Justify your answers to the following questions.

Question 1. [4 marks] Find the area of the surface of revolution resulting from rotating the arc of the parabola $y = 2x^2$ from $(0, 0)$ to $(1, 2)$ about the $y$-axis.

Question 2. [3.5 marks] Test the series $\sum n e^{-n^2}$ for convergence or divergence.