

## SAMPLE PAPER 3: PAPER 1

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### QUESTION 2 (25 MARKS)

#### Question 2 (a)

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

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

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

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

$$6x+1 = 16x^2$$

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

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

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

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

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

#### 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)

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

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

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

$$= 2F(y)$$


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