

① $(0,1) (r,\Delta) \Rightarrow ra = \frac{\Delta-1}{r-0} = \frac{r}{r} \rightarrow f'(r) = \frac{r}{r} \checkmark$ (۲)

② $m = \frac{r-1}{r-(-1)} = \frac{1}{r} \rightarrow \sqrt{ax-1} = \frac{1}{r}x + \frac{r}{r} \rightarrow ax-1 = \frac{1}{r^2}(x^2 + 2rx + 14)$
 $\frac{1}{r}x + \frac{r}{r} \sqrt{9ax-9} = x^2 + 2rx + 14 \rightarrow x^2 + (1-9a)x + r\Delta = 0 \rightarrow \Delta = 0$

$(1-9a)^2 - 4r\Delta = 0 \rightarrow a = -\frac{r}{9} \rightarrow f(x) = \sqrt{-\frac{r}{9}x-1} \rightarrow f(\Delta) = \sqrt{0} = 0$ (۲)
 $\hookrightarrow a = r \rightarrow f(x) = \sqrt{rx-1} \rightarrow \boxed{f(\Delta) = r}$ ✓

③ $\lim_{x \rightarrow 1} \frac{f(x)-f(1)}{x-1} \xrightarrow{HOP} \lim_{x \rightarrow 1} \frac{f'(x)}{1} \rightarrow \frac{(r+m)(x+r) - (x^2+2x+1)(1)}{(x+r)^2}$

$\rightarrow \frac{1+2m-r-m}{14} \rightarrow \frac{1+rm}{14r} = \frac{r}{r} \rightarrow 1+rm = 14 \rightarrow \boxed{m = r}$ (۲)

$y = \frac{r}{r}x + \frac{r}{r} \rightarrow \boxed{n = 1} \rightarrow \boxed{m+n = r}$ ✓

$f(1) = \frac{r}{r} = 1$

④ $f(x) = \frac{(r-\sin x)(9+r\sin x + \sin^2 x)}{(r-\sin x)(r+\sin x)} \rightarrow f(x) = \frac{\sin^2 x + r\sin x + 9}{r+\sin x}$ (۰)

$f'(x) = \frac{f'(x) - f'(x)}{f'(x)} = (fg(x) - f(x))' / \left(\frac{\Delta\pi}{r}\right)$
 $\rightarrow (fg-f)(x) = \left(\frac{9}{r+\sin x} - \frac{r-\sin^2 x}{r-\sin x}\right) = \frac{9}{r+\sin x} - \frac{(r-\sin x)(9+\sin^2 x + r\sin x)}{(r-\sin x)(r+\sin x)} = -\sin x$
 $\rightarrow (fg-f)'(x) = -\cos x \rightarrow (fg-f)'(\frac{\Delta\pi}{r}) = -\cos(\frac{\Delta\pi}{r}) = \frac{-1}{r}$

⑤ $(f \circ g)' \xrightarrow{x \cdot \frac{1}{r}} f(x) = \frac{-1}{\sqrt{rx}} \quad g(x) = \frac{1}{rx^\Delta} \Rightarrow \log \frac{-1}{\sqrt{rx^\Delta}}$

$\rightarrow \log(x) = \frac{-1}{\frac{1}{x}} \rightarrow \log(x) = -x \rightarrow (f \circ g)'(\frac{1}{\sqrt{r}}) = (-1) \checkmark$ (۲)

