Maths Module2 - Single Choice Questions
Solution of Triangles and Inverse

1. $\log_6(abc) = 6 \Rightarrow abc = 6^6$

let a, b, c are $\frac{A}{R}, A, AR$

$\therefore A^3 = 6^6 \Rightarrow A = 6^{6/3} = 6^2$

$b - a = \cancel{A(R-1)}\ A - \frac{A}{R} = \frac{A(R-1)}{R}$

a, b, c are integers ~~∴ R should also be integer~~

$\therefore \frac{36}{R}$ is also an Integer such that

$36 - \frac{36}{R}$ is a perfect square.

$\therefore$ possible values of $\frac{36}{R} = 11, 20, 27, 32, 35$

$\therefore \frac{36}{R} = 27 \Rightarrow R = \frac{4}{3}$

$\therefore AR = 36 \times \frac{4}{3} = 48$

$\therefore \frac{A}{R} + A + AR = 27 + 36 + 48 = 111$

Q.2. $\log_8(a_1 \cdot a_2 \cdot a_3 \cdots a_{12}) = 2010$

$(a)(ar)(ar^2)\ldots(ar^{11}) = 8^{2010}$

$a^{12}(r)^{1+2+3+\ldots+11} = 8^{2010}$

$a^{12}(r)^{66} = 8^{2010} \Rightarrow a^6 r^{33} = 8^{1005}$

$\cancel{(ar^6)^{11} = 8^{2010}} \Rightarrow a^2 r^{11} = 8^{335}$

$a^2 r^{11} = 2^{1005}$

$a^2 r^{11} = 2^4 \cdot 2^{1001}$

$\frac{1001}{11} = 91, \quad 11 \times 90 = 990 + 15 \times$

$11 \times 89 = 979 + 26 \checkmark$

$11 \times 1 = 11 \quad +994$ ✓

all odd no. included

$\therefore 1, 3, 5, \ldots 91$

$\therefore n = \frac{91-1}{2} + 1 = 46$

3. $(a^2-b^2)^{2(n-1)} = (a-b)^{2n}(a+b)^{-2}$

$(a-b)^{2(n-1)}(a+b)^{2(n-1)} = (a-b)^{2n}(a+b)^{-2}$

$\cancel{\therefore 2(n-1) = -2 \Rightarrow n = 0}$

$\cancel{2(n-1) \neq 2n}$

$\therefore (a-b)^{2n-2-2n} \cdot (a+b)^{2n-2+2} = 1$

$(a-b)^{-2}(a+b)^{2n} = 1$

$\therefore (a+b)^{2n} = (a-b)^2$

$\therefore 2n \log(a+b) = 2\log(a-b)$

$\therefore n = \frac{\log(a-b)}{\log(a+b)}$

4. $2\log_{(2000)^6} 4 + 3\log_{(2000)^6} 5$

$\cancel{= \log_{(2000)^6}(4^2+5^3) = \log 13}$

$\cancel{\frac{1}{6}\frac{\log 1}{\log(2000)}}$

$\cancel{\frac{1}{3}\log_{2000} 4 + \frac{1}{2}\log_{2000} 5 =}$

$\cancel{\frac{1}{6}\frac{\log(1)}{\log 5 + \log 4 + 2}}$

$\cancel{\frac{x}{3(y+x+2)} + \frac{1}{2}\frac{y}{(x+y+2)}}$

$\cancel{= \frac{2x+3y}{6(x+y+2)}}$