

سوال ۱۰ $r f(a) = f(-r) + a \rightarrow r(a+1)(v) = r^2 a - \varepsilon^2 a^2 \Rightarrow 14a + 14 = r^2 a - \varepsilon^2 a$

سوال ۱۱ $\boxed{a = -14}$

سوال ۱۲ $f(u) = \sqrt{u} + \frac{1}{\sqrt{u}} + r \rightarrow f\left(\frac{r-\sqrt{r}}{A}\right) + f\left(\frac{r+\sqrt{r}}{B}\right) = ?$

$AB = \varepsilon - r^2 = 1$

$\Rightarrow A = \frac{1}{B}, B = \frac{1}{A}$

$\Rightarrow \sqrt{A} = \frac{1}{\sqrt{B}}, \sqrt{B} = \frac{1}{\sqrt{A}}$

$f\left(\frac{r-\sqrt{r}}{A}\right) + f\left(\frac{r+\sqrt{r}}{B}\right) = \sqrt{A} + \frac{1}{\sqrt{A}} + r + \sqrt{B} + \frac{1}{\sqrt{B}} + r$

$= \sqrt{A} + \sqrt{B} + r + \sqrt{B} + \sqrt{A} + r$

$= r(\sqrt{A} + \sqrt{B}) + \varepsilon$

$\Rightarrow \boxed{r(\sqrt{A} + \sqrt{B}) + \varepsilon}$

$(\sqrt{A} + \sqrt{B})^2 = A + B + 2\sqrt{AB}$

$\Rightarrow \sqrt{A} + \sqrt{B} = \sqrt{4}$

سوال ۱۳ $r f(u) - w f(-u) = \varepsilon w^3 - w$

$\lim_{u \rightarrow -u} \begin{matrix} r f(u) - w f(-u) \\ \varepsilon w^3 - w \end{matrix} = \varepsilon w^3 - w$

$r f(u) - w f(-u) = r(u - r) - w(-u - r)$

$= ru - r^2 + wu + wr$

$= (r+w)u - r^2 + wr$

$\Rightarrow \boxed{f(u) = \frac{r}{\varepsilon} - \frac{w}{\varepsilon}}$

سوال ۱۴ $(u+r)f(u) - ruf(r) = \varepsilon u^3 - mu + r^2m - 1$

$\frac{u=0}{u=-r} \rightarrow r f(0) = r^2m - 1 \xrightarrow{x^2} r f(0) = 9m - r^2$

$\frac{u=-r}{u=-r} \rightarrow r f(0) = 15 + 2m$

$\Rightarrow r f(0) = \frac{r^2}{r} = \frac{1}{r} \Rightarrow 1 - \frac{1}{r} = \frac{r^2}{r} \Rightarrow \boxed{f(0) = \frac{r^2}{r}}$

$r f(0) = 9m - r^2 \Rightarrow 9m - r^2 = 15 + 2m$

$7m = r^2 + 15$

$\frac{1}{r} = \frac{3}{b} = \frac{9}{a}$

$$f(u) + f\left(\frac{1}{u}\right) = \frac{3u^3 - 12u + 3}{u} \Rightarrow f(u) + f\left(\frac{1}{u}\right) = 3u - 12 + \frac{3}{u}$$

سوال ٥

$$\begin{aligned} a &= 3 & f(u) + f\left(\frac{1}{u}\right) &= au + b + \frac{a}{u} < \\ b &= -9 & f\left(\frac{1}{u}\right) &= \frac{a}{u} + b \end{aligned}$$

$$f(u) = 3u - 9 \rightarrow f(-1) = -3 - 9 = -12$$

التي تسمى هذان $u = -1$ في عبارت اول تراه، صحيح.

$$\begin{aligned} f(u) &= (u-1)\sqrt{1-u} & 0 &= u < 1 & f(u) &= -(1-u)\sqrt{1-u} = -\frac{1}{2}(1-u)^{\frac{3}{2}} \\ g(u) &= -\sqrt{(1-u)^3} & 0 &= u < 1 & g(u) &= -(1-u)^{\frac{3}{2}} \end{aligned}$$

$$f(u)g(u) = (u-1)\sqrt{1-u} \cdot -\sqrt{(1-u)^3} = (1-u)^2$$

$$\begin{aligned} f(u) &= u\sqrt{u} & 0 &= u < \infty & f(u) &= u^{\frac{3}{2}} \\ g(u) &= \sqrt{u^3} & 0 &= u > 0 & g(u) &= u^{\frac{3}{2}} \end{aligned}$$

$$\begin{aligned} f(u) &= [\sqrt{u} - [\sqrt{u}]] & \left[\sqrt{u} - [\sqrt{u}] \right] & \rightarrow \text{fractional part} \\ g(u) &= \sqrt{u-1} & \sqrt{u-1} & \rightarrow \text{square root} \end{aligned}$$

$$f(u) = \frac{f+g}{f-g} \Big|_{(1)} \quad \frac{f(1)=2}{g(1)=1} \Rightarrow \frac{2+1}{2-1} = 3$$

$$f(u) = \frac{f+g}{f-g} \Big|_{(2)} \quad \frac{f(2)=3}{g(2)=3} \Rightarrow \frac{3+3}{3-3} = \text{undefined}$$

$$f(u) = \frac{f+g}{f-g} \Big|_{(-1)} \quad \frac{f(-1)=0}{g(-1)=1} \Rightarrow \frac{0+1}{0-1} = -1$$

$$g(n) = f(n-1) \Rightarrow g(n) = \left\{ (1, 1), (0, 2), \left(\frac{1}{3}, 3\right), \left(-\frac{1}{3}, 2\right), \left(\frac{2}{3}, -1\right) \right\}$$

سأله ١٥

$$h(n) = f(n+1) \Rightarrow h(n) = \left\{ (-2, 1), (2, 1), (0, 3), (3, -1), (-3, -1) \right\}$$

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