QUESTION 2 (25 MARKS)

Question 2 (a)

$\log_4(6x+1)-2=2\log_4 x$

$\log_4(6x+1)-2\log_4 x=2$

$\log_4\left(\frac{6x+1}{x^2}\right)=2$

$\log_a\left(\frac{x}{y}\right)=\log_a x-\log_a y$

$a^x=y \Leftrightarrow \log_a y=x$

$\frac{6x+1}{x^2}=4^2$

$6x+1=16x^2$

$16x^2-6x-1=0$

$(8x+1)(2x-1)=0$ [$x=-\frac{1}{8}$ is not allowed as $\log_4(-\frac{1}{8})$ is not defined.]

$x=\frac{1}{2}$

Question 2 (b) (i)

$F\left(\frac{a}{b}\right)=F(a)-F(b)$

$F(1) \Rightarrow a=b$

$F(1)=F(a)-F(a)=0$

Question 2 (b) (ii)

$F\left(\frac{1}{x}\right)=F(1)-F(x)$

$=0-F(x)$

$=-F(x)$

Question 2 (b) (iii)

$F(y^2)=F\left(\frac{y}{\frac{1}{y}}\right)=F(y)-F\left(\frac{1}{y}\right)$

$=F(y)-[F(1)-F(y)]$

$=F(y)-0+F(y)$

$=2F(y)$