

$$f(u) = \sqrt{u + \sqrt{u - r}} = \sqrt{u - r + r + \sqrt{u - r}} = \sqrt{(\sqrt{u - r} + r)^2} = |\sqrt{u - r} + r| = \sqrt{u - r} + r \quad (1)$$

$$g(u) = \sqrt{u - r} \sqrt{u - r} = \sqrt{u - r + r - \sqrt{u - r}} = \sqrt{(\sqrt{u - r} - r)^2} = |\sqrt{u - r} - r| = \sqrt{u - r} - r$$

مقدارهای مثبت و منفی را در نظر بگیرید

$$f(u) + g(u) = \sqrt{u - r} - r + r \rightarrow \begin{matrix} a=0 \\ b=r \\ c=-r \end{matrix} \rightarrow \frac{a+b}{c} = \frac{r}{-r} = -\frac{1}{r}$$

$$f(u) = \frac{u+r}{u-r+u+r} = \frac{u+r}{(u-r)(u+r)} \rightarrow R - f(u)$$

$$u=r \rightarrow \frac{r}{(-1)(1)} = -r \quad u=0 \rightarrow \frac{r}{r} \quad g/f(u) = f(r, -\frac{1}{r}, g(0, r))$$

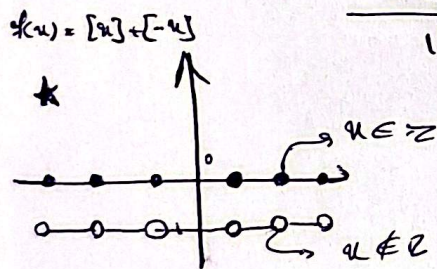
$$a) f(u) = f(r, -\frac{1}{r}, g(r, -\frac{1}{r}))$$

$$b) f(u^2) = f(1, -1, g(1, -1))$$

$$c) r g^2(u) + 1 = f(-r, 1, g(-r, 1)) \quad d) \frac{r g}{g} = f(1-r, (r-1), (-1, \frac{r}{r}))$$

$$h = r f + g \Rightarrow u+r=0 / r+u=0 / u+r(0)=u \rightarrow f(r, 0), (r, 0), (-r, 0)$$

$$\left(\frac{f}{g+1}\right)(u) = \frac{\frac{\sqrt{u^2-u}}{u-r}}{\frac{u-r}{[u]+[-u]}+1}$$

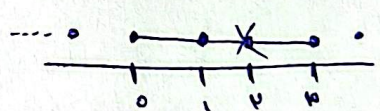


$$1) u \geq 0 \rightarrow u \geq 0$$

$$2) \sqrt{u^2-u} \geq 0 \rightarrow \sqrt{u} \geq \sqrt{u} \rightarrow u \geq u^2 \rightarrow u - u^2 \geq 0 \rightarrow u(1-u) \geq 0$$

$$3) u - r \neq 0 \rightarrow u \neq r \rightarrow u \in \mathbb{Z}$$

$$4) [u] + [-u] \neq 1 \neq 0$$



$$\frac{f}{g+1} = f \circ g$$

$$f(u) = \sqrt{u^2 - u^2 - r} \rightarrow -u^2 + u - r \geq 0 \rightarrow u^2 - u + r \leq 0$$

$$Df = [0, r]$$

$$h(u) = \frac{f(u)}{g(u)} \rightarrow g(u) \neq 0 \rightarrow Dg = f \circ g \circ f \circ g$$

$$h(u) = f(1, 0, g(1, \frac{\sqrt{1-r}}{r}))$$

(V)

$$\text{a)} y = u^3 - 10u^2 + 14u \rightarrow y - 1 = u^3 - 10u^2 + 14u - 1$$

$$y - 1 = (u - 1)^3 \rightarrow \sqrt[3]{y - 1} = u - 1 \rightarrow \sqrt[3]{y - 1} + 1 = u \rightarrow R = 1R$$

$$\text{b)} y = \frac{1}{u^2 - 4u} \rightarrow y(u^2 - 4u) = 1 \rightarrow yu^2 - 4yu - 1 = 0 \rightarrow \text{a)} y + 0 \rightarrow u = \frac{4y \pm \sqrt{16y^2 + 4y}}{2y}$$

$$\text{b)} y = 0 \rightarrow u = 0 \rightarrow \frac{0}{0}$$

$$4y(y - 1) > 0 \rightarrow \frac{+}{-} \frac{+}{-} \frac{-}{+} \rightarrow R_f = (-\infty, -1/3) \cup [0, +\infty)$$

$$\text{a)} y = u^2 - 4u + 10 \rightarrow \left| \frac{1}{4} \right| \alpha > 0 \rightarrow [u + \infty) \text{ b)} y = -u^2 + 4u + 10 \rightarrow \left| \frac{1}{4} \right| \alpha < 0$$

$$R = (-\infty, 1/3]$$

$$\text{c)} y = \sqrt{u^2 - 4u - 10} \rightarrow \left| \frac{1}{-1} \right| \alpha > 0 \rightarrow \sqrt{(-1) + \infty) \rightarrow R_f = [0, +\infty)$$

$$\text{d)} y = \sqrt{4u - u^2} \rightarrow \left| \frac{1}{1} \right| \alpha < 0 \rightarrow \sqrt{(-\infty, 4)} \rightarrow R = [0, 4]$$

$$\text{a)} y = (u^2 - 4u) \rightarrow R = 10R \text{ b)} y = u^2 + 4u^2 + u \rightarrow R = 1R$$

(2)

$$\text{c)} y = \sqrt{u^2 + 4u} \rightarrow R = \sqrt{2} \rightarrow [0, +\infty) \text{ d)} y = (u^2 - 4u^2 + u) \rightarrow R = [0, +\infty)$$

نکته: در این موارد باید دقت کرد که دامنه تابع را در نظر بگیریم.

$$\text{a)} y = \frac{u+1}{u-2} \rightarrow R = \mathbb{R} \text{ b)} y = \frac{u+1}{u+1} \rightarrow R_f = R \text{ f} \neq y$$

(10)