1. (3 points) Find the derivative of $x^{3x}$

2. (3 points) If $s = t^3 - 8t^2 + 649t$ is the position function of an object, find the acceleration of the object at time $t$. 
3. (4 points) A sample of a hannahium decayed to 82% after one year. What is the half life of hannahium. (You do not need to simplify, you may keep functions of constants in your answer- such as ln(5))