نیایش شاه‌نظری یازدهم ریاضی e تکلیف کد ۲۳

① $\log_{mn}^{m^۲n} = b = \log_{mn}^{mn} + \log_{mn}^{m} = 1 + \frac{1}{\log_{m}^{mn}} = 1 + \frac{1}{\log_{m}^{m} + \log_{m}^{n}}$

$1 + \frac{1}{1 + \frac{1}{\underset{a}{\cancel{\log_{n}^{m}}}}} = 1 + \frac{a}{a+1} = b \rightarrow [b] = \left[1 + \frac{a}{a+1}\right] = \underset{۰}{\cancel{\left[\frac{a}{a+1}\right]}} + 1 = \underline{1}$

$۰ < \frac{a}{a+1} < 1$

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②

الف) $y = \sqrt{\frac{x}{\log_{\frac{1}{۲}}^{x}}}$

① $x > ۰$

② $\frac{x}{\log_{\frac{1}{۲}}^{x}} \geq ۰$

	۰		1	
−		+	تن	−

$\rightarrow x \in [۰,1)$

$①\cap② \rightarrow ۰ < x < 1 \rightarrow \boxed{D_f = (۰,1)}$

ب) $y = \frac{\log_{۴}^{(x^۲ - x - ۲)}}{\sqrt{x^۲ - 1} + 1}$

① $x^۲ - x - ۲ > ۰$

$(x-۲)(x+1)$

	−1		۲	
+		−		+

$x \in (-\infty, -1) \cup (۲, +\infty)$

② $x^۲ - 1 \geq ۰ \rightarrow x^۲ \geq 1 \rightarrow x \in (-\infty, -1] \cup [1, +\infty)$

$①\cap② \rightarrow x \in (-\infty, -1) \cup (۲, +\infty) \rightarrow \boxed{D_f = \mathbb{R} - [-1, ۲]}$

③

$$2\log_{x}^{a} + \log_{a}^{\sqrt{x}} = 2 \qquad x=9 \longrightarrow$$

$$2\log_{9}^{a} + \log_{a}^{3} = 2$$

$$\underbrace{\boxed{\log_{3}^{a}}}_{m} + \underbrace{\boxed{\log_{a}^{3}}}_{\frac{1}{m}} = 2 \rightarrow m + \frac{1}{m} - 2 = 0$$

$$m^2 - 2m + 1 = 0 \longrightarrow m = 1$$

$$m = \log_{3}^{a} = 1 \longrightarrow \underline{a = 3}$$

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④

$$\left(\log \frac{5}{3}\right)x^2 + (\log 9)x - \log 15 = 0$$

$$|\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} = \frac{(\log 9)^2 - 4(-\log 15)\left(\log \frac{5}{3}\right)}{\log \frac{5}{3}}$$

$$\frac{(2\log 3)^2 + 4(\cancel{\overset{0.4}{\log 3}} + \cancel{(\overset{0.7}{\log 10 - \log 2})})[(\cancel{\overset{0.7}{\log 10 - \log 2}}) - \cancel{\overset{0.4}{\log 3}}]}{\log 10 - \log 2 - \log 3} = \frac{\sqrt{0.64 + \overset{1.32}{\cancel{4(1.1)(0.3)}}}}{0.3} =$$

$$\frac{\sqrt{1.96}}{0.30} = \frac{1.4}{0.3} = \boxed{\frac{14}{3}}$$

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⑤

$$\log_{14}^{10} = \frac{\log_{2}^{10}}{\log_{2}^{14}} = \frac{\log_{2}^{2} + \log_{2}^{5}}{\log_{2}^{2} + \log_{2}^{7}} = \frac{1 + \frac{1}{0.5}}{1 + 2.8} = \frac{3}{3.8} = \boxed{\frac{15}{19}}$$

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⑥

$$\log_{15}^{6} = \frac{\log_{3}^{6}}{\log_{3}^{15}} = \frac{1 + \log_{3}^{2}}{1 + \log_{3}^{5}} = \frac{1 + \frac{1}{1.6}}{2.5} = \frac{13}{20} = \underline{0.65}$$

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⑦

$$\log_{4}^{12} = \frac{\log_{2}^{12}}{\log_{2}^{4}} = \frac{2 + \log_{2}^{3}}{2} = \frac{2 + \frac{3m-1}{2}}{2} = \boxed{\frac{3m+3}{4}}$$

$$\log_{۸}^{۱۸} = m \rightarrow \log_{۲}^{۱۸} = ۳m \rightarrow ۱ + ۲\log_{۲}^{۳} = ۳m \rightarrow \log_{۲}^{۳} = \frac{۳m-۱}{۲}$$

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⑧

$$\left(\frac{۲}{۵}\right)^{۲x-۱} = \left(\frac{۱۲۵}{۸}\right)^{x^۲} \rightarrow \left(\frac{۵}{۲}\right)^{۱-۲x} = \left(\frac{۵}{۲}\right)^{۳x^۲}$$

$$۳x^۲ = ۱ - ۲x \rightarrow ۳x^۲ + ۲x - ۱ = ۰ \rightarrow x = -۱ \quad ; \quad x = \frac{۱}{۳}$$

$x = -۱ \rightarrow \log_{۸}^{-۸} \rightarrow$ غ‌ق‌ق

$$x = \frac{۱}{۳} \rightarrow \log_{۸}^{۴} = \log_{۲^۳}^{۲^۲} = \boxed{\frac{۲}{۳}}$$

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⑨

$$\log_{۲}^{۳} = a \qquad \log_{۸}^{b} = \frac{۲}{۳}(۱+a) = \frac{۲}{۳}\left(\log_{۲}^{۶}\right) = \log_{۸}^{۳۶}$$

$$b = ۳۶ \rightarrow \log ۳b - ۸ = \log ۱۰۰ = \boxed{۲}$$

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⑩

$$-۴ax^۲ + bx + \frac{۱}{۴}c = ۰ \qquad \frac{۱}{x_۱ + x_۲} = \log ۴ \rightarrow \frac{b}{۴a} = \log_{۴}^{۱۰} = \frac{۱}{۲}\log_{۲}^{۱۰}$$

$$\boxed{b = ۲a\log_{۲}^{۱۰}}$$

$$a = \frac{b+c}{۲} \rightarrow ۲a = ۲a\log_{۲}^{۱۰} + c \rightarrow c = ۲a\left(۱ - \log_{۲}^{۱۰}\right)$$

$$c = ۲a\left(\log_{۲}^{۰/۲}\right)$$

$$\left(\frac{۱}{\sqrt[۸]{۲}}\right)^{\frac{c}{a}} = \left(\frac{۱}{۲}\right)^{\frac{۱}{۸}\left(\frac{c}{a}\right)} = \frac{۱}{۲}^{\frac{۱}{۸}\left(\frac{۲a\log_{۲}^{۰/۲}}{a}\right)} = \left(\frac{۱}{۲}\right)^{\frac{۱}{۴}\log_{۲}^{۰/۲}} = ۲^{-\frac{۱}{۴}\log_{۲}^{۰/۲}}$$

$$\boxed{\sqrt[۴]{۵}} \leftarrow ۵^{\frac{۱}{۴}} \leftarrow \left(\frac{۱۰}{۲}\right)^{\frac{۱}{۴}} \qquad \Leftarrow ۰/۲^{-\frac{۱}{۴}\log^{۲}}$$