

If it is not clear what a question is asking, request clarification from the instructor. Misreading a question is not grounds for partial credit. To receive partial credit for a calculation problem, formulas and intermediate calculations must be legibly shown. A good strategy would be to go through and answer/set up as much of each question as you can and then go back to fill in details.

The number preceding the question number is the point value of that particular question. Total points = 64.

(10) 1. You tallied the following trees on one, 40BAF variable-radius plot:

<u>DBH</u>	<u>Number of Logs</u>	<u>Number of Trees Tallied</u>
20	2	2
16	2	1
16	1.5	2

What is the observation of basal area per acre for the plot?

What is the observation of trees per acre for the plot?

(4) 2. You tallied 12, 8-inch DBH red pine trees on 16, 20BAF plots in a cruise of a plantation. What would the stand table entry for 8-inch DBH red pine be?

(8) 3. The following are the relevant parts of a tree volume table and the corresponding VBAR table for a cruise you ran:

<i>Tree Volume</i>			<i>VBAR</i>		
<u>DBH</u>	<u>Number of Logs</u>		<u>DBH</u>	<u>Number of Logs</u>	
	<u>1.5</u>	<u>2</u>		<u>1.5</u>	<u>2</u>
15	128	160	15	104	130
16	147	180	16	105	129
17	166	208	17	105	132
18	188	235	18	106	133
19	212	265	19	108	135
20	236	295	20	108	135
21	262	328	21	109	136

For the plot in question 1.:

Estimate volume per acre assuming you measured both DBH and number of logs.

Estimate volume per acre assuming you measured **ONLY** number of logs (DBH not measured).

(5) 4. In traditional 3P timber sale sampling:

How do you determine what trees will be sampled?

What gets observed on sample trees (that isn't observed on non-sample trees)?

What do you end up having a complete census (no error) estimate of upon completion of the 3P sampling effort?

(4) 5. What is the advantage of a sampling with partial replacement (SPR) design over a strict continuous forest inventory (CFI) design in estimating change over time?

Why has the CFI design been more popular in actual application?

(4) 6. Why doesn't traditional site index (height growth curves) work well in (**I want to know the problem, not the solution**):

Uneven-aged stands:

“Young” stands:

(5) 7. Derive a **base-age 50** anamorphic site index equation from the following height equation that was fit to a broad cross-section of balsam fir stands:

$$\ln H = 4.2 - 14.4 * (1/A)$$

where H is total height of dominants and co-dominants and A is breast height age.

(3) 8. The USDA Forest Service Forest Inventory and Analysis group uses a three-phase sample design. What is the objective of (or what generally gets observed in) each phase?

Phase 1

Phase 2

Phase 3

(2) 9. Potlatch uses variable-radius plots for their stand inventories. However, they don't use "plain old" line-plot cruises (a systematic sample design). What design do they use (we discussed the design when covering sampling designs generally in the first third of the course AND when we talked about in-place timber inventories specifically)?

(5) 10. a. Sketch Langsaeter's hypothesis using the axes below (Langsaeter identified five zones if that helps). b. Label the vertical axis. c. Identify the point corresponding to crown closure, where competition among trees begins. d. Identify the part of the curve where we would want to manage stands for timber productivity.



(8) 11. The maximum stocking line on a density management diagram for a species is given by (notation as in class and the homework):

$$N = 20000 * D^{-1.6}$$

It's been decided that the species will be managed using an upper line that is 60% of the maximum and a lower line that is 30% of the maximum. See the following page.

A stand of interest is **right now** on the upper management line with 533 trees per acre and a quadratic mean DBH of 7.0 inches. You are to do a thin from below achieving a $D_{\text{after}}/D_{\text{before}}$ of 1.1. (**calculate using equations, not the chart**)

What is basal area per acre **before** thinning?

What are trees per acre **and** basal area per acre **after** thinning?

(6) 12. Interest lies in “cleaning” an upland hardwood stand that currently has 115 square feet of basal area and 200 trees per acre. Thirty (30) square feet of the current basal area is undesirable. You are to develop a prescription where the stand will be cleaned (NOW) in the standard way (which amounts to some degree of a thin from below) and ALL the undesirable basal area will be removed. Refer to the chart below and mark it up as needed to show your work.

What will stocking percent be after the cleaning?

How many trees per acre will be removed in the cleaning?

“Equation sheet”

$$G = N * D_q^2 * 0.005454 = 0.005454 * \sum D^2$$

$$\text{per acre characteristic (variable radius plots)} = \text{BAF} * \sum \frac{\text{tree value}}{\text{tree basal area}}$$

$$\text{volume per acre (variable radius plots)} = \overline{G} * \overline{\text{VBAR}}$$