

ان) $y = x^T - 5 \Rightarrow y + 5 = x^T \Rightarrow x = \sqrt{y+5} \Rightarrow R = [-5, +\infty)$ 10, 100 - 1

ب) $y = x^T + 1 \Rightarrow y - 1 = x^T \Rightarrow \sqrt{y-1} = x \Rightarrow R \subseteq \mathbb{R}$

ان) $y = x^T - (x + 7) \Rightarrow y = x^T - x - 7 \Rightarrow y + 7 = (x - \frac{1}{2})^T + \frac{1}{4} \Rightarrow y - \frac{1}{4} = (x - \frac{1}{2})^T$

$\Rightarrow \pm \sqrt{y - \frac{1}{4}} + \frac{1}{2} = x \Rightarrow R = [\frac{1}{2}, +\infty)$

ب) $y = x^T - 2x + 1 \Rightarrow x^T - 2x + 1 = y \Rightarrow x^T - 2x = y - 1 \Rightarrow x^T - 2x + 1 = y$

$\Rightarrow (x - 1)^T - 1 = y \Rightarrow \pm \sqrt{y + 1} + 1 = x \Rightarrow R = [-1, +\infty)$

ان) $y = \frac{x^T + 5}{x^T - 2} \Rightarrow y(x^T - 2) = x^T + 5 \Rightarrow yx^T - 2y = x^T + 5 \Rightarrow x^T(y - 1) = y + 5 \Rightarrow x = \frac{y + 5}{y - 1}$

1) $x^T = \frac{y + 5}{y - 1} \Rightarrow x = \pm \sqrt{\frac{y + 5}{y - 1}} \Rightarrow R = (1, +\infty)$ + $\frac{1}{y-1}$ - $\frac{1}{y-1}$ + R = $(-\infty, -\frac{1}{y-1}] \cup (1, +\infty)$

ب) $\frac{5|x| + 1}{|x| - 5} = y \Rightarrow y(|x| - 5) = 5|x| + 1 \Rightarrow y|x| - 5y = 5|x| + 1 \Rightarrow y|x| - 5|x| = 5y + 1$

$\Rightarrow |x|(y - 5) = 5y + 1 \Rightarrow |x| = \frac{5y + 1}{y - 5} \Rightarrow R = (\frac{1}{5}, +\infty)$ + $\frac{1}{y-5}$ - $\frac{1}{y-5}$ + R = $(-\infty, -\frac{1}{y-5}] \cup (\frac{1}{5}, +\infty)$

ان) $y = x^T - 7x + 7 \Rightarrow \min |x| = \frac{b}{a} = \frac{7}{1} = 7 \Rightarrow R = [7, +\infty)$

0, -5

ب) $y = x^T + (x + 7) \Rightarrow \max |x| = \frac{b}{a} = \frac{7}{1} = 7 \Rightarrow R = (-\infty, 7]$ 1, 100

ان) $y = \sqrt{x^T - 7x + 7} \Rightarrow \min |x| = \frac{b}{a} = \frac{7}{1} = 7 \Rightarrow R = \sqrt{[-7, +\infty)} \Rightarrow R = [0, +\infty)$

1, 100

ب) $y = \sqrt{-x^T + (x + 1)} \Rightarrow \max |x| = \frac{b}{a} = \frac{1}{1} = 1 \Rightarrow R = \sqrt{(-\infty, 1]} \Rightarrow R = [0, 1]$

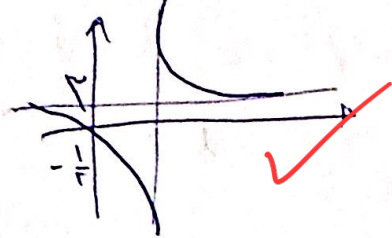
ان) $R_f \subseteq \mathbb{R}$

ب) $R_f \subseteq [0, +\infty)$

ان) $\frac{x^T + 1}{x^T - 2} \Rightarrow R = \{\frac{1}{5}\}$

ب) $y = \sqrt{\frac{x^T + 1}{x^T - 2}} \Rightarrow R_f = [0, +\infty) \cup \{\frac{1}{5}\}$

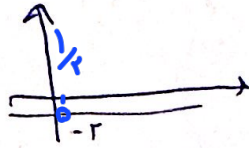
الذ $y = \frac{r^{n+1}}{n-1}$



1, 1/5

-9

ب) $y = \frac{r^n - r}{1 - r^n} = -1$
 $a \neq \frac{1}{r}$



≠

الذ $y = \cos r^n + \frac{1}{\cos r^n} \Rightarrow R_f = [r_0 + \infty)$ ✓

-10

1, 1/5

ب) $\sqrt[n]{n^2+1}$ $\Rightarrow R_f = (-\infty, -r] \cup [r, +\infty)$

$R_f = (-\infty, \sqrt[n]{-r}] \cup [\sqrt[n]{r}, +\infty)$