Q9) Assume that the following assets are correctly priced according to the security market line. Derive the security market line

$\mu_1 = 6\%$ $\beta_1 = 0.5$

$\mu_2 = 12\%$ $\beta_2 = 1.5$

What is the expected return on an asset with $\beta = 2$?

The security market line $r_i - r_f = \beta_i (r_m - r_f)$

We have $0.06 - r_f = 0.5 (r_m - r_f)$ or rearranging $0.5 r_m + 0.5 r_f = 0.06$ and $0.12 - r_f = 1.5 (r_m - r_f)$

or rearranging

$1.5 r_m + 0.5 r_f = 0.06$

and $0.12 - r_f = 1.5 (r_m - r_f)$

$1.5 r_m - 0.5 r_f = 0.12$

Solving these 2 equations gives rise to

$r_f = 0.03$ $r_m = 0.18/2 = 0.09$

The security market line is $r_i = 0.03 + \beta (0.06)$

$r_i = 0.03 + \beta (0.06)$ $= 0.03 + 2(0.06) = 0.15$