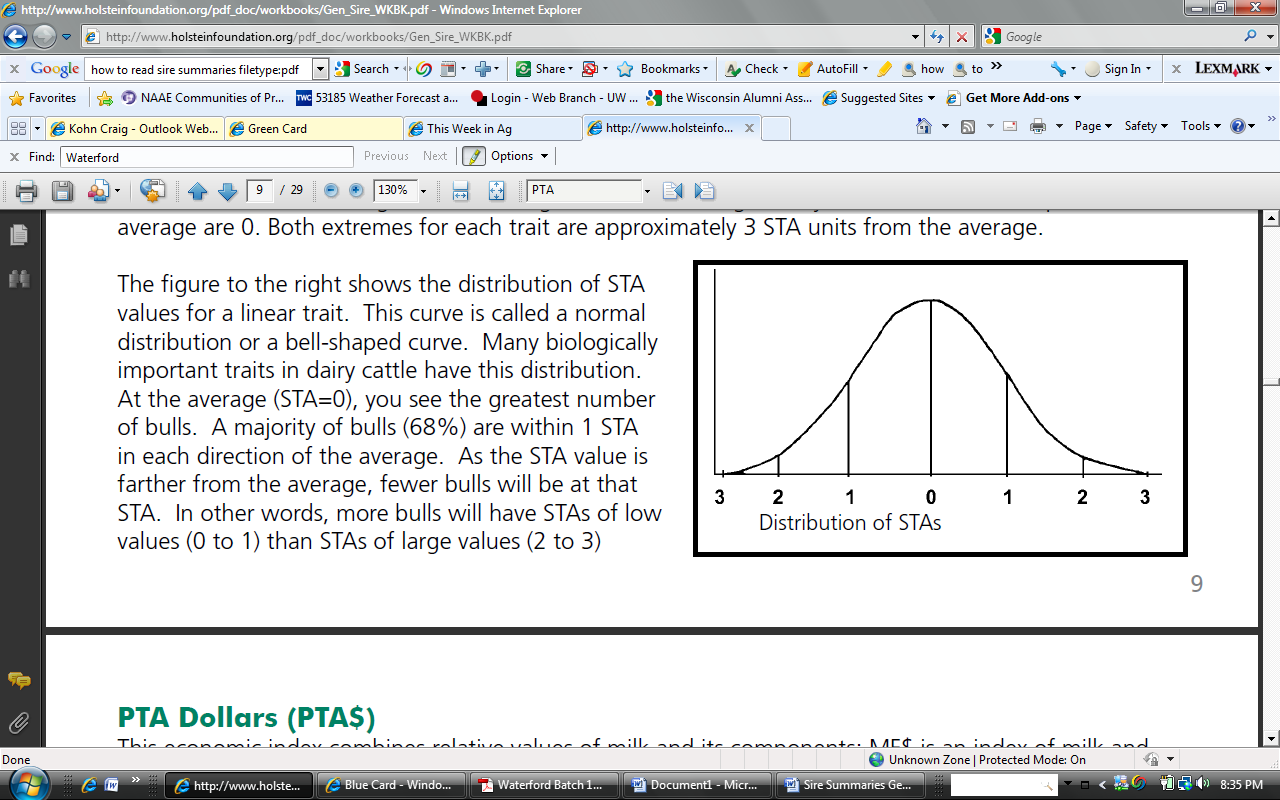
Sire Summaries & Genetic Selection C. Kohn, Waterford WI

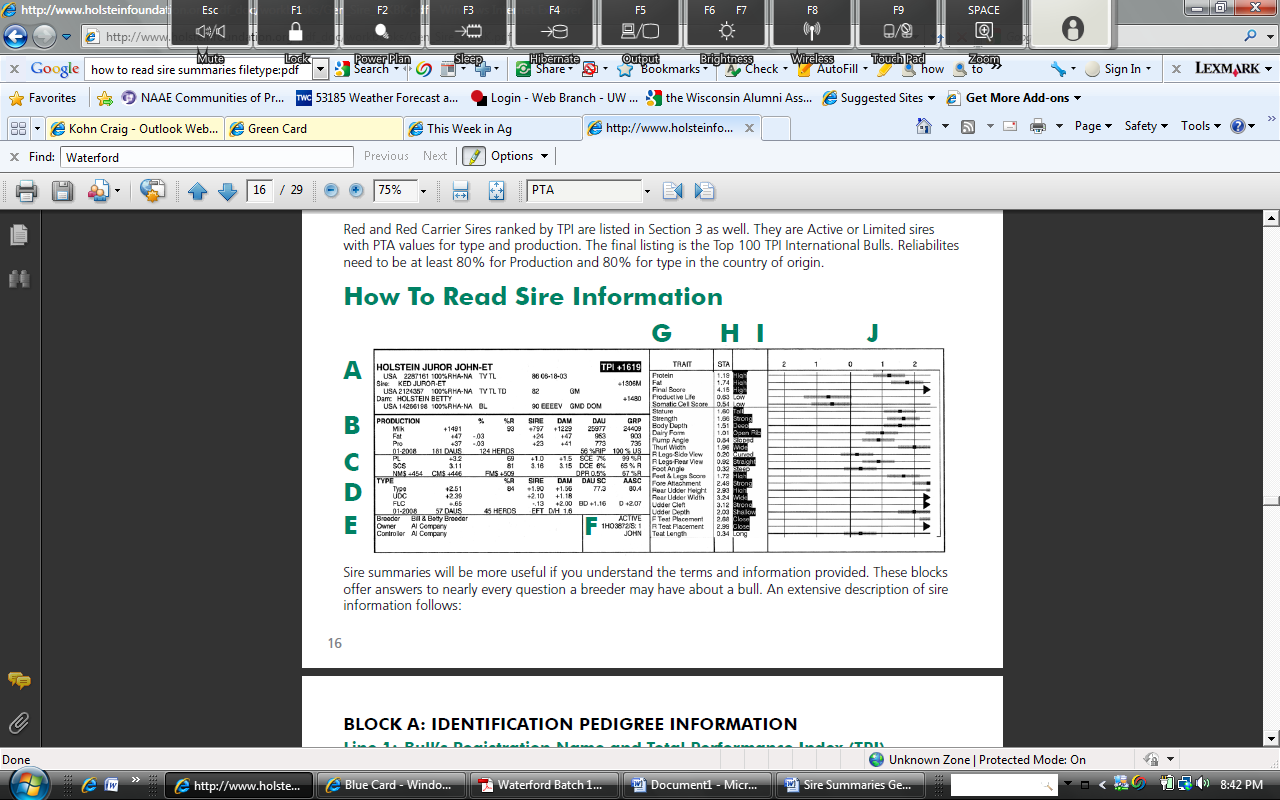
Name: Hour Date:

Date Assignment is due: Why late? Score: \_\_\_\_ /13   
 Day of Week Date If your project was late, describe why**Overview:** A **sire summary** is simply a report published by a breed association (such as the National Holstein Association or the American Jersey Cattle Association) that provides information on the genetic value of registered bulls. This information can provide a farmer or breeder with the information they need to improve the genetic value of their herd. A sire summary will focus primarily of the **Predicted Transmitting Ability** of each bull’s traits. Predicted Transmitting Ability is an estimate of how well a bull will transmit improvements to its offspring for milk pounds, fat percent, protein percent, productive life, and other genetic traits. This information can then be used to determine which bull would be best for mating to a specific cow.



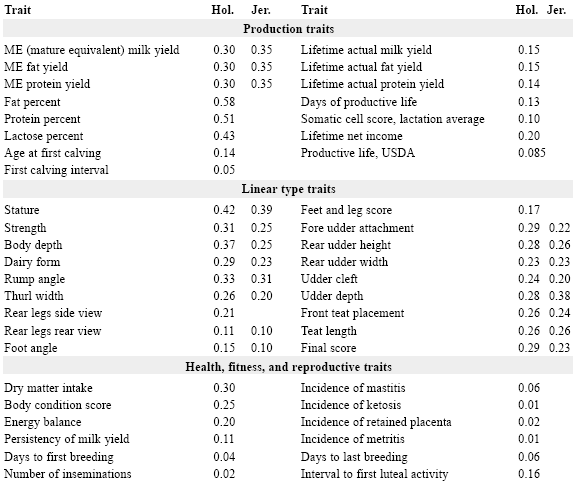
A PTA can be expressed as a **Standard Transmitting Ability** (STA). The STA system puts the value of that bull’s traits on a -3 to +3 scale, with 0 being average. An animal with a trait ranked as a +3 would be the best in regards to the trait compared to all other bulls in the breed. Similarly, an animal with a -3 would be among the worst animals in the breed for that particular trait. Most bulls’ traits will fall between -1 and +1.

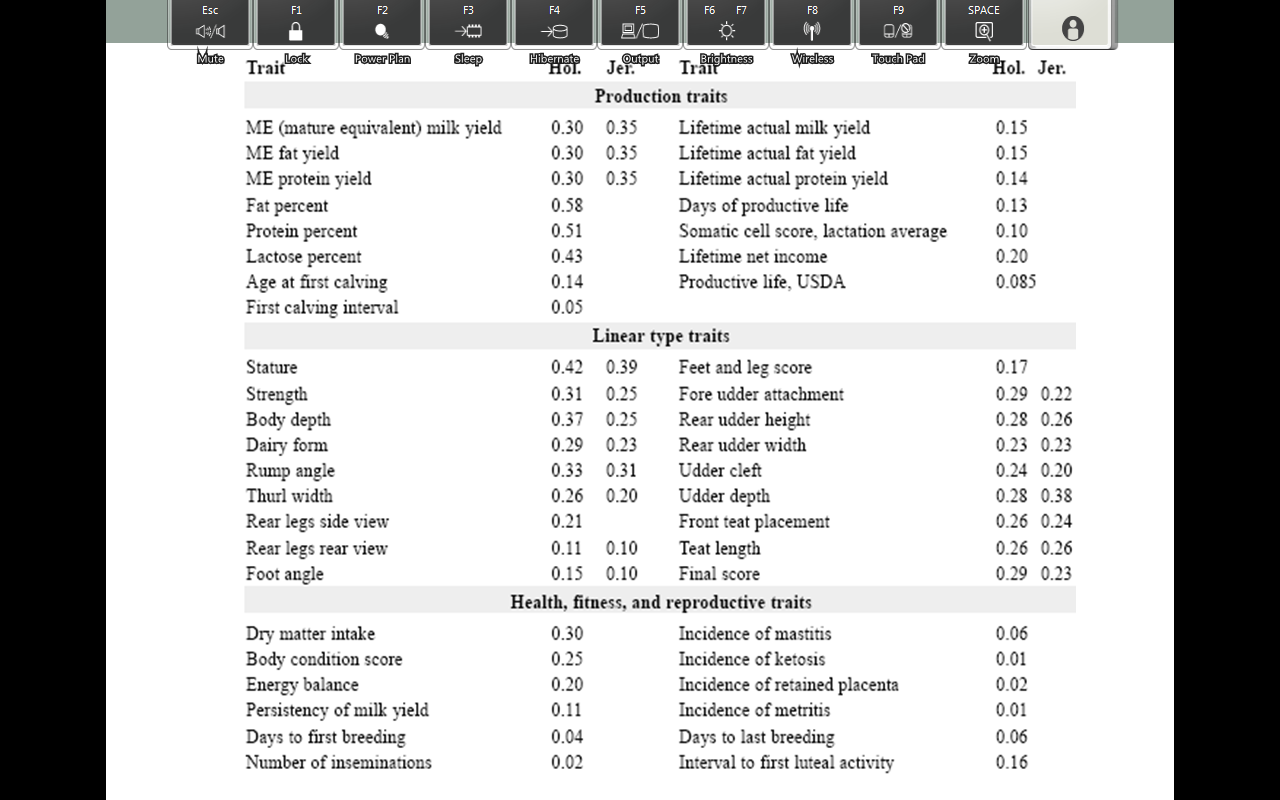
In this lab, you will be given information on different bulls. Using this information, as well as the heritability of each trait, you will have to select a specific bull to use for mating on a farm. General descriptions will be given of the cows on that particular farm’s herd. Your job will be to select a bull that would best improve the herd given its STA and the heritability of the traits in question.

You will be given sire summaries that look like the example below. Category A in this example simply shows the name and registration information of the animal. Categories B,C,D, and E provide specific genetic information, which is summarized on the right hand side. Categories G, H,I, and J reflect the STA values of that animal. Under Category J, the further right a bar is for each trait, the better that animal is compared to all other animals in that breed. Animals that are in the Top 2% for their breed for a trait will have a dark arrow pointing right. For example, the bull below was in the top 2% for four different traits.

**Background**: you have a small herd of 20 Holstein cows. In general, the cows in your herd are good milkers and each produces a large amount of milk each day. However, the quality of your milk, specifically in regards to fat and protein, is relatively low; this is easily your biggest concern. Your cows also tend to have a short productive life (they may be strong milkers when they first start milking, but their production begins to noticeably decline each year as they age). Finally, you’d like your cows to be stronger to hopefully reduce their likelihood of injury.

*Using the heritability chart and the sire summaries on the following pages, answer the questions below.*

1. For the 5 traits described above (milking production (*use ME Milk Yield)*, protein percent, fat percent, productive life, and strength), rank the traits from one to five in regards to their heritability, with one being the most heritable and five being the least. Also provide the heritability score for each.
2. Of the 5 traits listed above, what ones do you most need to improve in your herd (based on the background information above)?
3. Which of these five traits are very heritable (with a score above 0.40)? List them below.
4. Which of these five traits are not very heritable (with a score below 0.15)? List them below.
5. Provide a brief description of the kind of bull you need for your herd based both on the areas for genetic improvement as well as the heritability of those areas (i.e. if a trait needs to be improved but has a heritability below 0.15, you probably need to focus on better farming practices instead of better genetics).  
     
   *Our bull should be…*



*Heritability*

1. On the next page is a copy of a Sire Summary printout for 4 bulls: 1) Magor Bolivia Allen-ET, 2) Mainstream Manifold, 3) Majestic-Manor OM Beacon-ET, and 4) Mar-Bil Magna Geronimo-ET. Use this page to answer the questions below. Focus on their STA rankings on the right hand side to keep it simple.   
   1. Rank the four bulls from best to worst for Milk Protein:
   2. Rank the four bulls from best to worst for Milk Fat:
   3. Rank the four bulls from best to worst for Productive Life:
   4. Rank the four bulls from best to worst for: Strength
2. Of the traits that need improvement in your herd, which ones are the most heritable (have a score above 0.40)? *Hint – what did you put on the last page?*
3. Of the traits that need improvement, are any mostly not heritable (has a score below 0.15) and would not be easily changed through genetics?
4. Based on the information you gave above, which of these four bulls would be the best fit for the needs of your herd? Choose a bull and explain your choice.
5. What is the role of heritability and genetic selection in improving the performance of animals in agriculture? How can knowledge of both of these concepts make a farmer more profitable?
6. 