

$$\left(\frac{y}{x}\right) = \frac{y}{x} = \frac{1}{y} \quad \cot \frac{\pi}{6} = \cot \frac{\pi}{6} = \sqrt{3} \Rightarrow \sqrt{\sqrt{3}^2 + 1} = 2$$

$$y \cos \frac{\pi}{6} = \frac{1}{y} \Rightarrow f\left(\frac{1}{y}\right) \Rightarrow x = y \rightarrow \sqrt{\frac{y(y)-1}{y^2}} = \sqrt{\frac{y^2}{y^2}}$$

$$\frac{\sqrt{y}}{1-\sqrt{y}} \Rightarrow f\left(\frac{\sqrt{y}}{1-\sqrt{y}}\right) = \left[\frac{\sqrt{y}}{1-\sqrt{y}}\right] = -f$$

$$f\left(\frac{y}{x}\right) = \sin \frac{\pi}{6} = \frac{\sqrt{y}}{y} \Rightarrow g\left(\frac{\sqrt{y}}{y}\right) = \frac{\sqrt{y}}{y} \sqrt{1 - \left(\frac{\sqrt{y}}{y}\right)^2} = \frac{\sqrt{y}}{y} \times \sqrt{\frac{y-y}{y}} = \frac{\sqrt{y}}{y} \times \frac{1}{\sqrt{y}} = \frac{1}{y}$$

$$\text{الف) } \{(4, 5), (2, 5), (2, 12), (1, 12)\} \quad \text{ب) } \{0\} \quad \text{ج) } \{0\} \quad \text{د) } \{(4, 1), (2, 2), (1, 1)\}$$

$$f \circ g = \{(1, a), (2, v), (q, r), (b, v)\}$$

$$g \circ f = \{(2, r), (1, a)\}$$

$$a = \text{ب}$$

$$b = \text{د}$$

$$\left. \begin{array}{l} f \circ g \\ g \circ f \end{array} \right\} (4, 5)$$

در صورت کلی بر الی خطی بدون تابع f پس تابع کلی آن یکی از دو حالت زیر است:

$$f(x) = 2x + 1 \rightarrow f(-1) = -1$$

$$f(x) = -2x - 2 \rightarrow f(-1) = -1$$

$$g(-1) \Rightarrow 2x + 2 = -1 \rightarrow 2(-2) - 2 = -6$$

$$x + |x| \geq 0 \quad \begin{cases} x \geq 0 \rightarrow x + |x| = 2x \geq 0 \quad \checkmark \checkmark \checkmark \\ x < 0 \rightarrow x + |x| = x - x = 0 \quad (-\infty, \infty) \end{cases} \rightarrow f(x) = \begin{cases} \sqrt{2x}, & x \geq 0 \\ [f, p], & x < 0 \end{cases} [0, \infty)$$

$$f(x) = 0 \rightarrow x < 0$$

$$f(x) = f \rightarrow x \geq 0 \rightarrow \sqrt{2x} = f \rightarrow 2x = f^2 - x = 3$$

$$D(g \circ f) = (0, \infty) \setminus \{1\} = (0, 1) \cup (1, \infty)$$

$$1 - x^2 \geq 0 \rightarrow -1 \leq x \leq 1 \rightarrow f(x) = \sqrt{1 - x^2} \Rightarrow 0 \leq f(x) \leq 1$$

$$(f + g)(y) = f(y) + g(y) = \sqrt{1 - y^2} + \sqrt{y}$$

$$\|(f + g) \circ f\|(x) = \sqrt{1 - (f(x))^2} + \sqrt{f(x)} = \sqrt{1 - f} \quad x \in [-1, 1]$$

$$(f + g) \circ f \Rightarrow f(f(x)) + g(f(x)) \Rightarrow g(f(x)) \rightarrow f(x) \geq 0$$

$$f(x) \in [0, 1] \quad f(f(x)) \in [-1, 1] \quad x \in [-1, 1]$$