SECTION ASSIGNMENT #2

- You must work in groups of 3-4 people.

- Put each person's name and the section number at the top of the paper.

- Turn in one paper per group at the end of class.

Decibels are a unit of measure used to describe how loud a sound is. I_0 is the intensity of threshold sound, which is sound that can barely be perceived by the human ear. The loudness of a sound, in decibels, with intensity I is given by

$$dB = 10 \log_{10} \left(\frac{I}{I_0} \right).$$

So, decibels are on a logarithmic scale of the intensity.

a) A cat's purr has and intensity that is about 316 times as intense as threshold sound. How many decibels is a typical cat's purr?

b) It is recommended that one wear ear protection when exposed to sounds louder than 85 decibels. Above what intensity should you be sure to wear ear protection if you plan to follow this guideline?

c) A gunshot from a rifle has an intensity of about $2.5 \times 10^{13} I_0$. According to what you just figured out, do you think you should wear ear protection while firing a rifle?

d) Suppose sound #1 has intensity $10 I_0$ and sound #2 has intensity $100 I_0$. Calculate and compare the loudness of each sound in decibels. What do you notice?