

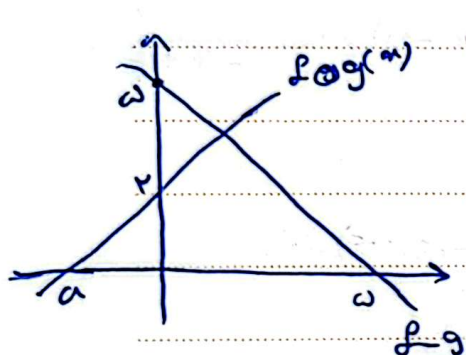
$$۴) f(n) = n^2 - ۲ \quad \log(n) = n^2 - ۴n - 1 \rightarrow g \circ f(n) = ?$$

$$۲g - ۲ = ۲n^2 - ۴n - 1 \rightarrow ۲g = ۲n^2 - ۴n + ۳ \rightarrow g = n^2 - ۲n + ۱$$

$$\rightarrow g(n) = (n-1)^2 \rightarrow g \circ f(n) = (n^2 - ۲n - 1)^2 = (n^2 - ۲n - 1)^2$$

$$g \circ f(n) = ۹n^4 - ۲۰n^3 + ۲۵n^2 - ۱۰n + ۱$$

$$۵) \log, f-g \rightarrow ۲g(n) = ۲f(n) - ۱۲ \rightarrow a = ?$$



$$۲f(n) - ۲g(n) = -۱۲ \rightarrow n = ۱$$

$$\begin{cases} f-g = -n+۱ \\ ۲g(n) - ۲f(n) = -۱۲ \end{cases} \rightarrow g(n) = n-1$$

$$\log(n) = ۲(n-1) + ۱ = ۲n - ۱$$

$$۹a + ۲ = ۰ \rightarrow ۹a = -۲ \rightarrow a = -\frac{۲}{۹}$$

$$۶) f(n) = 9^n \quad g(n) = \log_9 n \rightarrow \log(n) \leq g \circ f(n)$$

$$\log = 9^{\log_9 n} = n \quad \log_9 n = \frac{\log n}{\log 9} = \frac{\log n}{2} \quad g \circ f(n) = \log_9 9^n = n$$

$$\rightarrow ۲n \geq n^2 \rightarrow ۲n - n^2 \geq 0 \rightarrow n(۲-n) \geq 0$$

$$\rightarrow [0, 2] \rightarrow \{0, 1, 2\} \rightarrow [0, 2]$$

هجرت حضرت امام خمینی (رحمة الله عليه) از عراق به پاریس (۱۳۵۷ هـ ش) - روز نیروی انتظامی

$$v) f\left(\frac{m^r}{n}\right) = n^r + m - r - \frac{r}{m} + \frac{r}{m^r}$$

$$\rightarrow \frac{m^r}{n} = n - \frac{r}{n} \rightarrow n - \frac{r}{n} = t \rightarrow \frac{m^r}{n} = t^r + n - \frac{r}{n}$$

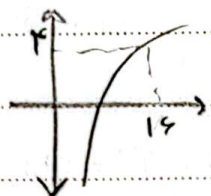
$$\rightarrow = t^r + t \Rightarrow f(m) = m^r + m$$

$$u) f(m) = \log_r m, g(m) = \wedge m - m^r \rightarrow A = D \log, B = R \log \rightarrow A \cap B = ?$$

$$D \log \subseteq \log_r \wedge m - m^r \rightarrow D \log \Rightarrow \wedge m - m^r > 0 \rightarrow m(\wedge - m) > 0 \rightarrow \frac{0}{-\phi + \phi} = \frac{\wedge}{-\phi + \phi}$$

$$\rightarrow (0, \wedge) \subseteq D \log = A$$

$$\hookrightarrow R \log \Rightarrow \log_r \wedge m - m^r$$



$$\rightarrow R = (-\infty, r] \subseteq B$$

$$A \cap B = (0, r] \rightarrow A \cap B = \{1, r, r^r\}$$

$$\boxed{\text{مجموعه } A \cap B = \{1, r, r^r\}}$$

$$9) f \circ f(m) = 1 - r f^r(m), g(m) = m - 1, h(m) = m^r + rm + 1$$

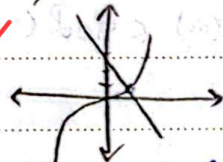
$$\rightarrow h(g(m)) = f(m) \rightarrow \text{مجموعه } m = ?$$

$$1) f(f(m)) = 1 - r f^r(m) \rightarrow f(t) = 1 - r t^r \rightarrow f(m) = 1 - r m^r$$

$$\rightarrow h(g(m)) = (m-1)^r + r(m-1) + 1 = m^r - r m^r + r m - 1 + r m - r + 1$$

$$h(g(m)) = m^r - r m^r + r m - r = 1 - r m^r \rightarrow m^r + r m - r = 0$$

$$m^r = -r m + r$$



$$\rightarrow \text{مجموعه } m = \{1, r, r^r\}$$

$$1.) f(m) = m - \frac{r}{m}, g \circ f(m) = a m^r + r m, g(r) = \wedge \rightarrow a = ?$$

$$m - \frac{r}{m} = r \rightarrow a r^r - r = r m \Rightarrow m^r - r m - r = 0 \rightarrow m = 1, r$$

$$\rightarrow m = -1 \rightarrow g(f(-1)) = -a - r = \wedge \Rightarrow a = -1 - r$$

$$m = r \rightarrow g(f(r)) = r^r a + \wedge = \wedge \Rightarrow a = 0$$