Subject:
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درسا صادق زاده یازدهم دفتر A

سوال ۱)

$3^{A(1)+B} = 1 \nearrow 3^0 \Rightarrow A+B=0$

$3^{3A+B} = 3^2 \Rightarrow 3A+B=2$

$$\begin{cases} A+B=0 \\ 3A+B=2 \end{cases}$$

$2A = 2 \Rightarrow A=1$

$B=-1$

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$f(x) = 3^{x-1} \xrightarrow{x=0} y=\frac{1}{3} \Rightarrow (0,\frac{1}{3})$

سوال ۲)

$\log_2^{(2^x+15)} = x+3 \rightarrow 2^{x+3} = 4^x+15 \rightarrow 4^x - 8\times 2^x + 15 = 0$

$2^x = t \Rightarrow t^2 - 8t + 15 = 0 \rightarrow (t-3)(t-5) = 0$

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$3 = 2^x \Rightarrow \log_2^3 = x \quad , \quad 2^x = 5 \Rightarrow \log_2^5 = x$

$\log_2^3 + \log_2^5 = \log_2^{15}$

سوال ۳)

$\overbrace{(\log_{21}^3)}^{t}{}^2 + (2\underbrace{\log_{21}^7}_{(1-t)} + \log_{21}^3)(3\log_{21}^3 + 2\log_{21}^7)$

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$\log_{21}^7 = \log_{21}^{21} - \underbrace{\log_{21}^3}_{t} \Rightarrow t^2 + (2-2t+t)(3t+2-2t)$

$= t^2 + (2-t)(t+2) = t^2 + 4 - t^2 = \underline{4}$

سوال ۴) $\log^{1-x} = t$

$\underline{\log^{(x^2-2x+1)}} + 3\underline{\log^{(1-x)}} = 5$

$\log^{(1-x)^2} \Rightarrow 2\log^{1-x} + 3\log^{1-x}$

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$= 5\log^{1-x} = 5 \Rightarrow \log^{1-x} = 1 \Rightarrow x = -9$

$\log_3^{(-x)} = \underline{2}$

سوال ۵)

$\log_2 (x^2+2x+4) + \log_2 (x-2) = 3$

$\log_2 (x^2+2x+4)(x-2) = \log x^3 - 2x^2 + 2x^2 - 4x + 4x - 8$

$= \log_2 x^3 - 8 = 3 \rightarrow x = \sqrt[3]{16} = 2^{\frac{4}{3}}$ $\quad \log_{2^{\frac{1}{3}}} x = \log_{2^{\frac{1}{3}}} 2^{\frac{4}{3}}$

$= 4\log_2 2 = \boxed{4}$

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سوال ۶)

$\log (2-x) - \log \frac{1}{(2-x)^2} = 3 \Rightarrow \log (2-x)^3 = 3$

$(2-x)^3 = 10^3 \xrightarrow{\text{رادیکال}} 2-x = 10 \rightarrow x = -8$

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$\log_{\sqrt{2}} (-x) = \log_{2^{\frac{1}{2}}} 2^3 = 6\log_2 2 = \boxed{6}$

سوال ۷)

$\log_4 (x-2) = ? \Rightarrow \log_4 \sqrt{6} = \boxed{\frac{1}{2}}$ $\quad x = 2+\sqrt{6}$

$3^{x^2-2} = 81^x$

$3^{x^2-2} = 3^{4x}$

$x^2 - 4x - 2 = 0$

$\Delta = 16 + 8 = 24$

$\frac{4 \pm 2\sqrt{6}}{2} = 2 \pm \sqrt{6}$

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سوال ۸)

$\log_3 2 = \frac{5}{8}$

$\log_{18} 8 = \frac{3\log_3 2}{\log_3 18 = 9\times 2} = \frac{3\log_3 2}{2\log_3 3 + \log_3 2} = \frac{\frac{15}{8}}{\underbrace{2+\frac{5}{8}}_{\frac{21}{8}}} = \frac{15}{8} \times \frac{8}{21} = \boxed{\frac{5}{7}}$

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سوال ۹) $\log_{\text{٤}}^{\text{۳}} = \text{۰٫۱۸}$

با $\log_{\text{۲}}^{\text{۳}} = \text{۱٫۶}$

$$\log_{\text{۱۲}}^{\text{۶}} = \frac{\log_{\text{۲}}^{\text{۳}} + \log_{\text{۲}}^{\text{۲}}}{\text{۲}\log_{\text{۲}}^{\text{۲}} + \log_{\text{۲}}^{\text{۳}}} = \frac{\text{۱٫۶}+\text{۱}}{\text{۲}+\text{۱٫۶}}$$

$$\frac{\text{۲۶}}{\text{۱۰}} \times \frac{\text{۱۰}}{\text{۳۶}} = \boxed{\frac{\text{۱۳}}{\text{۱۸}}}$$

سوال ۱۰)

$$(a\log \text{۲})\,x^{\text{۲}} + ax + b\log \text{۲۵} = \text{۰}$$

$$\xrightarrow{x=-\text{۱}} a\log \text{۲} - a + b\log \text{۲۵} = \text{۰} \Rightarrow b\log \text{۲۵} = a - a\log \text{۲}$$

$$b\log \text{۲۵} = a(\text{۱} - \log \text{۲}) \Rightarrow \frac{b}{a} = \frac{\text{۱} - \log \text{۲}}{\log \text{۲۵}}$$

$$= \frac{\log \text{۵}}{\log \text{۲}} = \log_{\text{۲}}^{\text{۵}} \qquad (\sqrt{\text{۲}})^{\frac{b}{a}} = \text{۲}^{\frac{\text{۱}}{\text{۲}}\log_{\text{۲}}^{\text{۵}}}$$

$$= \text{۲}^{\log_{\text{٤}}^{\text{۵}}} = \text{۵}^{\frac{\text{۱}}{\text{۲}}\log_{\text{۲}}^{\text{۲}}} = \boxed{\sqrt{\text{۵}}}$$