Question 6 **(10 marks)**

The error X in digitising a communication signal has a uniform distribution with probability density function given by

$$f(x) = \begin{cases} 1, & -0.5 < x < 0.5, \\ 0, & \text{otherwise.} \end{cases}$$

(a) Sketch the graph of $f(x)$. (2 marks)

(b) What is the probability that the error is at least 0.35? (1 mark)

(c) If the error is negative, what is the probability that it is less than –0.35? (2 marks)

(d) An engineer is more interested in the square of the error. What is the probability that the square of the error is less than 0.09? (2 marks)

(e) Calculate the variance of the error. (3 marks)