

## Checklist for Lab #4 – Flying Pigs

Below are the things that are required to be handed in for the lab.

1. Answers to all questions in the lab. If there's no or not enough space in the lab, please answer them on a separate sheet of paper.
2. Derivation of the theoretical expression for the tension force in the string along with the derivation of the uncertainty in the tension force. This should show the coordinate system that you used as well as a full vector expression of the forces. Then break those forces down into the coordinates you assumed for your coordinate system. In this derivation you will probably need the fact that for small angles,  $\cos \theta \sim 1$ . Note, you want the final expression for the tension force in the string to be in terms of the things that you **actually** measured. Hint: There are only **two** things you **actually** measured, one of which is needed here and the other is needed in the period. What were they?
3. Derivation of the theoretical expression for the period of the flying pig along with the derivation of the uncertainty in the period. In this derivation you will probably need the fact that for small angles,  $\cos \theta \sim 1$ . Note, you want the final expression for the period of the pig to be in terms of the things that you **actually** measured. Hint: Again, there are only **two** things you **actually** measured, one of which was needed for the tension and the other in is needed here.

- For the derivations, you may want to work these out on separate sheets of paper and then transfer them into the lab or turn in the sheets. Make sure they are legible and that you explain what you are doing.
- You want to compare your results for the measured and theoretical periods as well as the measured and theoretical tension forces. Try to avoid vague generalizations and point to specific reasons why the results do not match if they do not match within uncertainties. Also, human error is not a source of error.
- All your numbers need to have a unit attached to them.
- For your uncertainty calculations you need to make sure they are dimensionally correct. If they do not give the correct units then they formula cannot be correct and you need to fix it. If you have to explain sources of uncertainty, human is never a source.