

Calculation Homework Packet

This homework packet is designed to help you practice sample size calculations, pen selection and somatic cell count (SCC) calculations, all of which you will need during an audit.

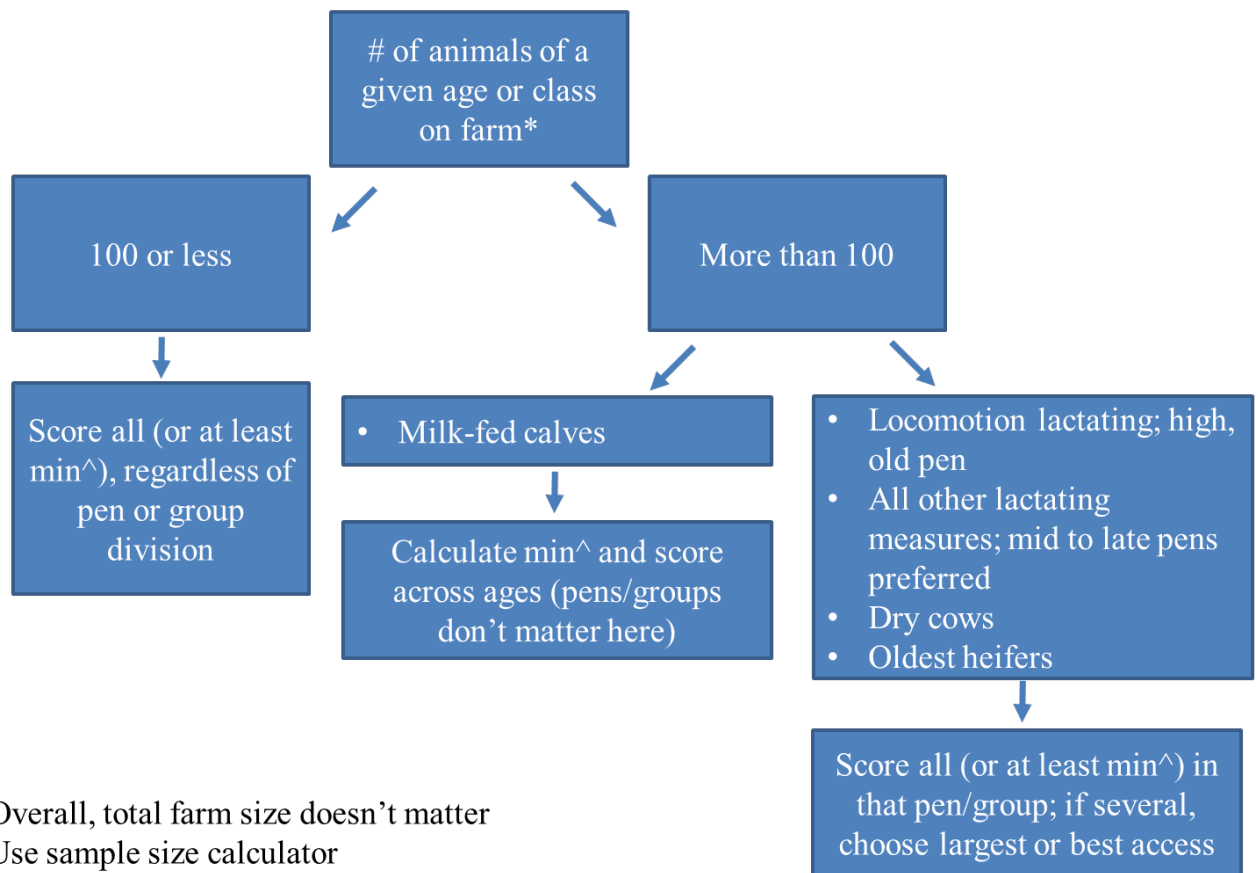
Please bring your answers to the in-person training session and be prepared to discuss.

Part 1: Sample Size Calculations

Instructions:

- A) Given the herd breakdown for the following farms, describe the ideal and minimum sample sizes you would take for each age group you would be required to sample if carrying out an audit.
- B) Given this print out from a commercial farm of pen sizes and composition, determine which group you would score for locomotion.

Sample size decision tree



A: Example and Solution

Sweet Clover Farm has 65 lactating cows in tie stalls. There are 5 close-up dry cows kept in tie stalls and 10 far-off dry cows on pasture in a single group. They manage 60 heifers total and split them into 4 pens (8, 8, 12, 12 heifers, respectively) and one pasture (20 heifers). 18 calves are being raised in 2 group pens: 10 heifers are in one pen, and 8 bulls are in the other pen.

Notes: **Solution**

Type	Number	Pen	Ideal	Minimum	Special Considerations?
Lactating	65	Individual tie stalls	65	57	57 comes from the sample size calculator
Dry	15	Far-off on pasture, close-up in tie stalls	15	15	
Heifers	60	4 group pens and 1 pasture	60	60	As each pen is less than 30 individuals, according to the sample size calculator, all need to be scored
Calves	18	2 group pens separated by sex	18	18	

A: Problem 1

Green Grass Dairy has 700 animals total. They milk 400 cows, and keep them in 4 equal pens, grouped by production. They currently have 40 far-off dry cows together on pasture, and 10 close-up dry cows due in the next week that are kept in a bedded pack close to the office. They manage 150 heifers that are grouped by age. The youngest group of 50 was recently weaned off milk, the middle group of 50 is their breeding group, and the oldest is a bred group of 50 that they keep on pasture near their far-off dry cows. They are raising 100 calves in individual hutches that get fed at 6am and 6pm every day.

Notes:

Type	Number	Pen	Ideal	Minimum	Special Considerations?
Lactating	400	4 equal pens, grouped by production			
Dry	50	1 far-off (40), 1 close-up (10)			
Heifers	150	3 equal pens, grouped by age			
Calves	100	Individual hutches			

A: Problem 2

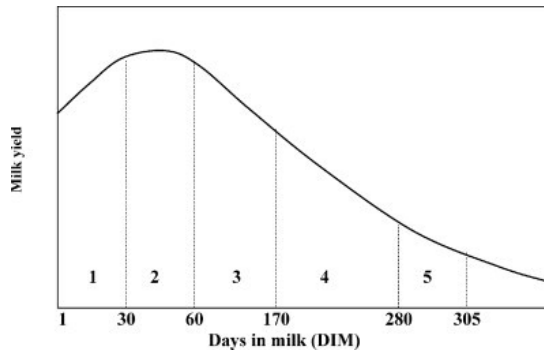
Corn Silk Dairy has 140 animals total. They are raising 22 calves in a group pen with an automatic calf feeder and 38 heifers in 3 pens grouped by age (the 4-9 month pen has 18 heifers, the 10-15 month pen has 12 heifers and the 16-22 month bred heifer pen has 8). They currently milk 68 cows in a herringbone parlor. All lactating cows are kept in one bedded pack pen. The 12 dry cows and pre-fresh heifers are kept in a separate barn split into a far-off and close-up pen. The day you visit, they expect to have 2 in the close-up half and 10 in the far-off half.

Notes:

Type	Number	Pen	Ideal	Minimum	Special Considerations?
Lactating	68	1 bedded pack			
Dry	12	1 far off (10), 1 close up (2)			
Heifers	38	3 pens, grouped by age			
Calves	22	Group pen			

B: Problem 3

In large herds with more than one pen of lactating cows, the audit instructs you to score lameness in the **highest producing, oldest** pen of cows. Age (to identify the *oldest*) is often expressed in terms of number of lactations. Milk production (to identify the *highest producing*) may be available for each pen, if the farm has the technology to collect this information. Otherwise, on farms without this technology, days in milk (DIM) or, the number of days since the cow gave birth, is used as an estimate of milk production. Milk production or yield follows a lactation curve, illustrated here. Typically, groups 2 and 3 on the lactation curve are the target group for locomotion.



Using this print out from a commercial farm, determine which group of lactating cows to score for locomotion. This farm has milk meters too, so you have all 3 pieces of information the audit asks you to consider. Which pen would you choose based on:


- Milk production (Av MILK) + lactation number (LACT)?
- DIM + lactation number (LACT)?

By PEN	Pct	Count	Av MILK	Av DIM	Av LACT
0	1	36	78	40	1.0
1	8	372	101	167	2.6
2	9	379	83	207	1.0
3	8	367	98	178	2.6
4	9	374	101	169	2.5
5	9	384	98	179	2.6
6	6	270	83	49	2.4
7	9	395	81	321	1.8
8	9	386	98	135	2.2
9	8	363	81	206	1.1
10	9	412	70	365	1.7
11	8	337	62	344	1.8
12	1	50	101	161	2.3
13	6	266	52	331	1.5

Part 2: Somatic Cell Count Calculation

Instructions: Based on the SCC data provided in the table below, determine if the average SCC for the previous 3 and 12 months is $< 400,000$ (Item C2 Udder Health in the audit).

Below is the SCC data that you were provided upon visiting the Corn Silk Dairy operation in April, at the blue arrow. Evaluate if the average SCC is acceptable for the past 3 and 12 months (all numbers provided are in thousands).



Month	March	Feb	Jan	Dec	Nov	Oct
SCC Counts	250, 520, 233	341,320, 289	360, 345, 375	340, 360, 355	400, 425	480, 390
Month	Sept	Aug	July	June	May	April
SCC Counts	465, 410, 395	386, 401, 455	410, 385, 240	320, 355, 280	260, 286, 310	260, 220, 210

Notes:

Answers:

Last 3-month average: _____

Last 12-month average: _____