

19, 25

بار دوم

مسئله شماره ۱۹ و ۲۵

$n^3 f(n+1) \geq 0 \rightarrow n^3 \times (1^n - 1) \geq 0$ (۱) (۲)

$$\frac{-1}{-1+1-1} \rightarrow D = [0, 1] \checkmark$$

$f(n) = \sqrt{-n+1-n+1} \rightarrow -n+1-n+1 \geq 0$ (۲) (۳)

که اگر مرتبه درگیر و نبود ۲ - پس باید کوچکتر از ۲ باشد

$\Rightarrow -2n+2 \leq 0$

$$\boxed{n \geq 1} \quad D = (-\infty, 1] \checkmark$$

$\frac{n-1}{f(n)} \geq 0$

$$\frac{-1-1}{-1+1-1} \rightarrow D = (-1, 1] \cup (1, 2) \checkmark$$

$$\frac{1}{9n^2 - 2n^2 - 2n - 2} = \frac{1}{(9n^2 - 2n^2 + 1) - (2n^2 + 2n + 2)} = \frac{1}{(7n^2 - 1)^2 - (n+2)^2}$$

$$\frac{1}{(7n^2 - 1)(7n^2 - 1 - (n+2)^2)} \Rightarrow \frac{1}{7n^2 - 1} = \frac{1}{7n^2 - 1}$$

 $a = -1 \checkmark \quad b = 1 \checkmark$

$\sqrt{-(a+b)} = \sqrt{4} = 2 \checkmark$

$$n^3 + n - \frac{4}{n^2} - \frac{1}{n} \geq 0$$

$$\left(n^3 - \frac{4}{n^2} \right) + \left(n - \frac{1}{n} \right) \geq 0 \quad \left(n - \frac{1}{n} \right) + \left(n^3 + n - \frac{4}{n^2} \right) \geq 0$$

$$\frac{-1}{-1+1-1} \rightarrow D = [-2, 0) \cup [2, +\infty)$$

$$\frac{n^2 - 4}{n^2} \rightarrow \frac{n^2 - 4}{n^2} = \frac{(n-2)(n+2)}{n^2}$$

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$$n \leq 1 \Rightarrow f(1) = 1$$

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$$f(1) = 1 \checkmark$$

(2) (4)

$$f(n) = n^2 - 4n + 1 \Rightarrow (n-2)^2 + 1$$

$$\Rightarrow f(\sqrt{n-2}) = 1$$

$$g(n) = n^2 + 4n + 1 \Rightarrow (n+2)^2 - 3 \Rightarrow g(\sqrt{n-2}) = 1$$

$$\Rightarrow \frac{g(\sqrt{n-2})}{f(\sqrt{n-2})} = -1 \checkmark$$

(2) (1)

$$f(n) = \sqrt{(n-2) + 4\sqrt{n-2} + 1} \Rightarrow f(n) = \sqrt{(\sqrt{n-2} + 1)^2} = \sqrt{n-2} + 1$$

$$g(n) = \sqrt{(n-2) + 4\sqrt{n-2} + 1} \Rightarrow g(n) = \sqrt{(\sqrt{n-2} + 1)^2} = \sqrt{n-2} + 1$$

$$f(n) + g(n) = 2\sqrt{n-2} \Rightarrow a + b = p \checkmark$$

$$\Rightarrow \frac{a+b}{2} = \frac{p}{2} \checkmark$$

$$g = \{1, 2, 3\}$$

$$g \subseteq \mathbb{R} - \{1, 2\} \checkmark \quad \left. \begin{matrix} \frac{n+1}{(n-1)(n-2)} \end{matrix} \right\} \Rightarrow g \cap g = \{1, 2\} \checkmark$$

$$\frac{g}{f} = \left\{ \left(1, \frac{1}{2}\right), \left(2, \frac{1}{3}\right) \right\}$$

(1, 1/2)

(2) (1)

$$1) f(n) = \left\{ \left(\frac{1}{2}, 1\right), \left(\frac{1}{3}, 1\right), (1, 2), \left(\frac{1}{2}, 2\right) \right\} \checkmark$$

$$2) f(n) = \left\{ (1, 2), (-1, 2), (\sqrt{2}, 1), (\sqrt{2}, -1), (5, 2), (5, -2) \right\}$$

$$3) f(n) + 1 = \left\{ (-1, 1), (1, 2), (5, 2), (5, -2) \right\} \checkmark$$

$$4) \frac{f}{g} = \left\{ (1, -2), (5, -2), \left(\frac{1}{2}, \frac{1}{3}\right) \right\} \checkmark$$