1. The number of solutions of the equation $\log_4(x-1)=\log_2(x-3)$ is _____.

2. The number of distinct solutions of the equation, $\log_{\frac{1}{2}}|\sin x|=2-\log_{\frac{1}{2}}|\cos x|$ in the interval $[0,2\pi]$, is _____

3. Let $a,\ b,\ c$ be the three distinct positive real numbers such that $(2a)^{\log_e a}=(bc)^{\log_e b}$ and $b^{\log_e 2}=a^{\log_e c}$. Then $6a+5bc$ is equal to _____.
(Ignore the case where we are getting infinite solutions for a, b, c)
NOTE: This question was BONUS in JEE Mains, We have modified the question statement

4. If the solution of the equation $\log_{\cos x}(\cot x)+4\log_{\sin x}(\tan x)=1,\ x\in\left(0,\frac{\pi}{2}\right)$ is $\sin^{-1}\left(\frac{\alpha+\sqrt{\beta}}{2}\right)$, where α,β are integers, then $\alpha+\beta$ is equal to:
(1) 3 (2) 5
(3) 6 (4) 4

5. The sum of the roots of the equation, $x+1-2\log_2(3+2^x)+2\log_4(10-2^{-x})=0$, is :
(1) $\log_2 14$ (2) $\log_2 12$
(3) $\log_2 13$ (4) $\log_2 11$

6. The number of solutions of the equation $\log_{(x+1)}(2x^2+7x+5)+\log_{(2x+5)}(x+1)^2-4=0,\ x>0$, is

7. If for $x\in\left(0,\frac{\pi}{2}\right)$, $\log_{10}\sin x+\log_{10}\cos x=-1$ and $\log_{10}(\sin x+\cos x)=\frac{1}{2}(\log_{10}n-1), n>0$, then the value of n is equal to :
(1) 20 (2) 12
(3) 9 (4) 16

8. Let $A=\{x\in R:|x+1|<2\}$ and $B=\{x\in R:|x-1|\geq 2\}$. Then which one the following statements is NOT true?
(1) $A-B=(-1,1)$ (2) $B-A=R-(-3,1)$
(3) $A\cap B=(-3,-1]$ (4) $A\cup B=R-[1,3)$

9. If $A=\{x\in R:|x|<2\}$ and $B=\{x\in R:|x-2|\geq 3\}$; then
(1) $A\cap B=(-2,-1)$ (2) $B-A=R-(-2,5)$
(3) $A\cup B=R-(2,5)$ (4) $A-B=[-1,2)$

10. The number of integral solution x of $\log_{\left(x+\frac{7}{2}\right)}\left(\frac{x-7}{2x-3}\right)^2\geq 0$ is
(1) 7 (2) 8
(3) 6 (4) 5

11. Let $S=\left\{x\in[-6,3]-\{-2,2\}:\frac{|x+3|-1}{|x|-2}\geq 0\right\}$ and $T=\{x\in Z:x^2-7|x|+9\leq 0\}$. Then the number of elements in $S\cap T$ is
(1) 7 (2) 5
(3) 4 (4) 3

12. If $A=\left\{x\in R:\left|x-2\right|>1\right\}, B=\left\{x\in R:\sqrt{x^2-3}>1\right\}, C=\left\{x\in R:\left|x-4\right|\geqslant 2\right\}$ and Z is the set of all integers, then the number of subsets of the set $(A\cap B\cap C)^c\cap Z$ is _____.