Sample Paper 7: Paper 1

Question 2 (25 marks)

Question 2 (a)

$S_n = pn^2 + qn$

$S_{n-1} = p(n-1)^2 + q(n-1) = pn^2 - 2pn + p + qn - q$

$S_n - S_{n-1} = T_n \Rightarrow T_n = pn^2 + qn - pn^2 + 2pn - p - qn + q$

$= 2pn - p + q$

$T_{n+1} = 2p(n+1) - p + q$

$T_{n+1} - T_n = 2p(n+1) - p + q - 2pn + p - q$

$= 2pn + 2p - p + q - 2pn + p - q$

$= 2p =$ Common Difference

$a = T_1 \Rightarrow a = 2p - p + q = p + q$

$d = T_{n+1} - T_n = 2p$

Question 2 (b) (i)

$a,\ ar,\ ar^2$

$\log a,\ \log ar,\ \log ar^2$

$= \log a,\ \log a + \log r,\ \log a + 2\log r$

$d = \log a + \log r - \log a = \log r$

$a = \log a$

$S_n = \frac{n}{2}[2\log a + (n-1)\log r]$

Question 2 (b) (ii)

$S_{50} = 2450 \Rightarrow 25[2\log_3 1 + 49\log_3 r] = 2450$

$0 + 49\log_3 r = 98$

$\log_3 r = 2$

$\therefore r = 3^2 = 9$