Javier Duarte, Department of Physics
University of California San Diego
Physics 2C, Winter 2020

Reading Assignment due Tuesday 2/4: Submit via Gradescope by 11:30am

1. Why is C_p bigger than C_v? Explain in 2-3 sentences.

2. A sample of gas is adiabatically compressed to half of its initial volume. As a result, the pressure increases from p_0 to $2.64p_0$

   (a) Is the sample of gas diatomic or monoatomic?

   (b) If the initial temperature of the gas were room temperature, what would be the final temperature of the gas in °C?

   (c) Did the gas jump to a higher or lower isotherm? On a pV diagram, draw the initial point, final point, path, and the two isotherms. Draw the adiabatic path with a solid line (and an arrow to indicate the direction), and draw both isotherms with dotted lines.

3. The following figure shows the insulation separating the inside of a house and the outside in the wintertime (the far left side is the warm house and the far right side is the cold outside). The interior of the house is at 25°C and the exterior of the house is at −10°C. The insulation between the inside of the house and the outside is made up of four different materials, all of the same thickness: a, b, c, and d. The equilibrium temperatures of the ab, bc, and cd interfaces are given:
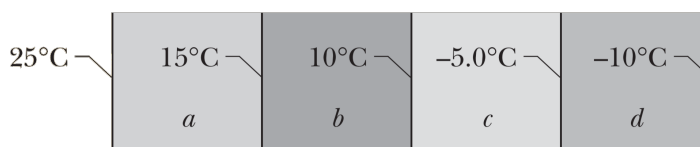
   (a) Rank the four materials according to their thermal conductivities, greatest first. Explain.

   (b) Rank the four materials according to the energy per unit time transmitted through them, greatest first. Explain.

For extra practice (not due): From Chapter 19 of Knight, 4th edition: Conceptual Questions: 3, 5-6, 11. Exercises: 26-37.