

B.15 If X_1 and X_2 are independent then also X_1 and X_2^2 are independent, therefore

$$\mathbb{E} [X_1 X_2^2] = \mathbb{E} [X_1] \mathbb{E} [X_2^2].$$

Furthermore

$$\sigma_2^2 = \mathbb{E} [X_2^2] - \mu_2^2,$$

consequently

$$\mathbb{E} [X_1 X_2^2] = \mu_1 (\sigma_2^2 + \mu_2^2).$$