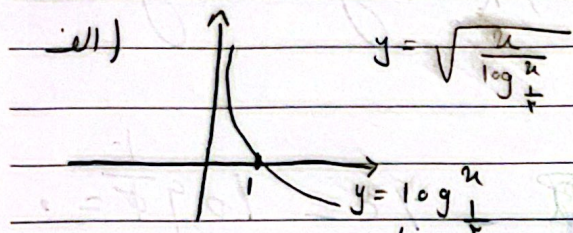


پیدا کردن بازه همبستگی

$$\log_n^m = a \Rightarrow n^a = m \quad \log_{mn}^{m^2n} = b \Rightarrow \log_{n^{a+1}}^{n^{2a+1}} = b \Rightarrow \frac{2a+1}{a+1} \log_n^n = b \Rightarrow \quad (1)$$

$$b = \frac{2a+1}{a+1} \Rightarrow [b] = \left[\frac{2a+1}{a+1} \right] \Rightarrow [b] = \left[\frac{a+a+1}{a+1} \right] \Rightarrow [b] = \left[\frac{a}{a+1} + 1 \right]$$

$$\Rightarrow [b] = \left[\frac{a}{a+1} \right] + 1 \quad a > 0, 0 < \frac{a}{a+1} < 1 \quad [b] = 0 + 1 = 1$$



⑤ جدولی که باید در نظر بگیریم این است

در این جدول باید هر یک از مقادیر صغیر باشد و باید

⑥ جدولی که باید در نظر بگیریم این است

از این جدول مقادیر به دست آمده برای x در آن به صورت $a < x < b$ است. اصل هیچ عدد صحیحی ندارد.

$$y = \frac{\log(x^2 - x - 2)}{x^2} \quad \sqrt{x^2 - 1} + 1 \neq 0, x^2 - 1 > 0, x^2 - x - 2 > 0$$

$$\Rightarrow x^2 - x - 2 > 0 \quad \Rightarrow x < -1 \text{ یا } x > 2$$

$$x^2 - 1 > 0 \Rightarrow x^2 > 1 \Rightarrow \begin{cases} x > 1 \\ x < -1 \end{cases} \quad \sqrt{x^2 - 1} + 1 \neq 0 \Rightarrow$$

$$\Rightarrow (-\infty, -1) \cup (2, +\infty)$$

$$x \log_a^x + \log_a^{\sqrt{x}} = 2 \Rightarrow x \log_a^a + \log_a^{\sqrt{a}} = 2 \Rightarrow \log_a^a + \log_a^{\sqrt{a}} = 2 \quad (2)$$

$$x = 9$$

$$a = ?$$

$$\log_a^a + \frac{1}{\log_a^a} = 2 \Rightarrow z + \frac{1}{z} = 2$$

$$\log_a^a = z$$

$$xz \Rightarrow z^2 - 2z + 1 = 0 \Rightarrow \begin{cases} z = 1 \\ z = 1 \end{cases}$$

$$\Rightarrow \log_a^a = 1 \Rightarrow a = 3^1 = 3$$

$$\log r \approx 0,3 \quad \left(\log \frac{a}{r} \right) x^r + (\log r) x - \log 1 a = 0 \quad (K)$$

$$\log r \approx 0,3 \Rightarrow (\log a - \log r) x^r + (r \log r) x - \log a - \log r = 0$$

$$\Rightarrow (\log a) x^r - 0,3 x^r + 0,1 x - \log a - 0,3 = 0$$

$$\Rightarrow \left(\log \frac{10}{r} \right) x^r - 0,3 x^r + 0,1 x - \left(\log \frac{10}{r} \right) - 0,3 = 0$$

$$\Rightarrow (\log 10 - \log r) x^r - 0,3 x^r + 0,1 x - (\log 10 - \log r) - 0,3 = 0$$

$$\Rightarrow (1 - 0,3) x^r - 0,3 x^r + 0,1 x - (1 - 0,3) - 0,3 = 0$$

$$\Rightarrow 0,7 x^r + 0,1 x - 1 = 0 \Rightarrow \begin{cases} x = \frac{-11}{r} \\ x = 1 \end{cases}$$

$$\Rightarrow 1 - \left(-\frac{11}{r} \right) = \frac{1r}{r}$$

$$\log \frac{V}{r} = 2,1 \quad \log \frac{r}{a} = 0,2 \quad \log \frac{10}{1r} = 0 \quad (Q)$$

$$\frac{\log r}{\log a} = \frac{1}{r} \Rightarrow \frac{\log r}{\log \frac{10}{r}} = \frac{1}{r} \Rightarrow \frac{\log r}{\log 10 - \log r} = \frac{1}{r} \Rightarrow \frac{\log r}{1 - \log r} = \frac{1}{r} \Rightarrow \log r = \frac{1}{r}$$

$$\frac{\log V}{\log r} = \frac{2,1}{10} \Rightarrow \frac{\log V}{\frac{1}{r}} = \frac{2,1}{10} \Rightarrow \log V = \frac{1r}{10} \quad \frac{1}{\log \frac{1r}{10}} = \frac{1}{\log r \times V} = \frac{1}{\log r + \log V}$$

$$\Rightarrow \frac{1}{\frac{1}{r} + \frac{1r}{10}} = \frac{10}{19}$$

$$\log_{\omega} \omega = 1/\omega$$

$$\log_{\frac{r}{\omega}} \omega = 1/\frac{r}{\omega}$$

$$\log_{\omega} \frac{r}{\omega} = ?$$

(E)

$$\log_{\omega} \omega \times \log_{\frac{r}{\omega}} \omega = \log_{\frac{r}{\omega}} \omega$$

$$\log_{\omega} \omega \times \log_{\frac{r}{\omega}} \omega = 1/\omega \times 1/\frac{r}{\omega} \Rightarrow \log_{\frac{r}{\omega}} \omega = \frac{1}{r}$$

$$\log_{\omega} \frac{r}{\omega} = \frac{\log_{\frac{r}{\omega}} \frac{r}{\omega}}{\log_{\omega} \frac{r}{\omega}} \Rightarrow \log_{\omega} \frac{r}{\omega} = \frac{\log_{\frac{r}{\omega}} \frac{r}{\omega} + \log_{\frac{r}{\omega}} \omega}{\log_{\frac{r}{\omega}} \frac{r}{\omega} + \log_{\frac{r}{\omega}} \omega} = \frac{1 + 1/r}{1/r + 1/r} = \frac{1 + 1/r}{2/r} = \frac{r+1}{2}$$

$$\log_{\frac{1}{\omega}} \omega = m$$

$$\log_{\frac{r}{\omega}} \omega = \frac{\log_{\frac{r}{\omega}} \omega}{\log_{\frac{r}{\omega}} \frac{1}{\omega}}$$

(V)

$$\log_{\frac{r}{\omega}} \omega = ?$$

$$\log_{\frac{r}{\omega}} \omega = \log_{\frac{r}{\omega}} \frac{r}{\omega} + \log_{\frac{r}{\omega}} \frac{\omega}{r} = \log_{\frac{r}{\omega}} \frac{r}{\omega} + \log_{\frac{r}{\omega}} \frac{\omega}{r} = \frac{r}{r} + \log_{\frac{r}{\omega}} \frac{\omega}{r}$$

$$\Rightarrow \frac{r}{r} \log_{\frac{r}{\omega}} \frac{r}{\omega} + \frac{1}{r} \log_{\frac{r}{\omega}} \omega = \frac{r}{r} + \frac{1}{r} \log_{\frac{r}{\omega}} \omega$$

$$\log_{\frac{r}{\omega}} \omega = \log_{\frac{r}{\omega}} \frac{r}{\omega} = \frac{r}{r} \log_{\frac{r}{\omega}} \frac{r}{\omega} = \frac{r}{r}$$

$$\log_{\frac{1}{\omega}} \omega = m \Rightarrow \log_{\frac{1}{\omega}} \omega + \log_{\frac{1}{\omega}} \frac{r}{\omega} = m \Rightarrow \log_{\frac{1}{\omega}} \frac{r}{\omega} + \log_{\frac{1}{\omega}} \omega = m \Rightarrow \frac{r}{r} \log_{\frac{1}{\omega}} \frac{r}{\omega} + \frac{1}{r} \log_{\frac{1}{\omega}} \omega = m$$

$$\Rightarrow \frac{r}{r} \log_{\frac{1}{\omega}} \frac{r}{\omega} + \frac{1}{r} = m \Rightarrow \log_{\frac{1}{\omega}} \frac{r}{\omega} = \frac{r(m-1)}{r}$$

$$\log_{\frac{r}{\omega}} \omega = \frac{\frac{r}{r} + \frac{1}{r} \log_{\frac{r}{\omega}} \omega}{\frac{r}{r}} = \frac{\frac{r}{r} + \frac{1}{r} \left(\frac{r(m-1)}{r} \right)}{\frac{r}{r}} = \frac{r + (r(m-1))}{r} = \frac{r + rm - r}{r} = \frac{rm}{r} = \frac{r}{r} (m+1)$$

$$0/r = \frac{r}{\omega} \quad (0/r)^{r(m-1)} = \left(\frac{1/r}{\omega} \right)^{r(m-1)} \Rightarrow \left(\frac{r}{\omega} \right)^{r(m-1)} = \left(\frac{\omega}{r} \right)^{r(m-1)}$$

(A)

$$\Rightarrow \left(\frac{r}{\omega} \right)^{r(m-1)} = \left(\frac{\omega}{r} \right)^{r(m-1)} \Rightarrow \left(\frac{\omega}{r} \right)^{-r(m-1)} = \left(\frac{\omega}{r} \right)^{r(m-1)} \Rightarrow r(m-1) = -r(m-1)$$

$$\Rightarrow r(m-1) + r(m-1) = 0 \Rightarrow \begin{cases} m = -1 \rightarrow \text{UUE} \\ m = \frac{1}{r} \end{cases} \quad \log_{\frac{1}{\omega}} \left(\frac{1}{r} + 1 \right) = \log_{\frac{1}{\omega}} \frac{r}{\omega} = \log_{\frac{r}{\omega}} \frac{r}{\omega} \Rightarrow \frac{r}{r} \log_{\frac{r}{\omega}} \frac{r}{\omega} = \frac{r}{r}$$

$$\log_r^r = a \quad \log_{\frac{b}{a}} = \frac{r}{r} (1+a) \quad \log (rb-1) = 6 \quad (9)$$

$$\log_{\frac{b}{a}} = \frac{r}{r} (1 + \log_r^r) \Rightarrow$$

$$\log_{\frac{b}{a}} = \frac{r}{r} + \frac{r}{r} \log_r^r \Rightarrow \log_{\frac{b}{a}} = \frac{r}{r} + \log_{\frac{b}{a}}^r$$

$$\Rightarrow \log_{\frac{b}{a}} - \log_{\frac{b}{a}}^r = \frac{r}{r} \Rightarrow \log_{\frac{b}{a}} = \frac{r}{r}$$

$$\Rightarrow \frac{b}{a} = \lambda^{\frac{r}{r}} \Rightarrow \frac{b}{a} = \sqrt[r]{\lambda^r} \Rightarrow \frac{b}{a} = r \Rightarrow b = ar$$

$$\Rightarrow \log (10\lambda - \lambda) = \log 100 = r$$

$$-ra \cdot x^r + bx + \frac{1}{r} c = 0 \quad \frac{1}{-ra} = \log r \Rightarrow \frac{ra}{b} = \log r \quad (10)$$

$$\Rightarrow \frac{a}{b} = \frac{\log r}{r} = \frac{r \log r}{r} = \frac{\log r}{r}$$

$$ra = b + c \Rightarrow \frac{ra}{b} = 1 + \frac{c}{b}$$

$$\frac{a}{b} = \frac{\log r}{r} \Rightarrow r \left(\frac{\log r}{r} \right) = 1 + \frac{c}{b} \Rightarrow \frac{c}{b} = -1 + \log r$$

$$\left\{ \frac{c}{b} = -1 + \log r \right.$$

$$\Rightarrow \frac{c}{a} = \frac{-1 + \log r}{\frac{\log r}{r}} \Rightarrow \frac{c}{a} = \frac{\log r - \log 1}{\frac{1}{r} \log r} = \frac{\log \frac{r}{1}}{\frac{1}{r} \log r}$$

$$= \frac{\log \frac{1}{a}}{\frac{1}{r} \log r} = \frac{\log \frac{1}{a}}{\log \sqrt[r]{r}} = \log \frac{\frac{1}{a}}{\sqrt[r]{r}} = \left(\frac{1}{\sqrt[r]{r}} \right)^{\frac{c}{a}} = \left(\frac{1}{\sqrt[r]{r}} \right)^{\log \frac{1}{a}} = \left(\frac{1}{a} \right)^{\log \sqrt[r]{r} \frac{1}{a}}$$

$$= \left(\frac{1}{a} \right)^{\log \sqrt[r]{r} \frac{1}{a}} = \left(\frac{1}{a} \right)^{\left(\frac{1}{r} \right) \log r} = \left(\frac{1}{a} \right)^{-\frac{1}{r}} = a^{\frac{1}{r}} = \sqrt[r]{a}$$