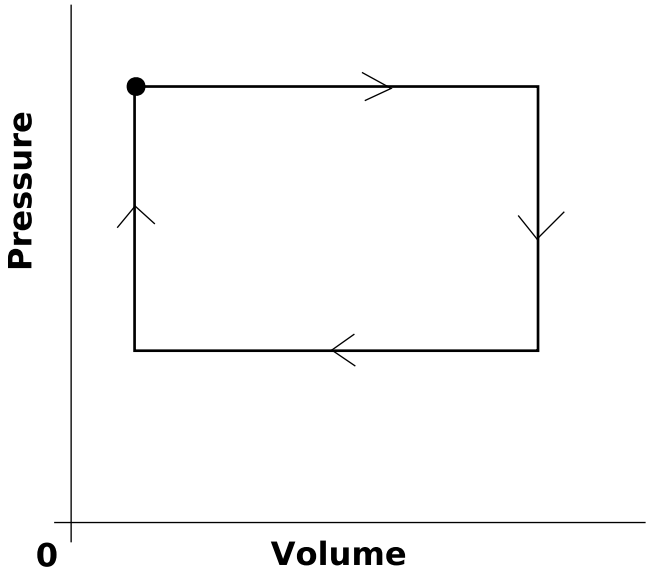
1 pV rectangle

This worksheet considers processes that happen at constant pressure, volume, temperature or entropy.

Earlier in PH423, we spent time discussing partial derivatives and how they relate to measurements. Today we will analyze a different type of measurement. The analysis will involve integrals. To visualize this analysis, it's common to use what are called pV diagrams such as the square shown in the Figure.



Note When you consider a pV diagram, you cannot assume that the substance which has pressure p and volume V is an ideal gas. It could equally well be water, or a strange gooey substance that you found on a distant planet. *You can* ***never*** *assume that we are talking about an ideal gas unless it is stated in the problem, or you have explained why the ideal gas as a suitable approximation!*

In your groups, work out the following questions:

1. What does this figure describe? Is p a function of V?
2. What is the net work done after one cycle of this process? How much work was done at each step?
3. What is the net energy transfered by heating over one cycle of this process? Try to find the energy transfered by heating at each step.

2 TS rectangle

Now let's look at another cycle. Let's consider the following figure, which looks similar, but is now a plot of T vs. S, and answer the following questions:

1. What is this cycle? How would you go about running a cycle like this?
2. What is the net heat transfer over one cycle of this process? How much was transfered on each step?
3. What is the net work done after one cycle of this process? How much work was done at each step?

