

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. Don't miss out on the "freebee" questions.

The number preceding the question number is the point value of that particular question. Total points = 80.

(4) 1. Having data from a two-stage sample you apply equation (7.1) to the observations on your secondary sample units and estimate the mean per secondary unit to be 10. **In symbols** (the notation used in class and your text), what do you multiply your estimate of the mean per secondary, 10, by to obtain an estimate of the population total?

(4) 2. Cluster sampling is said to be a "special case" of two-stage sampling. What relationship between (any of) $\{N, M, n, m\}$ defines that special case?

(4) 3. Interest lies in estimating the number of Burk-beetles in rotting logs on a site. Burk-beetles tend to prefer short logs. Knowing that logs have a "dominant lineal dimension" you decide to use line-intercept sampling to select logs for observation of the number of Burk-beetles. When your boss finds out what you did she exclaims, "That was dumb. You're fired!". Why?

(6) 4. For homework question 2. you localized a standard volume equation (i.e. one based on species, DBH, and height). What would be different about the process of localizing the **form-class volume** equation $V = -10.6 + 1.3 \cdot f \cdot D^2 H$, where V is volume, f is Girard form class, D is DBH and H is height?

What would be the same (what would you do in the same way as the homework)?

(4) 5. Again referring to homework question 2., why wasn't the simple linear regression equation $V = b_0 + b_1 D + \text{error}$ – a good choice for the local volume equation?

(4) 6. You find a published **constant form factor volume equation** for your area that predicts sawlog volume to a minimum 8-inch top diameter based on DBH and **total tree height**. Why **shouldn't** you use the equation? (If you don't recall what a constant form factor volume equation is, ask for help. You will lose some, but not all, points for asking.)

(6) 7. Given the taper equation (with symbols and units as defined in class and the text):

$$\frac{d^2}{D^2} = 0.8 - 1.2 \frac{h}{H} + 0.4 \left(\frac{h}{H} \right)^2$$

interest lies in the cubic foot volume in the first 16-foot log (assume a 1-foot stump but no kerf or trim allowance) for a 10-inch DBH, 60-foot tall tree. Completely **set up** the integral that will produce the volume of interest; find the actual cubic foot volume for **extra credit only** if you have time.

(6) 8. To obtain the most complete coverage possible, how would you space lines and plots on lines in a line-plot cruise of a 60.5 acre parcel that will use $n=20$ plots?

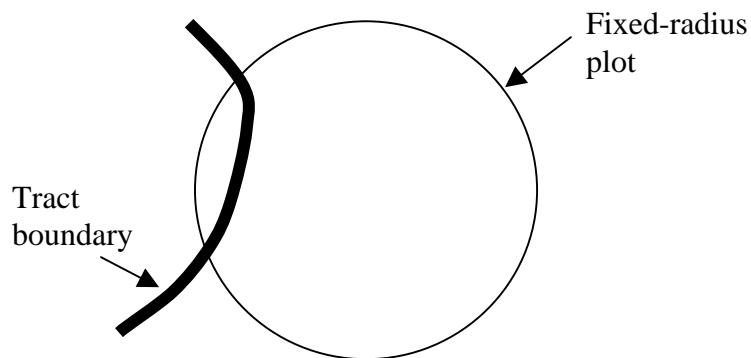
(6) 9. For the “woodlot” we discussed in class, you decide to stratify the area, identifying a portion buffering the creek as a separate stratum (so you have two strata total). You accurately determine the areas (acres) of the two strata. You then proceed to install a “pure” line-plot cruise (i.e. no random starts) of the entire area, running lines perpendicular to the creek. You provide the data to your boss, assuming he'll know the correct way to analyze the data. He is confused why you went to the trouble of determining the two areas (acreages) and just analyzes the data as a simple random sample.

His **estimate** of volume per acre will likely be fine. Why?

His estimate of standard error will likely be too high. Why? (part of the reason is it's a systematic sample, but there is more; the more is what I'm interested in)

(4) 10. Your technicians, Austin Square University graduates, have been determining whether trees are “on” 1/20-acre plots by measuring from plot center to the face of the tree closest to plot center. Trees per acre will be {under-estimated, over-estimated} (circle one)

(4) 11. With the “walk-through” method of boundary overlap correction, trees between plot center and the tract boundary may count as one or two tally trees. Place a “1” in a (any) location on the diagram below where the walk-through method would result in a single tally. Place a “2” in a (any) location where the walk-through method would result in a double tally. Mark plot center (with an X) as a reference.



(6) 12. The following four (4) trees were tallied on one (1), 1/30-acre plot:
(DBHs) 8, 10, 8, 10

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

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

(8) 13. Twenty (20), 1/15-acre plots were taken in a cruise. The following six (6), 16-inch DBH red oak were tallied across all 20 plots:

- 1-log – 2 trees
- 2-log – 1 tree
- 3-log – 3 trees

What is the per acre stock table entry for 16-inch DBH red oak? (use the attached volume table)

(4) 14. With variable-radius plots as we defined them in class, how many times bigger is the plot for a 15-inch DBH tree in comparison to the plot for a 5-inch DBH tree?

(4) 15. If you keep your eye over plot center when tallying a variable-radius plot with a prism you will tally {too few, too many, just the right number of} (circle one) trees.

(6) 16. Explain the proper procedure for dealing with a tree where it is not clear, using a prism or angle gauge, whether the tree is “on” or “off” a variable-radius plot. Be specific. You should refer to an equation from the formula sheet in your explanation.