مجتبی عقیلی پور   تکلیف شماره ۳۵

سوال ۱)

$x^2 = 3^{Ax+B} \Longrightarrow (0,1),(2,9) \Rightarrow 3^{A+B}=1 \Rightarrow A+B=0$

$3^{2A+B}=9 \Rightarrow 2A+B=2 \Rightarrow A=1 ,\ B=-1$

$\Rightarrow 3^{x-1} \xrightarrow{x=0} \boxed{y=\frac{1}{3}}$

سوال ۲)

$2^{x+3} = 4^x + 15 \Rightarrow 2^x \times 8 = 2^{2x}+15 \Rightarrow 2^x(8-2^x)=15$ (>0 ✓)

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

$\Rightarrow x = \log_2 3 , \log_2 5 \Longrightarrow \log_2 15$

سوال ۳)

$(\log_{21} 3)^2 + \log_{21} 147 \times \log_{21} 1323$

$\log_{21}^{21}+\log_{21}^{7} \quad \log_{21}^{9}+\log_{21}^{147}$

$\Rightarrow (1-\log_{21}7)^2 + (1+\log_{21}7)(2(1-\log_{21}7)+(1+\log_{21}7))$

$(1-\log_{21}7)^2$ ($=t$) $\quad 2(1-(\log_{21}7)^2)+(1+\log_{21}7)^2 \Rightarrow 1+t^2-2t+2-2t^2+1+t^2+2t = \textcircled{4}$

سوال ۴)

$2\log(1-x)+3\log(1-x)=5 \Rightarrow \log_{10}(1-x)=1 \Rightarrow 1-x=10 \Rightarrow x=\boxed{-9}$

$\log_3 9 = \boxed{2}$ $\quad x^2-2x+1>0$ ✓ $\quad 1-x>0$ ✓

سوال ۵)

$\log_2 (x^2+2x+4) + \log_2 (x-2) = 3 \quad (-\log_{2}8) \quad \log_2 \frac{(x^2+2x+4)(x-2)}{8} = 0 \Rightarrow (x^2+2x+4)(x-2) = 8$

$x^3-2x^2+2x^2-4x+4x-8=8 \Rightarrow x^3=16 \Rightarrow x=\sqrt[3]{24}$

$\Longrightarrow \log_{\sqrt[3]{2}} \sqrt[3]{24} = \boxed{4}$ $\quad x-2>0$ ✓ $\quad x^2+2x+4>0$ ✓

سوال ۶)

$\log(2-x) - \log\frac{1}{(x-2)^2} = 3 \Rightarrow \log(2-x)^3 = 3 \Rightarrow 2-x=10 \Rightarrow \boxed{x=-8}$

$(2-x)^2$ $\quad 2-x>0$ ✓ $\quad (x-2)^2>0$ ✓

$\log_{\sqrt{2}} 8 = \textcircled{6}$

سوال ۷)

$x^2-2=4x \Rightarrow x^2-4x-2=0 \Rightarrow \frac{4\pm\sqrt{24}}{2} \Rightarrow 2+\sqrt{6}$ ✓ $\quad 2-\sqrt{6}$ ✗

$x-2>0$ ✓

$\log_6 (x-2) \Longrightarrow 2 = $ غ ق ق $\Rightarrow (x-2)=\sqrt{6} \Rightarrow \log_6 \sqrt{6} = \frac{1}{2}$

$(x-2>0$

سوال ۸۵)

$\log_9 \frac{2}{3} = \frac{a}{8}$ $\quad \log_{18} 8 = ? \Rightarrow \frac{3\log_9 2}{\log_9 18} \rightarrow \frac{3}{\log_9 18} = \frac{3}{1+2\log_9 3} = \frac{3}{1+\frac{b}{a}}$

$\rightarrow \frac{3}{\frac{a+b}{a}} = \frac{3a}{a+b} = \frac{3}{7}$

سوال ۹۵)

$\log_9 \frac{3}{4} = \frac{8}{10}$ $\quad \log_{12} \frac{9}{8}$?

$2\log_9 12 = 18 \Rightarrow \log_9 12 = 9/4$ $\quad \log_9 12 = \frac{a}{18} \rightarrow 1 - \log_{12} 2 = \log_{12} 6$

$\frac{14}{18}$

سوال ۱۰)

$(a\log 2)x^2 + ax + b\log 2 = 0 \xrightarrow[\Rightarrow]{-1 = \frac{D}{a}} a = (a+b)\log 2 \Rightarrow \log 2 = \frac{a}{a+b}$

$\frac{1}{\log 2} = 1 + \frac{b}{a} \Rightarrow \log 10 - 1 \Rightarrow \log 5 = \frac{b}{a} \Rightarrow (\sqrt{2})^{\log 5} \Rightarrow \boxed{\sqrt{5}}$
