Note: Numbers in square brackets refer to the marks for each question.

1. The sixth assumption we make in the standard multiple linear regression model, (MLR.6) is the 'normality' assumption.

   (a) [4] Write down the formal mathematical statement of this assumption.

   (b) [4] In simple language, explain what this assumption enables us to do.

   (c) [4] Under what circumstances is this assumption not needed?

2. The results of estimating a regression are shown below (standard errors in parentheses):

$$\hat{y} = \underset{(0.022)}{0.86} + \underset{(0.097)}{0.432}x_1 + \underset{(0.029)}{0.142}x_2 - \underset{(0.023)}{0.079}x_3$$

   The regression uses 150 observations and has an R^2 of 0.259.

   (a) [4] What is the 95% confidence interval for the estimated coefficient on x_3?

   (b) [4] Test the hypothesis that the coefficient on x_1 equals 0.5, using a two-sided alternative at the 5% significance level.