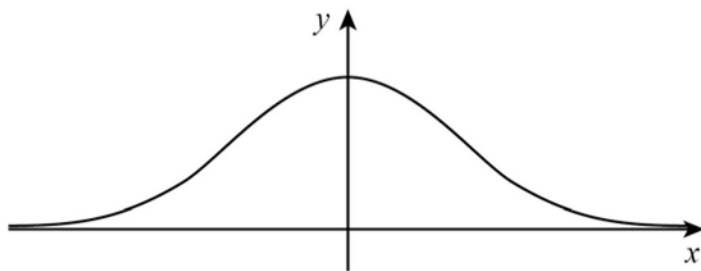


7 The diagram shows part of the graph of $y = e^{-x^2}$

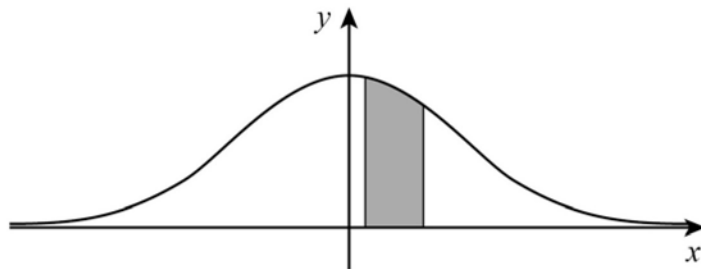


The graph is formed from two convex sections, where the gradient is increasing, and one concave section, where the gradient is decreasing.

7 (a) Find the values of x for which the graph is concave.

[4 marks]

7 (b) The finite region bounded by the x -axis and the lines $x = 0.1$ and $x = 0.5$ is shaded.



Use the trapezium rule, with 4 strips, to find an estimate for $\int_{0.1}^{0.5} e^{-x^2} dx$

Give your estimate to four decimal places.

[3 marks]

7 (c) Explain with reference to your answer in part (a), why the answer you found in part (b) is an underestimate.

[2 marks]

7 (d) By considering the area of a rectangle, and using your answer to part (b), prove that the shaded area is 0.4 correct to 1 decimal place.

[3 marks]