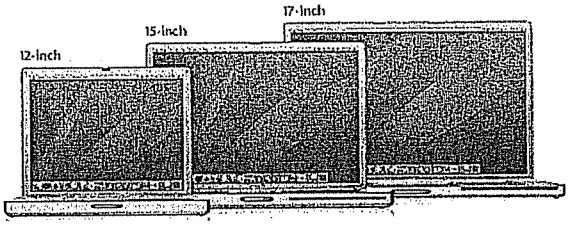
Stat101 Worksheet
Confidence Interval for a Population Mean

Name:
Section: Key

Select your PowerBook G4.

New models featuring:

- 1.5GHz or 1.67GHz PowerPC G4 processor
- Display resolution up to 1680x1050
- Up to 5.5 hours of battery life
- SuperDrive standard in every model
- Hard drives up to 7200rpm available
- Dedicated graphics memory up to 128MB
- Mac OS X Tiger and iLife '05



Dr Cook was shopping in the last few days at the Apple Store in Jordan Creek Mall. She was surprised to see a large ad for Powerbooks with big letters stating the battery life of 5.5 hours, with "up to" in smaller letters beside it. On her brand new Powerbook she gets 1.5 hours at most. So she asked some friends with Powerbooks how long their batteries lasted. Here is the data (including the value for her own powerbook):

1.5, 3, 3.5, 1.5, 2

1. What is the sample size, n?

   $n =$ 5

2. Compute the sample mean and standard deviation.

   $\bar{y} =$ 2.3 $\quad s =$ 0.908 $\quad t^*_4 =$ 2.776

3. Compute a 95% confidence interval for the average battery life of a powerbook, using this formula $\bar{y} \pm t_{n-1}\frac{s}{\sqrt{n}}$.

   Upper $= 2.3 + 2.776\left(\frac{0.908}{\sqrt{5}}\right) = 3.427$ hours

   Lower $= 2.3 - 2.776\left(\frac{0.908}{\sqrt{5}}\right) = 1.172$ hours

4. Give two assumptions that you need to make for the confidence interval to be valid, and explain whether they are satisfied or not.

Random Sample: No, this is a convenience sample

10% condition: yes 5 is much less than 10% of all Powerbooks

Independent: perhaps this is reasonable if all 5 powerbooks were bought at different times and manufactured in different batches.

Nearly Normal: Since there a no outliers, (what we need to look for in very small samples, this is reasonable,