



1. How did you handle the height-dbh relationship: \_\_\_\_\_ (5)

2. How did you handle the volume-dbh & height relationship: \_\_\_\_\_ (5)

3. The current stand/stock table (with BA/ac) is: (24)


4. Current mean volume/acre is: \_\_\_\_\_ with the following precision statistics: (13)

5. A 95% sampling error of: \_\_\_\_\_ and a coefficient of variation of: \_\_\_\_\_ (10)

6. How did you handle the growth-dbh relationship: \_\_\_\_\_ (5)

7. The future stand/stock table (with BA/ac) is: (28)


8. The best estimate of future volume/acre is: \_\_\_\_\_ (10)

**Bonus: (10 points, all or none) It would take \_\_\_\_\_ additional plots to achieve a  $\pm 10\%$  sampling error.**

**Save your worksheets in a D:\yourname directory  
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D.2 acre plot

$ln = 4.7429 - 3.4000 (BA)$   
 $(-3.4/DBH)$

1. How did you handle the height-dbh relationship:  $H = 115e^{(-3.4/DBH)}$  (5)

2. How did you handle the volume-dbh & height relationship:  $CU_3 = -6.22 + 0.001998 (H^{2.4})$  (5)

3. The current stand/stock table (with BA/ac) is: (24)

D.2 ac PLOT

DBH	Trees	BA	Volume
10	10	5.45	106.34
12	12	9.42	224.44
14	11.5	12.29	334.20
16	10.5	14.66	437.07
18	8.5	15.02	456.0
Total	52.5	56.85	1565.56

D.1 acre plot

DBH	Trees	BA	Volume
10	20	10.90	202.68
12	24	18.84	448.88
14	23	24.58	669.40
16	11	29.32	868.14
18	17	30.04	942.0
Total	105	113.70	3131.10

4. Current mean volume/acre is:  $1,565.56 \text{ ft}^3$  with the following precision statistics: (13)

5. A 95% sampling error of:  $18.85\%$  and a coefficient of variation of:  $26.69\%$  (10)

6. How did you handle the growth-dbh relationship:  $Growth = 0.095745 + 0.006383 (DBH)$  (5)

7. The future stand/stock table (with BA/ac) is: (28)

D.2 ac PLOT

DBH	Trees	BA	Volume
10	6.33	3.45	64.14
12	10.50	8.25	196.38
14	10.98	11.74	319.61
16	10.32	14.42	426.80
18	9.27	16.04	502.83
20	5.29	11.54	377.20
Total	52.5	65.43	1897.07

D.1 acre plot

DBH	Trees	BA	Volume
10	12.66	6.90	178.28
12	21.00	16.50	397.76
14	21.96	23.48	679.22
16	20.64	29.84	853.64
18	18.14	32.04	1005.46
20	10.58	23.08	754.54
Total	105	130.86	3774.14

8. The best estimate of future volume/acre is:  $1,887.07 \text{ ft}^3$  (10)

Bonus: (10 points, all or none) It would take  $18 = 0.2$  additional plots to achieve a  $\pm 10\%$  sampling error.  $19 = .01$

## Statistical Formulas

$$s^2 = \frac{\sum_{k=1}^n x_i^2 - \frac{\left(\sum_{k=1}^n x_i\right)^2}{n}}{n-1}$$

$$s_{\bar{x}} = \sqrt{\frac{s^2}{n} \left(1 - \frac{n}{N}\right)}$$

$$SE\% = \left(\frac{t_{n-1, \alpha} s_{\bar{x}}}{\bar{x}}\right) * 100\%$$

$$\bar{x} \pm (t_{n-1, \alpha}) s_{\bar{x}}$$

$$CV\% = \frac{\sqrt{s^2}}{\bar{x}} * (100\%)$$

$$n = \frac{1}{\frac{1}{N} + \left(\frac{AE\%}{t_{cv\%}}\right)^2}$$

$$PACF = \frac{1}{\text{plot size}}$$

$$\text{prism plot size} = \frac{ba}{BAF}$$

$$ba / ac = \frac{BAF * \text{tally trees}}{\# \text{ of points}}$$

$$CSS_y: \sum y^2 = \sum Y^2 - \frac{(\sum Y)^2}{n}$$

$$b_1 = \frac{\sum xy}{\sum x^2} = \frac{CSP_{xy}}{CSS_x}$$

$$CSS_x: \sum x^2 = \sum X^2 - \frac{(\sum X)^2}{n}$$

$$b_0 = \bar{Y} - b_1 \bar{X}$$

$$CSP_{xy}: \sum xy = \sum XY - \frac{\sum X \sum Y}{n}$$

$$TSS = CSS_y = \sum y^2$$

$$ESS = \sum (Y - \hat{Y})^2$$

$$RSS = \frac{(CSP_{xy})^2}{CSS_x} = \frac{(\sum xy)^2}{\sum x^2} = b_1 \sum xy$$

$$r^2 = \left(1 - \frac{\text{Error SS (ESS)}}{\text{Total SS (TSS)}}\right)$$

$$\text{Volume} = b_0 + \beta(ba)$$

$$\bar{Y}_{adj} = \bar{y}_2 + \beta(\overline{BA}_1 - \overline{ba}_2), \text{ where } n_1 = \text{number of large sample points, } n_2 = \text{small sample points}$$

**Student's t-Table**  
**Forest Description and Analysis**

**The Distribution of Probability**

df	0.5	0.4	0.3	0.2	0.1	0.05	0.02	0.01	0.001
1	1.000	1.376	1.963	3.078	6.314	12.706	31.821	63.657	636.619
2	0.819	1.061	1.386	1.886	2.920	4.303	6.965	9.925	31.598
3	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	12.941
4	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	6.856
6	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	5.405
8	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	5.041
9	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.781
10	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.587
11	0.697	0.876	1.088	1.363	1.769	2.201	2.718	3.106	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	4.318
13	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	4.140
15	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	4.073
16	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	4.015
17	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.965
18	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.883
20	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.850
21	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.819
22	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.792
23	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.767
24	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.745
25	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.725
26	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.690
28	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.659
30	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.646
40	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.551
60	0.679	0.848	1.046	1.296	1.671	2.000	2.390	2.660	3.460
120	0.677	0.845	1.041	1.289	1.658	1.980	2.358	2.617	3.373
∞	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.291