

$f(u^3+u) = 2u^2-1$ $f(v) \xrightarrow{u=1} f(\frac{v^3+1}{v}) = \frac{2 \times (1)^2-1}{v} = 1$ $f(10) \xrightarrow{u=2} f(\frac{v^3+2}{10}) = \frac{2 \times (2)^2-1}{10} = \frac{7}{10}$ $f(v) + f(10) = 1 + \frac{7}{10} = \frac{17}{10}$ جواب	6
$f(u) = u^3 - 4u^2 + 12u \rightarrow f(u) = u^3 - 4u^2 + 12u + \cancel{8} - \cancel{8} = (u-2)^3 + 8$ $g(u) = u^3 + 9u^2 + 20u \rightarrow g(u) = u^3 + 9u^2 + 20u + \cancel{27} - \cancel{27} = (u+3)^3 - 27$ $\frac{g(\sqrt[3]{50}-2)}{f(\sqrt[3]{50}+2)} \xrightarrow{+8, -8} \frac{(\sqrt[3]{50}-2)^3 - 27}{(\sqrt[3]{50}+2)^3 + 8} = \frac{(\sqrt[3]{50})^3 - 27}{(\sqrt[3]{50})^3 + 8} = \frac{50-27}{50+8} = \frac{23}{58}$ جواب	7
$f(u) = \sqrt{(u-2)+2\sqrt{u-2}+2} \rightarrow f(u) = \sqrt{(\sqrt{u-2}+2)^2} = f(u) = \sqrt{u-2}+2 $ $g(u) = \sqrt{(u-2)-2\sqrt{u-2}+2} \rightarrow g(u) = \sqrt{u-2}-2 $ $f(u) + g(u) = a + b\sqrt{u+c} \xrightarrow{2 \leq u < 8} \sqrt{u-2} + 2 + 2 - \sqrt{u-2} = 4$ $\xrightarrow{u \geq 8} \sqrt{u-2} + 2 + \sqrt{u-2} - 2 = 0 + 2\sqrt{u-2}$ $0 + 2\sqrt{u-2} = a + b\sqrt{u+c} \rightarrow \begin{cases} a=0 \\ b=2 \\ c=-2 \end{cases}$ $\frac{a+b}{c} = \frac{0+2}{-2} = -1$ جواب	8
$f(u) = \frac{u+2}{u^2-2u+3} \rightarrow D_f = \mathbb{R} - \{1, 3\}$ $\hookrightarrow u^2-2u+3 \neq 0 \rightarrow (u-1)(u-3) \neq 0 \rightarrow \begin{cases} u \neq 1 \\ u \neq 3 \end{cases}$ $D_f \cap D_g \rightarrow \{2, 0\}$ $\frac{g}{f} = \left\{ \left(2, -\frac{1}{2}\right), \left(0, \frac{2}{3}\right) \right\}$ جواب $f(u) \xrightarrow{u=2} \frac{2+2}{2^2-2 \times 2 + 3} = -2$ $\xrightarrow{u=0} \frac{0+2}{0^2-2 \times 0 + 3} = \frac{2}{3}$	9
الف) $f(2u) = \left\{ \left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), (2, 2), \left(-\frac{1}{2}, 2\right) \right\} \rightarrow$ جواب ب) $f(u^2) = \left\{ (2, 2), (\pm\sqrt{3}, -1), (2, 2), (\pm\sqrt{3}, 2) \right\}$ $\rightarrow f(u^2) = \left\{ (2, 2), (\pm\sqrt{3}, -1), (2, 2) \right\}$ جواب ج) $2g^2(u)+1 \rightarrow \left\{ (-2, 1), (1, 3), (3, 9), (-1, 1) \right\} \rightarrow$ جواب د) $\frac{f}{g} = \left\{ (1, -2), (3, -1) \right\} \rightarrow$ جواب ه) $fg = \left\{ (1, 2), (3, -2), (2, 2), (-1, 2) \right\}$ نکته: $u^2=1 \rightarrow u=\pm 1$ $u^2=3 \rightarrow u=\pm\sqrt{3}$ $u^2=4 \rightarrow u=\pm 2$ نکته: در این دو سوال به توان دو می‌رسیم و باید دقت کنیم	10