

۲. آزمون

1. $u=1 \rightarrow a+1=b^*$ $f'(u) = \begin{cases} 1 & u < 1 \\ \frac{2b}{u\sqrt{u}} & u > 1 \end{cases}$ $\xrightarrow{\text{در نقطه ۱ پیوسته نیست}} 1 = \frac{2b}{u\sqrt{u}} \Rightarrow \frac{2b}{1\sqrt{1}} = \frac{2b}{1} \Rightarrow b = \frac{1}{2}$ $\left. \begin{matrix} a+1=b \\ a=\frac{1}{2} \end{matrix} \right\} a+b=2$

2. $u=1 \rightarrow r-m-f < 0 \Rightarrow f(u) = \frac{-r-m+\epsilon}{\sqrt{u}} \Rightarrow f'(u) = \frac{-r(\sqrt{u})' - \frac{r-m}{\sqrt{u}}(-\frac{1}{2}\sqrt{u})}{(\sqrt{u})^2} \Rightarrow f'(1) = \frac{-r(1) - \frac{r-m}{1}}{1} = \frac{-1}{2}$

3. $g(u) = \frac{1-u-r+\sqrt{r-m}}{\sqrt{u}}$ $u=1 \rightarrow u-r < 0 \Rightarrow g(u) = \frac{r-m+\sqrt{r-m}}{\sqrt{u}}$
 $g'(u) = (-1 + \frac{r-m}{\sqrt{u}})' \sqrt{u} - \frac{r-m+\sqrt{r-m}}{u}$
 $\Rightarrow g'(1) = \frac{(-1 + \frac{r-m}{1}) - \frac{r-m+\sqrt{r-m}}{1}}{1} = \frac{-1}{2} - \frac{\sqrt{r-m}}{2}$
 $f'(1) - 2g'(1) = \frac{-1}{2} + \frac{1}{2} + \frac{\sqrt{r-m}}{2} = \frac{\sqrt{r-m}}{2}$

3. $ba+c = \frac{1}{a} \xrightarrow{*} \frac{-1(a)}{a^2} + c = \frac{1}{a} \Rightarrow c = \frac{2}{a} \Rightarrow ac=2$
 $b = \frac{-1}{u^2} \xrightarrow{u=a} b = \frac{-1}{a^2} *$

4. $f'(m) = \begin{cases} 0 & u < a \\ m(m-a)^{m-1} & u > a \end{cases}$ $\rightarrow$ در صورت تقارن $u-a < 0 \Rightarrow m-1 < 0 \Rightarrow m < 1$
 $m=0 \rightarrow f'(a) = f'_2(a)$
 $m=1 \rightarrow \begin{cases} f'(a) = 0 \\ f'_2(a) = 1 \end{cases} \rightarrow f'(a) \neq f'_2(a)$
 $m=1 \checkmark$

5. $g'(f(g(u))) \cdot (f(g(u)))' \Rightarrow g(u) = \frac{1}{2u^m}$ $f(u) = \frac{1}{\sqrt{2u}}$ $\rightarrow f \circ g = \frac{1}{\sqrt{2 \cdot \frac{1}{2u^m}}} = u \rightarrow (f \circ g(u))' = 1$

6. $y = -a\alpha - \omega \Rightarrow (r, 2a - \omega)$ $f(r) = -r\alpha - \omega$ $f'(r) = -\alpha$
 $\rightarrow f'(r) = f'(r) = 2 \rightarrow -\alpha + 2a + \omega = 2$ $2a = -r \rightarrow \alpha = \frac{-r}{2}$
 $y = \frac{r}{2}u - a \rightarrow f(u) = \frac{r}{2} - a = \frac{1}{2}$ $f'(r) = \frac{r}{2}$ $\frac{f'(r)}{f'(u)} = \frac{1}{2}$

7. $(f \circ g(u))' = g'(u) f'(g(u))$ $g'(u) = (u^2-1)^{-\frac{1}{2}} = \frac{1}{2(u^2-1)^{\frac{3}{2}}}$ $u = \frac{\sqrt{2}}{2} \rightarrow g'(\frac{\sqrt{2}}{2}) = -\sqrt{2}$
 $g(\frac{\sqrt{2}}{2}) = \frac{1}{\sqrt{2-1}} = 2 \rightarrow f(u) = (f(u))^2 + 1 + 4u^2 + 1 \rightarrow f'(u) = 2u = f'(2) = 4$
 $\rightarrow -\sqrt{2}(4) = 4(-12\sqrt{2}) \Rightarrow$ برابر ۴

8. $g'(u) = f'(u+1) + 3f'(3u+1) \rightarrow g'(2) = f'(-1) + 3f'(7) = \frac{7}{2} + 3(\frac{7}{2}) = 14$
 $\rightarrow f'(-1)$

9. $f(a) = 2 \Rightarrow \lim_{h \rightarrow 0} \frac{f(a+h) - f(a-h)}{h(a-h)} = -f'(a) \times \frac{1}{a}$ $f(u) = (1 + \sqrt{u+2}) + (u-2) \frac{1}{\sqrt{u+3}}$
 $\Rightarrow \frac{-2a}{12} \times \frac{1}{a} = \frac{-2}{12}$ $f'(a) = 2 + \frac{1}{12} - \frac{2a}{12}$

10. $y = \frac{1-rm}{4} \rightarrow y = \frac{m}{2} + \frac{1}{4} \Rightarrow m = \frac{1}{2}$ $\xrightarrow{\text{محدود}} m' = -2 \Rightarrow y = u^2 - 2u + 1 \Rightarrow y' = 2u - 2 = m' = -2$
 $2u = 2 \Rightarrow u = 1 \Rightarrow (1, 2)$
 در این نقطه نمودار معکوس است.