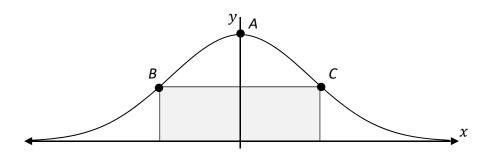
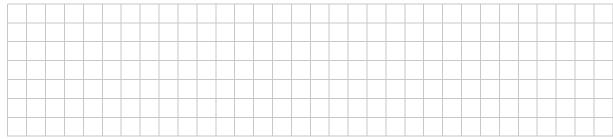
Question 8 (40 marks)

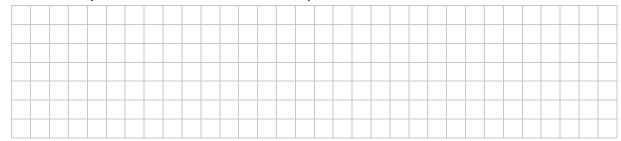
The graph of the **symmetric** function $f(x) = \frac{1}{\sqrt{2\pi}}e^{-\frac{1}{2}x^2}$ is shown below.



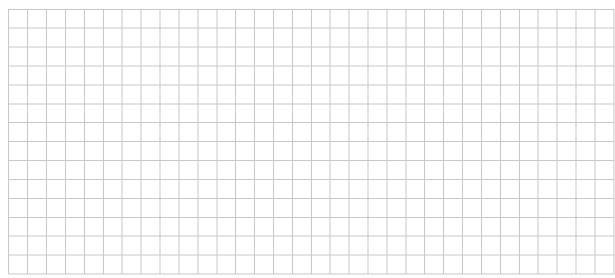
(a) Find the co-ordinates of A, the point where the graph intersects the y-axis. Give your answer in terms of π .



(b) The co-ordinates of B are $\left(-1, \frac{1}{\sqrt{2\pi e}}\right)$. Find the area of the shaded rectangle in the diagram above. Give your answer correct to 3 decimal places.



(c) Use calculus to show that f(x) is decreasing at C.



(d) Show that the graph of f(x) has a point of inflection at B.

