

نام و نام خانوادگی شماره کلاس (در ادامه پاسخ دهید) ...

الف) $(x - \sqrt{\frac{x}{x-1}})^2 \Rightarrow \left(\sqrt{\frac{x}{x-1}} - \sqrt{\frac{x}{x-1}} \right)^2 \Rightarrow \left(\frac{x}{x-1} - \frac{x}{x-1} \right)^2 = 0$ ✓

ب) $\log y - \sin x = c$
 $\Rightarrow \log y = \sin x + c \Rightarrow y = 10^{\sin x + c} = 10^{\sin x} \cdot 10^c = 10^{\sin x} \cdot 10^c$ ✓

الف) $y = \sqrt{\frac{x^2 - 4}{x^2 - 9}} \xrightarrow{\text{عوض شود}} x = \sqrt{\frac{y^2 - 4}{y^2 - 9}} \Rightarrow x' = \frac{y' - 4}{y' - 9} \Rightarrow x' y - 4x = y' - 4$ ✓

ب) $\Rightarrow x' y - y' = 4x - 4 \Rightarrow (x' - 1)y = 4x - 4 \Rightarrow y' = \frac{4x - 4}{x^2 - 1} \Rightarrow y = \sqrt{\frac{4x^2 - 4}{x^2 - 1}}$

ج) $\Rightarrow \frac{-1}{x^2 - 1} = \frac{-2}{x^2 - 1} + \frac{1}{x^2 - 1} \Rightarrow \left(0, \frac{1}{x^2 - 1} \right) \checkmark (1, +\infty) \Rightarrow \frac{1}{x^2 - 1} \checkmark$

الف) $f(x) = x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}}$ ✓

ب) $x > 0 \Rightarrow x + \frac{1}{x} > 2 \Rightarrow 2\sqrt{x + \frac{1}{x}} > 2\sqrt{2} \Rightarrow R_f = [2\sqrt{2}, +\infty)$ ✓

ج) $x < 0 \Rightarrow x + \frac{1}{x} < -2 \Rightarrow 2\sqrt{x + \frac{1}{x}} \Rightarrow R_f \Rightarrow x > 0$

$(x - \sin x)(1 + \sin x) \Rightarrow -\sin^2 x + \sin x + x = 0 \Rightarrow -(\sin x - 1)^2 + 1 + x = 0$

$\sin x = 1 \Rightarrow x = \frac{\pi}{2} \Rightarrow R = [-\frac{\pi}{2}, 0] \Rightarrow R_g = [0, \frac{\pi}{2}] \Rightarrow R_y = [0, \frac{\pi}{2}]$ ✓

$(-\frac{1}{x} + 0) + (-\frac{1}{x} + 1) + \dots + (-\frac{1}{x} + 1)$ ✓

$y = -\frac{1}{x} + 1$

$\Rightarrow (2 \times 1) - (1 + 2 + \dots + 9) \left(-\frac{1}{x} \right) = 2 - \frac{45}{x} = 2 - 15 = -13$ ✓

چون دایره $(1, +\infty)$ تقریباً می شود، سبب آن $\{x\}$ است ✓

$f(x) = \sqrt{ax^2 + bx + c} \Rightarrow a=0 \rightarrow$ تابع خطی $\rightarrow$ با توجه به دامنه $x > 0$

$\Rightarrow ax^2 + bx + c = h(x - r)^2 = h(x^2 - 2rx + r^2)$ ✓

$\Rightarrow a = h, b = -2hr, c = hr^2$

$\Rightarrow h(1 - 2r + r^2) = 1 \Rightarrow h = 1 \Rightarrow a = 1, b = -2, c = 1$

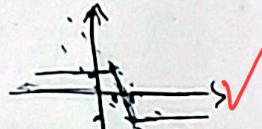
$g(x) = \sqrt{x^2 - 2x + 1} \Rightarrow \Delta = b^2 - 4ac = 4 - 4 = 0$ ✓

$$|n-r| - |n-1| = kn$$

✓

$$\begin{aligned} & -n+r+n-1=1 \quad \downarrow \quad -\frac{1}{n+r} \\ & n-r-n+1=-1 \end{aligned}$$

$$kn \Rightarrow \begin{pmatrix} 1 \\ 1 \end{pmatrix} (k=1) \Rightarrow \begin{pmatrix} k \\ -1 \end{pmatrix} \Rightarrow \begin{pmatrix} k \\ -1 \end{pmatrix} \quad \checkmark$$

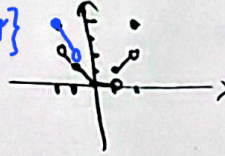


نمی توانیم از شکل ۲ بخرد و جواب داد

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$$y = n[n]$$

$$R_f = [0, 2) \cup \{2\} \quad R_f = [0, 2] - \{1\}$$



الف)

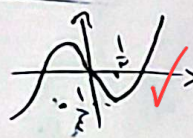
$$[-1, -1], [-1, 0], [0, 1], [1, 2]$$

$$-2 \leq x < -1 \rightarrow y = -2x \quad -1 \leq x < 0 \rightarrow y = -x \quad 0 \leq x < 1 \rightarrow y = 0 \quad 1 \leq x < 2 \rightarrow y = x \quad x=2 \rightarrow y=2$$

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$$y = n|n| - n$$

$$\begin{aligned} & n^2 - n & n > 0 \\ & -n^2 - n & n < 0 \end{aligned}$$



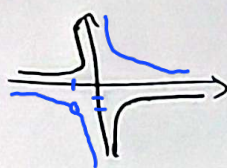
$$R_f = \mathbb{R}$$

$$R_f = [-1, 2]$$

با توجه به بازه بندی قدرت سوال

$$y = \frac{1}{n} + \frac{1}{n+1} + \frac{1}{n^2+n} \Rightarrow y = \frac{(n+1) + (ny+1)}{n^2+n} = \frac{r(n+1)}{n(n+1)}$$

$$= \frac{r}{n} \quad \checkmark$$



$$R_f = \mathbb{R} - \{0\}$$

$$R_f = \mathbb{R} - \{0, -2\}$$

$$a+b=-2$$

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$$\frac{n - \sqrt{5n+1}}{n - 2\sqrt{5n+1}}$$

$$\Rightarrow \sqrt{n} = t \Rightarrow \frac{t^2 - \sqrt{5}t + 1}{t^2 - 2\sqrt{5}t + 1}$$

$$\Rightarrow y = (-1, +\infty)$$

$$\frac{(t-1)(t-\sqrt{5})}{(t-1)(t-1)}$$

$$\frac{\sqrt{n} - \sqrt{5}}{\sqrt{n} - 1} = y \Rightarrow \frac{\sqrt{y} - \sqrt{5}}{\sqrt{y} - 1}$$

$$\Rightarrow \sqrt{y} - \sqrt{5} = \sqrt{y} - 1$$

$$\Rightarrow \sqrt{y}(n-1) = n - \sqrt{5}$$

$$R_f = (-\infty, 1) \cup [2, +\infty)$$

$$R_f = (-1, +\infty)$$

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

$$= n+2 \Rightarrow \left. \begin{aligned} & n=1 \Rightarrow n+2=3 \\ & n=-1 \Rightarrow n+2=1 \end{aligned} \right\} = \{3, 1\}$$

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