

1- $D_{g \circ f} = \{u | u \in D_f \cap \{u | f(u) \in D_g\}$ $D_f: u-1 > 0 \Rightarrow u > 1$
 $\log_r^{u-1} \geq 0 \Rightarrow u-1 \geq 1 \Rightarrow u \geq 2$ } $u \geq 2$

9- $\sqrt{-(u-1)^2}$ $D_g = -(u-1)^2 \geq 0 \Rightarrow D_g = \{1\} \Rightarrow f(u) = 1 \Rightarrow \sqrt{\log_r^{u-1}} = 1 \Rightarrow \log_r^{u-1} = 1$
 $\checkmark u-1 = r^1 \Rightarrow u = 1+1 = 2$

2- $f \circ g(u) = f(g(u)) = f(2u^2 - 4u + 1) = 2(2u^2 - 4u + 1) - 1 = 4u^2 - 8u + 1$
 $g \circ f(u) = f(u)^2 - 3f(u) + 1 = (2u-1)^2 - 3(2u-1) + 1 = 4u^2 - 4u + 1 - 6u + 3 + 1 = 4u^2 - 10u + 5$
 $f \circ g(u) = g \circ f(u) \Rightarrow 4u^2 - 8u + 1 = 4u^2 - 10u + 5 \Rightarrow 2u = 4 \Rightarrow u = 2$

3- $g(f(u)) = \omega u^2 + 11 \Rightarrow g(\frac{u}{t}) = \omega (\frac{u}{t})^2 + 11$ $ru = t \Rightarrow u = \frac{t}{r}$ $g(t) = \omega (\frac{t}{r})^2 + 11 \Rightarrow g(t) = \frac{\omega t^2}{r^2} + 11$
 $g(u) = \frac{\omega u^2}{r^2} + 11 \Rightarrow g(u-v) = \frac{\omega (u-v)^2}{r^2} + 11 = \frac{\omega u^2}{r^2} + \frac{\omega (-1)^2 u}{r} + \frac{\omega (-1)^2}{r^2} + 11$ $\checkmark$
 $g(u) = \frac{\omega (v-v)^2}{r^2} + 11 = 11$ $\checkmark$

4- $f(g(u)) = f(g(u)) - f = 2u^2 - 4u - 1 = g(u) = 2u^2 - 4u - 1 + f \Rightarrow g(u) = u^2 - 2u + 1 = (u-1)^2$
 $g(f(u)) = (f(u)-1)^2 = (2u-1)^2$ $\checkmark$

5- $f-g(u) = -u+1$ $f(g(u)) = f(g(u)) - 1 = \frac{u}{r} f(u) - 1$ $f-g = f - \frac{u}{r} f + 1 = -\frac{1}{r} f(u) + 1 = -u+1$
 $f(u) = \frac{-u+1}{-\frac{1}{r}} = r(-u+1) = -ru+r$ $g(u) = \frac{r}{r} (ru+r) - 1 = ru-1 \Rightarrow f \circ g(u) = f(ru-1) = -ru+r+1 = -ru+1$
 $\checkmark$

6- $f \circ g(u) = q \log_r^u = u \log_r^q$ $g \circ f(u) = \log_r^{qu} = u \log_r^q$ $f \circ g(u) = g \circ f(u)$
 $u^2 - ru \leq 0 \Rightarrow u(u-r) \leq 0$ $\frac{0}{+} \frac{r}{-} \Rightarrow [0, r]$
 البته باز هم شرط داشته g و u مقدار $\{0, r\}$ قابل قبول نیستند و جواب قابل اجزای صحت به شکل $u \in (0, r)$ است. $\checkmark$

7- $f(u - \frac{r}{u}) = u - \frac{r}{u} + u^2 - \frac{r}{u^2} - f \Rightarrow f(u) = u^2 + u$ $\checkmark$

8- $f \circ g = \log_r^{u-u^2}$ $D_{f \circ g} = u-u^2 > 0$ $u(1-u) > 0$ $\frac{+}{-} \frac{+}{-} \Rightarrow (0, 1) \Rightarrow A$ $\frac{-b}{2a} = \frac{-1}{2} = -\frac{1}{2}$
 $\rightarrow A(f(1)-(f(0)) = 14 \Rightarrow R: (-\infty, 14]$ $\xrightarrow{\text{مقدار و نظریه کسری}} \log_r^{(0,14]} \Rightarrow (0, f] \Rightarrow [1, 2, 3, f] \Rightarrow$ $\checkmark$

9- $f(f(u)) = 1 - 2f(u) \Rightarrow f(u) = 1 - 2u^2$ $h(g(u)) = (u-1)^2 + 2(u-1) + 1 = u^2 - 2u^2 + 2u - 1 + 2u - 2 + 1 = -u^2 + 4u - 2$
 $h(g(u)) = f(u) \Rightarrow -u^2 + 4u - 2 = 1 - 2u^2 \Rightarrow u^2 + 4u - 3 = 0$ $\checkmark$
 در اینجا نقطه قطع می کند $\checkmark$
 له ارسیم دارد $\checkmark$

10- $g(f(u)) = \alpha u^2 + ru = 1$ $u - \frac{f}{u} + r \Rightarrow u^2 - f + ru = 0 \Rightarrow (u-f)(u+1) = 0 \Rightarrow u = f$
 $u = f \Rightarrow g(f) = 4fa + 1 = 1 \Rightarrow a = 0$ $\checkmark$
 $u = -1 \Rightarrow g(f) = -a - 2 = 1 \Rightarrow a = -3$ $\checkmark$

