\cos x - 1}{\sin x + 1} \rightarrow y \sin x + y = \cos x - 1$
 $y \sin x - \cos x = -1 - y \rightarrow \sin(x - \frac{\pi}{2}) = -1 - y$
 $\sin x = \frac{y+1}{1-y} \rightarrow -1 \leq \frac{y+1}{1-y} \leq 1$
 $y \neq 1 \rightarrow y - 1 \leq y + 1$
 $y \neq -1 \rightarrow y + 1 \leq y - 1$
 $\rightarrow \frac{y+1}{1-y} \leq 1$
 $\rightarrow y \leq \frac{1}{2}$
 $\rightarrow \frac{y+1}{1-y} \geq -1$
 $\rightarrow y \geq \frac{-1}{-1+1} = -\frac{1}{0}$
 $R = [-\frac{1}{2}, \frac{1}{2}]$

$x^2 - x + 1 \neq 0 \rightarrow \Delta < 0 \rightarrow$
 $y = \frac{x^2 - x + 1}{x^2 - x + 1} \rightarrow (y-1)x^2 + (1-y)x + 1 = 0$
 $y \neq 1 \rightarrow \Delta = (1-y)^2 - 4(y-1) \geq 0$
 $1 + y^2 - 2y - 4y + 4 \geq 0 \rightarrow y^2 - 6y + 5 \geq 0$
 $(y-1)(y-5) \geq 0$
 $R = [1, 5] \cup [5, +\infty)$

$y = |x-1| - |x-2|$
 $x \leq 1 \rightarrow y = -x + 1 - (-x + 2) = -1$
 $1 < x < 2 \rightarrow y = x - 1 - (-x + 2) = 2x - 3$
 $x \geq 2 \rightarrow y = x - 1 - (x - 2) = 1$
 $R = [-1, 1]$
 $y = |x-1| + |x+1|$
 $x \leq -1 \rightarrow y = -x + 1 - x - 1 = -2x$
 $-1 < x < 1 \rightarrow y = -x + 1 + x + 1 = 2$
 $x \geq 1 \rightarrow y = x - 1 + x + 1 = 2x$
 $R = [2, +\infty)$

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

$y = \sqrt{-x^2 + 2x - 1} \rightarrow y^2 = -x^2 + 2x - 1$
 $x^2 - 2x + 1 + y^2 = 0$
 $\Delta = 4 - 4(1+y^2) \geq 0$
 $4 - 4 - 4y^2 \geq 0$
 $-4y^2 \geq 0$
 $y = 0$
 $R = [0, 1]$

$y = \sqrt{x^2 - 2x + 1} \rightarrow y = |x-1|$
 $R = [0, +\infty)$
 $y = \sqrt{x^2 - 2x + 1} \rightarrow y = |x-1|$
 $R = [0, +\infty)$
 $y = \sqrt{x^2 - 2x + 1} \rightarrow y = |x-1|$
 $R = [0, +\infty)$

$y = \frac{x+1}{x-1} \rightarrow y(x-1) = x+1$
 $\rightarrow x^2 - (y+1)x + y + 1 = 0$
 $\Delta = (y+1)^2 - 4(y+1) \geq 0$
 $(y+1)(y-3) \geq 0$
 $R = (-\infty, -1] \cup (3, +\infty)$

$y = \frac{x^2 + 1}{x^2 + 1} \rightarrow y = 1$
 $R = \{1\}$
 $y = \frac{x^2 + 1}{x^2 + 1} \rightarrow y = 1$
 $R = \{1\}$
 $y = \frac{x^2 + 1}{x^2 + 1} \rightarrow y = 1$
 $R = \{1\}$

$-n+r$
 $+r+n+r$
 ≤ 1
 $n+r \leq 1$
 $n \leq 1-r$
 III

$-n+r$
 $-r+n-r$
 ≤ 1
 $-n \leq 1$
 $n \geq -1$
 II

$n-r-r+n-r \leq 1$
 $-n-2r \leq 1$
 $-n \leq 1+2r$
 $n \geq -1-2r$
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$R = (-\infty, -1-2r] \cup [-1-r, +\infty)$

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الف) $y = [n] + [c-n] = [n] + [-n] + r$

$R = \{r, c\}$

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ب) $y = 3n - [n]$

$-2 \leq n < -1 \rightarrow y = 3n+r$
 $-1 \leq n < 0 \rightarrow y = 3n+1$
 $0 \leq n < 1 \rightarrow y = 3n$
 $1 \leq n < 2 \rightarrow y = 3n-1$
 $n \geq 2 \rightarrow y = 3n$

$R = [-\infty, \infty)$

ج) $y = \sin^2 n - \sin n + 1$

$\sin n = -1 \rightarrow 1+1+1 = 3$
 $\sin n = 1 \rightarrow 1-1+1 = 1$
 $\sin n = \frac{-b}{2a} = \frac{1}{2} \rightarrow y = \frac{3}{4}$

$R = [\frac{3}{4}, 3]$

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د) $y = \sin^2 n + \sin^2 n + 1$

$\sin^2 n = 1 \rightarrow 3$
 $\sin^2 n = 0 \rightarrow 1$
 $\sin^2 n = \frac{-b}{2a} = \frac{1}{2} \rightarrow \times$

$R = [1, 3]$