



۲. آزمون

فاینا قولیان

DATE

Subject:

$$F(x) = \sqrt{x + \epsilon \sqrt{x - \epsilon} + \epsilon - \epsilon} \Rightarrow$$

$$F(x) = \sqrt{x - \epsilon + \epsilon \sqrt{x - \epsilon} + \epsilon} = \sqrt{(\sqrt{x - \epsilon} + \epsilon)^2}$$

$$g(x) = \sqrt{x - \epsilon \sqrt{x - \epsilon} + \epsilon - \epsilon} \Rightarrow \sqrt{x - \epsilon - \epsilon \sqrt{x - \epsilon} + \epsilon}$$

$$\sqrt{(\sqrt{x - \epsilon} - \epsilon)^2} \Rightarrow f(x) + g(x) =$$

$$|\sqrt{x - \epsilon} + \epsilon| + |\sqrt{x - \epsilon} - \epsilon| = 2\sqrt{x - \epsilon}$$

$$x \geq 0 \quad a = 0$$

$$\frac{a+b}{c} = \frac{-1}{\epsilon} \quad b = \epsilon \quad c = -\epsilon$$

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

$$\frac{g(x)}{F(x)} = \frac{1}{\epsilon} \quad \frac{g(0)}{F(0)} = \frac{\epsilon}{\frac{\epsilon}{\epsilon}} = \epsilon$$

$$\frac{g}{F} = \left\{ \left( \epsilon, -\frac{1}{\epsilon} \right) \left( 0, \epsilon \right) \right\}$$

$$a) f(x) = \left\{ \left( \frac{1}{x}, 2 \right) \left( \frac{x}{2}, -1 \right) \left( \frac{2}{x}, 1 \right) \left( \frac{-1}{x}, 2 \right) \right\}$$

$$b) f(x) = \left\{ (1, 2) (-1, 2) (\sqrt{x}, -1) (-\sqrt{x}, -1) (x, 1) (-x, 1) \right\}$$

$$c) xg^2(x) + 1 \Rightarrow g^2(x) \left\{ (-2, 9) (1, 1) (3, 4) \right.$$

$$\left. (-1, 0) \right\}$$

$$xg^2(x) = \left\{ (-2, 18) (1, 2) (3, 12) (-1, 0) \right\}$$

$$xg^2 + 1 \Rightarrow \left\{ (-2, 19) (1, 3) (3, 13) (-1, 1) \right\}$$

$$d) \frac{x^2}{g} \Rightarrow x^2 \left\{ (1, 4) (2, -1) (3, 4) (-1, 2) \right\}$$

$$\frac{x^2}{g} = \left\{ \left( \frac{1}{2}, 4 \right) \left( \frac{2}{x}, -\frac{1}{x} \right) \left( \frac{-1}{x}, \frac{4}{x} \right) \right\}$$

$$F(n) \{ (1, 1) (1, 1) (1, 1) (-1, 0) \} - \epsilon$$

$$F+g \Rightarrow \{ (1, 1) (1, 1) (-1, 1) \}$$

$$I \quad F \rightarrow \begin{matrix} \forall n \geq 0 \\ n \geq 0 \end{matrix} \quad \sqrt{F(n) - n} \Rightarrow \sqrt{F(n) - n}$$

$$n \neq 1$$

$$\begin{matrix} 0 & 1 \\ + & - & + \end{matrix} [0, 1]$$

$$n \Rightarrow [0, 1] - \{1\}$$

$$g \Rightarrow n \in \mathbb{Z} \rightarrow 0 \quad n \notin \mathbb{Z} \rightarrow -1$$

$$\frac{f(n)}{g(n)+1} \Rightarrow \exists n \in \mathbb{Z} \quad p \in \mathbb{Z} \quad \{ \}$$

$$\sqrt{-(n^2 - an + \epsilon)} \Rightarrow \sqrt{-(n-1)(n-\epsilon)} \quad \frac{1}{\sqrt{1-\epsilon}} - \epsilon$$

$$D_F = [1, \epsilon]$$

$$\frac{f(n)}{g(n)} \Rightarrow \{ (1, 0) (1, \sqrt{\epsilon}) (\epsilon, \frac{0}{\epsilon}) \}$$

$$a) \Rightarrow g = (n-1)^2 + 1 \Rightarrow (n-1)^2 = g-1 \quad \checkmark$$

$$n-1 = \sqrt{g-1} \Rightarrow n = \sqrt{g+1} \quad \checkmark$$

$$R_f = \mathbb{R}$$

$$\Rightarrow g = \frac{1}{n^2 - 2n} \Rightarrow n^2 - 2n = \frac{1}{g}$$

$$(n-1)^2 = \frac{1}{g}$$

$$n-1 = \sqrt{\frac{1+g}{g}}$$

$$\leftarrow (n-1)^2 = \frac{1+g}{g}$$

$$\Downarrow$$

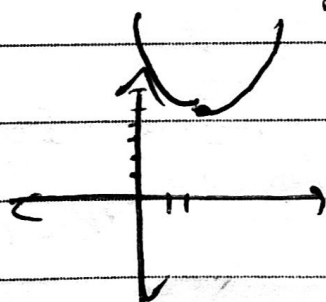
$$n = \sqrt{\frac{1+g}{g}} + 1$$

$$g \neq 0$$

$$\frac{1+g}{g} \geq 0 \Rightarrow \frac{-1}{-1} \geq 0$$

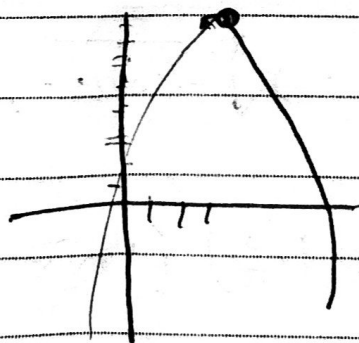
$$R_f = \mathbb{R} - \{0\}$$

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



$$R_f = [1, +\infty)$$

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



$$R_f = (-\infty, 1]$$

$$\sqrt{-V, +\infty}$$

$$c) \frac{b}{va} = v$$

$$g = -V$$

$$R_f = [0, +\infty)$$

$$d) \frac{-b}{va} = v$$

$$g = 9$$

$$R_f = \sqrt{-\infty, 9] = [0, 9]$$

$$e) R_f = \mathbb{R}$$

$$\Rightarrow R_f = \mathbb{R} - 9$$

$$f) R_f = \sqrt{\mathbb{R}} \Rightarrow [0, +\infty)$$

$$g) (\mathbb{R})^p = [0, +\infty)$$

$$h) R_f = \mathbb{R} - \{1\}$$

$$-1.$$

$$i) R_f = \mathbb{R} - \{1\}$$