

هزاره و پانزدهم

۱۸

خوشه اول

$$\begin{aligned} & \text{در } x=1 \Rightarrow a+1=b \\ & \text{در } x=0 \Rightarrow 1=\frac{2}{3}b \Rightarrow b=\frac{3}{2} \\ & \text{در } x=\frac{1}{2} \Rightarrow a=\frac{1}{2} \Rightarrow a+b=2 \end{aligned}$$

$$\begin{aligned} & f'(x) = \frac{-2\sqrt{x} - \frac{2}{3}x^{-\frac{1}{3}}(x-2)}{(x^2)^2} \Rightarrow f'(1) = \frac{-2 - \frac{2}{3}(1)}{1} = -\frac{10}{3} \\ & g(x) = \frac{2-x+\sqrt{3x}}{x^{\frac{2}{3}}} \Rightarrow g'(x) = \frac{x^{\frac{2}{3}}(-1+\frac{3}{2\sqrt{3x}}) - \frac{2}{3}x^{\frac{2}{3}}(2-x+\sqrt{3x})}{x^{\frac{8}{3}}} \\ & g'(1) = \frac{(-1+\frac{3}{2\sqrt{3}}) - \frac{2}{3}(1+\sqrt{3})}{1} = -1 + \frac{\sqrt{3}}{2} - \frac{2}{3} - \frac{2\sqrt{3}}{3} = -\frac{5}{6} - \frac{\sqrt{3}}{2} \\ & f'(1) - 2g'(1) = -\frac{10}{3} + \frac{5}{3} + \frac{\sqrt{3}}{3} = \frac{\sqrt{3}}{3} \end{aligned}$$

$$\begin{aligned} & f(n) \Rightarrow \begin{cases} ba+c=\frac{1}{a} \Rightarrow ba=\frac{1}{a}-c \\ -\frac{1}{a^2}=b \Rightarrow ba^2=-1 \end{cases} \\ & \Rightarrow a(ba)=-1 \\ & a(\frac{1}{a}-c)=-1 \\ & 1-ac=-1 \Rightarrow ac=2 \end{aligned}$$

$$b+(n-a)^m \Rightarrow m=4k+1$$

لذا

$$\begin{aligned} & \Rightarrow f \circ g(\sqrt[3]{2}) = x \\ & \Rightarrow f \circ g(\sqrt[3]{2}) = x \rightarrow (f \circ g)' = n' \end{aligned}$$

$$f'(a) + f(a) = r \rightarrow -a + 3a + 8 = r \Rightarrow a = \frac{-r}{2} \quad (9)$$

$$\Rightarrow f'(a) = a = \frac{r}{2} \quad \checkmark$$

1,8

$$f \circ g(x) = g'(x) \cdot f'(g(x)) =$$

1,8

(9)

$$\left(\frac{-1}{r}\right)(rx)(x^r-1)^{-\frac{r}{r}} \cdot \frac{-rx}{(x^r-1)^r} = \frac{-1}{r} \times \frac{r}{r} \left(\frac{1}{r}\right)^{-\frac{r}{r}} \cdot \frac{-r \times r}{r(1)}$$

$$= \frac{\cancel{r}^1}{\cancel{r}^1} \times \frac{1}{\cancel{r}^1} \times \cancel{r}^r \times \cancel{r}^r = r \times r \rightarrow \frac{r \times r}{-r^r \times \sqrt{r}} = \frac{-r}{\sqrt{r}} \times r = \frac{-1 \times r}{\sqrt{r}} = -\sqrt{r} \quad \boxed{= -\sqrt{r}}$$

$$g'(x) = (1) \cdot f'(x+1) + r(f'(x+1)) \Rightarrow \quad (1)$$

$$g'(r) = \frac{r}{r} + \frac{r}{r} = 2 \quad \checkmark$$

2

$$= \frac{(f(x-h) - f(x))(f(x-h) - 1)}{(x-h)(h)} = \frac{f'(x)}{x} (f(x) - 1) \quad (9)$$

$$f'(x) = r + \frac{1}{x} \rightarrow \frac{-rx}{x \times 1r} \times 1 = \frac{-r}{1r} \quad \checkmark$$

2

$$y = \frac{rx+1}{r} \xrightarrow{y=0} -r = m \Rightarrow rx - r = -r$$

$$\Rightarrow x = 1 \rightarrow y = r \Rightarrow A \left| \frac{1}{r} \right| \checkmark : \text{نقطه } (1, r)$$

$$\text{نقطة كوشي} \rightarrow \phi_{+}(a) = \phi_{-}(a)$$

$$n=0 \rightarrow \text{مشتق غير موجود} \quad \times$$

$$n=1 \rightarrow \phi'_{-}(a) = 0, \quad \phi'_{+}(a) = 1 \quad \checkmark$$

$$\rightarrow \boxed{n=1}$$

$$n \geq 2 \rightarrow \phi'_{-}(a) = 0, \quad \phi'_{+}(a) = n(\underbrace{x-a}_{a-a=0})^{n-1} \quad \times$$

$$f(r) = -ra - a \quad \phi'(r) = -a$$

$$-r(-\frac{r}{r}) - a = -\frac{1}{r}$$

$$-a - (-ra - a) = r \rightarrow ra = r \rightarrow a = -\frac{r}{r}$$

$$\rightarrow \frac{\phi(r)}{\phi'(r)} = \frac{-\frac{1}{r}}{-\frac{r}{r}} = \frac{1}{r}$$

4

$$(\phi \circ g)' = g'(\frac{r}{\sqrt{\lambda}}) \times \phi'(g(\frac{r}{\sqrt{\lambda}}))$$

$$g(\frac{r}{\sqrt{\lambda}}) = \frac{1}{\sqrt{\frac{q}{\lambda} - 1}} = r \rightarrow g'(\frac{r}{\sqrt{\lambda}}) \times \phi'(r)$$

$$g'(\frac{r}{\sqrt{\lambda}}) = -\frac{1}{r} (u^2 - 1)^{-\frac{r}{r}} \times r u = \frac{q}{\sqrt{\lambda}} \times -\frac{1}{r} \times (\frac{q}{\lambda} - 1)^{-\frac{r}{r}} = -\frac{r}{\sqrt{\lambda}} \times (r^2)^{-\frac{r}{r}}$$

$$= -\frac{r^2 \times \sqrt{r}}{r} = -\lambda \sqrt{\lambda}$$

$$\phi(u), u=r \rightarrow \phi(u) = u[\varepsilon]_{+1}^r = uu^{r+1} \rightarrow \phi'(r) = ur(r) = 4r$$

$$\frac{-\lambda \sqrt{r} \times 4r}{-\lambda \sqrt{r}} = r$$

5