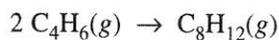
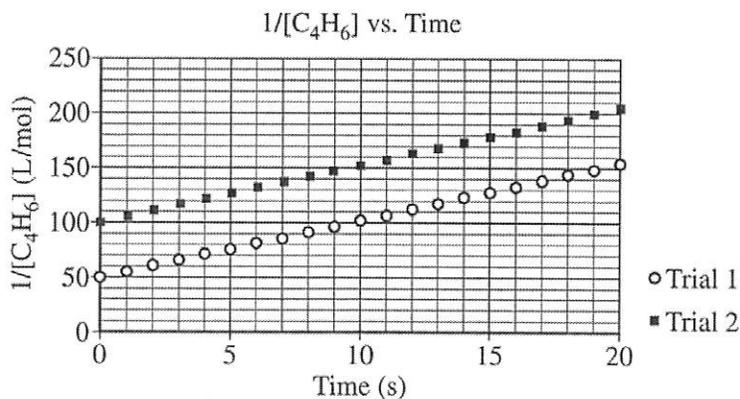
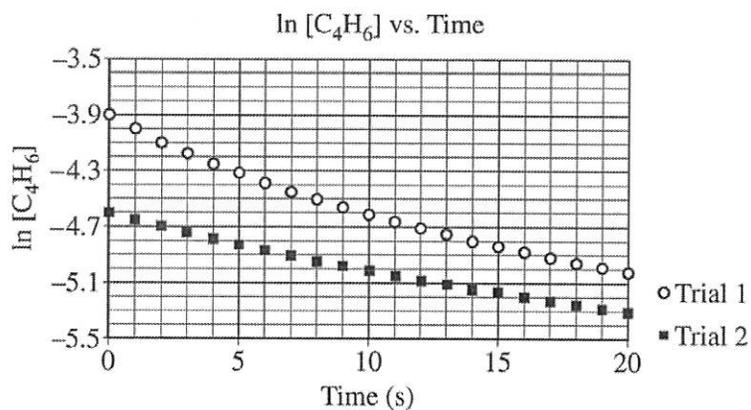
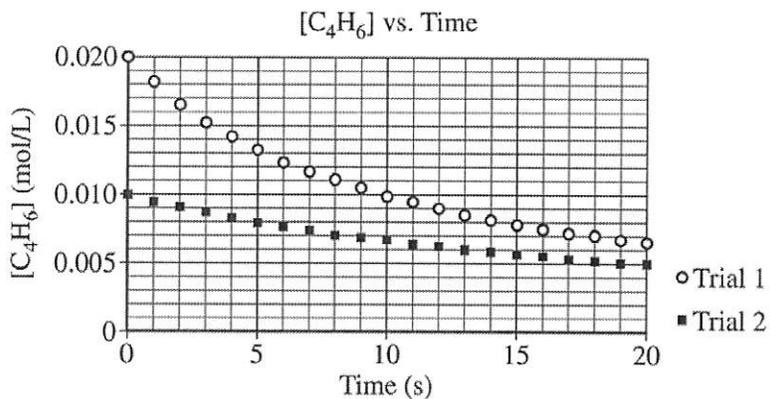


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5. At high temperatures the compound  $\text{C}_4\text{H}_6$  (1,3-butadiene) reacts according to the equation above. The rate of the reaction was studied at 625 K in a rigid reaction vessel. Two different trials, each with a different starting concentration, were carried out. The data were plotted in three different ways, as shown below.



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- (a) For trial 1, calculate the initial pressure, in atm, in the vessel at 625 K. Assume that initially all the gas present in the vessel is  $C_4H_6$ .
- (b) Use the data plotted in the graphs to determine the order of the reaction with respect to  $C_4H_6$ .
- (c) The initial rate of the reaction in trial 1 is  $0.0010 \text{ mol}/(\text{L} \cdot \text{s})$ . Calculate the rate constant,  $k$ , for the reaction at 625 K.