1. Find the equation of the tangent line to the graph of $f(x) = x^3 4^x$ at the point (1, 4).

2. Find the derivative of $f(x) = \log_{15}(11x)$

3. Find the indefinite integral: $\int \frac{e^{3x}}{5+e^{3x}} dx$

4. Find the indefinite integral: $\int 2^{tanx} sec^2 x \, dx$

5. Evaluate: $\int_{\frac{1}{2}}^{2} \frac{e^{\frac{1}{x}}}{x^2} dx$

Given the following function: $f(x) = xe^{-x^2/2}$.

a) For what values of x is f increasing? Decreasing?

b Find the x coordinate of any points of inflection of the graph of f.

c Find the average value of f(x)

d) Using the results found in parts (a), (b), and (c), sketch the graph of f in the xy-plane provided below (Indicate all intercepts)