PHYS 1220 Group Work Sheet
Temperature

With your group, discuss how to answer these questions and write your group answer in the space provided. Explain/show how you got your answer: don't just write down a number! (Especially not one without units!)

1. The freezing point of pure water is 273.15 K = 32°F. What is absolute zero in Fahrenheit?

2. The year 2024 was the hottest year ever recorded, exceeding the pre-industrial global average by 2.62°F.
   a. What is the increase in Celsius?

   b. What is the increase in kelvin?

3. The temperature inside a classroom might vary between 18.0°C and 24.0°C. If a steel meter stick is exactly 1.0000 meters long at 18.0°C, what is its length at 24.0°C? (Steel $\alpha = 1.2\times10^{-5}/°C$)

4. The thermal coefficient of volume expansion of gasoline is $1.1\times10^{-3}/°C$. Flow meters on most American gas pumps are calibrated for gasoline at 16.5°C. On a late summer day, the gasoline in a tank is at a temperature of 26.5°C. If gasoline is priced at $3.00/gallon, how much does a purchaser overpay for 10.0 gallons of gasoline?

5. A automobile's gasoline tank, made of high-density polyethylene ($\alpha = 15\times10^{-5}/°C$), is filled to the brim with 0.0568 m^3 of gasoline at 20.0°C. As the car sits in the sun, the temperature of the gasoline increases to 28.0°C.

   a. Does gasoline spill out of the tank, or does space open up in the tank?

   b. What is the resulting volume difference?