

$R_f = [0, +\infty)$ $y = \sqrt{x-2} \rightarrow x = \sqrt{y-2}^2$ $\rightarrow x^2 = y-2 \rightarrow y = x^2 + 2 \quad D_f = [0, +\infty)$ $y = x^2 - 2x + 3, x \in [2, +\infty) \rightarrow x = y^2 - 2y + 3 \rightarrow x = (y-1)^2 - 1 \rightarrow \sqrt{x+1} = y-1$ $\rightarrow y = \sqrt{x+1} + 1, x \in (-1, +\infty)$	الف) 6
$\begin{aligned} (x_1, y) &\xrightarrow{f} x_1 = x^2 \quad \frac{x_1}{\sqrt{x_1^2-2}} = \frac{x^2}{\sqrt{x^2-2}} \xrightarrow{\text{تبدیل}} \frac{x^2}{x^2-2} = \frac{x^2}{x^2-2} \rightarrow x_1^2 \cdot \frac{x^2}{x^2-2} = x^2 \cdot \frac{x^2}{x^2-2} = x^2 \\ (x_2, y) &\xrightarrow{f} \frac{x_2}{\sqrt{x_2^2-2}} = \frac{x^2}{\sqrt{x^2-2}} \rightarrow x_1^2 = x_2^2 \rightarrow x_1 = \pm x_2 \end{aligned}$ $\leftarrow x_1$ نمی تواند برابر x_2 مخالف علامت باشد چون علامت خیلی تغییر می کند پس یک به یک است $\xrightarrow{\text{تبدیل}} x^2 = \frac{y^2+0}{y^2-2} \rightarrow y^2 = \frac{2x^2}{x^2-1} \rightarrow y = \frac{\sqrt{2x}}{\sqrt{x^2-1}}$	8
$f^{-1}(n) = \sqrt{x-1} \rightarrow f(n) = x^2 + 1 \rightarrow g(n) = f(n) + \sqrt{f(n)}$ $= x^2 + 1 + \sqrt{x^2 + 1}$ $g^{-1}(12) \rightarrow (12, x) \rightarrow g(x) = (x, 12) \rightarrow x^2 + 1 + \sqrt{x^2 + 1} = 12$ $\rightarrow x = 2$ چون جواب $g(2) = 12$ پس $g^{-1}(12) = 2$	10
$f^{-1}(n) = \frac{x}{1+x} \rightarrow f(n) = \frac{y}{1+y} \rightarrow x = \frac{y}{1+y} \rightarrow -\frac{2}{0} = \frac{y}{1+y} \xrightarrow{\text{تبدیل}} -2 = \frac{y}{1+y} \rightarrow y = -\frac{2}{1} \cdot \alpha$ $g(n) = \sqrt{n-1} \rightarrow n = \sqrt{y-1} \rightarrow y = (n+1)^2 \xrightarrow{g^{-1}(-\frac{2}{0})} y = (\frac{2}{0})^2 = \frac{4}{0} \rightarrow y = -\frac{2}{1}$ $f(-\frac{2}{0}) + g^{-1}(-\frac{2}{0}) = \frac{9}{20} - \frac{2}{1} = \frac{9-20}{20} = -\frac{11}{20}$	9
$f(x) = x + \sqrt{x} \rightarrow f^{-1}(n) = y + \sqrt{y} \rightarrow x = y + \sqrt{y} \rightarrow x = (\sqrt{y} + \frac{1}{\sqrt{y}})^2 - \frac{1}{y}$ $\rightarrow x + \frac{1}{x} = (\sqrt{y} + \frac{1}{\sqrt{y}})^2 \Rightarrow \sqrt{x + \frac{1}{x}} = \sqrt{y} + \frac{1}{\sqrt{y}} \rightarrow \sqrt{y} = \sqrt{x + \frac{1}{x}} - \frac{1}{\sqrt{y}}$ $\Rightarrow y = x + \frac{1}{x} + \frac{1}{x} - \sqrt{x + \frac{1}{x}} \rightarrow a = 1, b = \frac{1}{x}, c = -\frac{1}{x}$ $\Rightarrow a + 2b + c = 1 + 1 - 1 = 1$	7

★ پاسخ سوالات 8 و 10 جایسته اند.