1) Evaluate the following integral

$$\int \frac{x+3}{x^2+2x+5}dx \tag{1}$$

hint: The solution is $\frac{1}{2}\ln(x^2+2x+5)+\arctan(\frac{x+1}{2})$. Find the solution!

2) Evaluate the following integral.

$$\int \frac{\sqrt{x}dx}{x(\sqrt[3]{x}-1)} \tag{2}$$

Hint: At first glance solving this problem seems impossible. However, if you use the substitution $x=u^6$, then you can modify this integral to something you are familiar with. Please notice that 6 is the greatest common factor between 2 and 3. It might give you an idea how to solve integrals similar to this format.

3) Evaluate the following limit by using squeeze theorem

$$\lim_{x\to\infty} e^{-x}\sin^2(\frac{1}{x}) \tag{3}$$

Hint : The solution is zero. What I need is to see how you apply that theorem in order to find the answer.