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

$n=2 \Rightarrow 3^{2A+B}=9=3^2 \Rightarrow 2A+B=2$

$A=1, B=-1 \Rightarrow f(n)=3^{n-1} \xrightarrow[n=0]{} f(0)=3^{-1}=\frac{1}{3}$

(۲) $\log_2^{2^n+15}=n+3 \Rightarrow 2^{n+3}=2^n+15 \Rightarrow 8\times 2^n=2^n+15$

$\xrightarrow{2^n=t} t^2+15=8t \Rightarrow t^2-8t+15=0 \Rightarrow (t-3)(t-5)=0$

$t=3=2^n \Rightarrow n=\log_2^3$

$t=5=2^n \Rightarrow n=\log_2^5$

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

(۳) $(\log_{12}^3)^2+\log_{12}^{(12)(9)}\log_{12}^{(12)(3)}=(\log_{12}^3)^2+\log_{12}^{(4)(9)}\log_{12}^{(4)(3)}$

$=(\log_{12}^3)^2+(1+\log_{12}^3)(2+\log_{12}^3)=(\log_{12}^3)^2+(2-\log_{12}^3)(2+\log_{12}^3)=4$

$1-\log_{12}^3$ ، $2-(\log_{12}^3)^2$

(۴) $\log^{(1-n)^2}+3\log^{(1-n)}=6 \Rightarrow 6\log^{(1-n)}=6 \Rightarrow \log^{(1-n)}=1 \Rightarrow 1-n=10^1=10$

$\Rightarrow n=-9$ $\quad \log_3^{(-n)}=\log_3^9=4$

(۵) $\log_2^{(n-1)(n^2+3n+4)}=2 \Rightarrow (n-1)(n^2+3n+4)=4 \Rightarrow n^3-1=4 \Rightarrow n^3=5$

$\Rightarrow n=\sqrt[3]{5}$ $\quad \log_{\sqrt{5}}^n=\log_{5^{\frac{1}{2}}}^{5^{\frac{1}{3}}}=\frac{\frac{1}{3}}{\frac{1}{2}}\log_5^5=\frac{2}{3}$

(۶) $\log^{(n-1)}-\log^{(n-2)^{-2}}=3 \Rightarrow \log^{(n-1)}-2\log^{(n-2)}=3 \Rightarrow \log^{(n-1)}-2\log^{(n-2)}=3$

$\xrightarrow[n-1=n^2-4n+4]{} n^2-5n+5=0 \Rightarrow n=\frac{5\pm\sqrt{5}}{2}$

$\Rightarrow n=-1$ $\quad \log_5^{(n-1)}=\log_5^{-2}=\log_{5^{-1}}^{5^2}=\frac{2}{-1}\log_5^5=-2$

(۷) $3^{n^2-2n}=3^{2n} \Rightarrow n^2-2n=2n \Rightarrow n^2-4n=0 \Rightarrow n=0$ یا $n=4$

$\Rightarrow \begin{cases} n-2=\sqrt{5} \\ n-2=-\sqrt{5} \end{cases}$ قبول

$\log_5^{(n-2)}=\log_5^{\sqrt{5}}=\frac{1}{2}$

(۸) $\log_{18}^8=\frac{\log_2^8}{\log_2^{18}}=\frac{3}{1+2\log_2^3} \overset{(I)}{=} \frac{3}{1+\frac{2}{3}}=\frac{3}{\frac{5}{3}}=\frac{9}{5}$

$\log_3^2=\frac{2}{3} \Rightarrow \log_2^3=\frac{3}{2}$ (I)

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⑨ $\log_{12}^{6} = \frac{\log_2^6}{\log_2^{12}} = \frac{1+\log_2^3}{2+\log_2^3} \overset{(I)}{=} \frac{1+1/6}{2+1/6} = \frac{2/6}{3/6} = \boxed{\frac{13}{18}}$

$\log_{\sqrt{2}}^{3} = 0/18 \Rightarrow \frac{1}{2}\log_2^3 = 0/18 \Rightarrow \log_2^3 = 1/6$ (I)

⑩ $\overset{n=-1}{\Rightarrow} a\log^2 - a + b\log^2 = 0 \Rightarrow (a+b)\log^2 = a \Rightarrow \log^2 = \frac{a}{a+b} \Rightarrow \log_2^{10} = \frac{a+b}{a}$

$\Rightarrow 1+\log_2^5 = 1+\frac{b}{a} \Rightarrow \log_2^5 = \frac{b}{a}$ (I)

$(\sqrt{2})^{\frac{b}{a}} \overset{(I)}{=} (\sqrt{2})^{\log_2^5} = 5^{\log_2^{\sqrt{2}}} = 5^{\frac{1}{2}} = \boxed{\sqrt{5}}$