

[20-04-2018 (Fri)]

Func-1

⊗ ~~Q.1~~  $f(x) = 2^x + 3^x$  is a one-one func.

Proof:-  $f(x_1) = f(x_2) \Rightarrow 2^{x_1} + 3^{x_1} = 2^{x_2} + 3^{x_2}$

$$\Rightarrow 2^{x_1} - 2^{x_2} + 3^{x_1} - 3^{x_2} = 0$$

~~$\Rightarrow 2^{x_1} - 2^{x_2} + 3^{x_1} - 3^{x_2} = 0$~~   $\Rightarrow 2^{x_1}(1 - 2^{x_2-x_1}) + 3^{x_1}(1 - 3^{x_2-x_1})$

$= 0$   
..... ⊗

If  $x_1 < x_2$  i.e. if  $x_2 - x_1 > 0$   
then  $2^{x_2-x_1} > 1, 3^{x_2-x_1} > 1$   
 $\Rightarrow \text{LHS} < 0$

If  $x_1 > x_2$  i.e. if  $x_2 - x_1 < 0$   
then  $2^{x_2-x_1} < 1, 3^{x_2-x_1} < 1$   
 $\Rightarrow \text{LHS} > 0$

Hence, ⊗  $\Rightarrow x_1 = x_2$  (proved).

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Q.2 Solve:  $2^x + 3^x = 13$

Solve  $2^x + 3^x = 2^2 + 3^2 \Rightarrow x = 2$  (Ans)  
NO other solutions exist.