

Name: _____

EXAM 1-03
FO-3015 Forest Description and Analysis

1. Given a **magnetic azimuth** of 165° in an area with a magnetic declination of $N5^\circ W$:

The equivalent TRUE bearing is _____ (5)

2. Point X is located 24.855 chains WEST of the 325,000m E grid line and 9.942 chains SOUTH of the 3,625,000mN grid line on a NAD27 7.5' quad sheet. The NAD 27 UTM coordinates of point X are:

Easting: _____ (5)

Northing: _____ (5)

3. Suppose your traverse had a total perimeter of 487.5 chains and the calculations showed a linear closure error of 81.25 links;

The linear precision is 1 in _____ chains? (3)

4. For a scale of 1:20,000:

a) The Equivalent Scale is: 1 inch = _____ feet (3)

b) The Equivalent Scale is: 1 inch = _____ meters (3)

c) The area scale is _____ acres per square inch. (3)

5. Explain in your own words, the difference between NAD 27 and WGS 84 datums: (4)

6. Using your clinometer with the percent scale, you determine with the “peg method” that your clinometer has a DOUBLE error of +8 ft at a linear distance of 80 ft. Now that you know the percent error of your instrument, you can calculate the correct height of each tree below using the known error, distance and clinometer readings supplied:

a) distance from tree = 147 feet

sum of readings (to top and bottom of tree) = +44

total tree height = _____ ft (5)

b) distance from tree = 90 feet

reading to top of tree = +70

reading to base of tree = + 5

total tree height = _____ ft (5)

c) distance from tree = 128

reading to top of tree = +65

reading to base of tree = - 5

total tree height = _____ ft (5)

7. A tree that is 95 feet in total height has a merchantable height of 4 - 16.0 ft. logs to an 8.0 inch top, a $DBH_{ob} = 14.7$ inches and a $DBH_{ib} = 12.6$ inches. The scaling diameters of the first 16.0 ft. log measures 13.8 inches, d.o.b., and 12.1 inches, d.i.b.

The Mesavage and Girard Form Class of this tree is calculated to be _____ (3)

8. Complete the following table of dbh class intervals for 1- and 2-inch dbh classes: (14)

DBH Class	<u>1-inch classes</u>		<u>2-inch classes</u>	
	Min	Max	Min	Max
8	—	—	—	—
12	—	—	—	—
13	—	—		
14	—	—	—	—

9. You completed a strip cruise of 20 acres using 1.0 chain wide segments of 4 chains length each on lines spaced at 5 chain intervals. Sawtimber was tallied on the entire strip width (i.e. 1.0 chain width) and pulpwood was tallied on the left half (i.e. 0.50 chain width) of each strip segment. The volumes for the five strip segments tallied are given below:

<u>Segment no.</u>	<u>Pulp Vol. (cords)</u>	<u>Sawtimber Vol. (bd.ft.)</u>
1	2.5	900
2	2.2	700
3	2.8	800
4	2.8	860
5	<u>1.7</u>	<u>740</u>
Totals	12.0	4000

- a) The mean pulpwood volume per acre for the cruise is _____ cords per acre. (5)
- b) The mean sawtimber volume per acre for the cruise is _____ bd.ft. per acre. (5)
10. Your boss hands you a timber cruise report from Mad Dog Consulting Firm out of Oxford, MS which contains the following verbage:
 A timber cruise with 60 one-fifth acre (0.2 ac) plots was conducted on 160 acres of the Rebel Tree Farm. The mean volume per acre for pine sawtimber was 4,500 board feet, Doyle log scale, with a standard deviation of $\pm 2,150$ board feet.
- A. The 95% confidence interval on mean volume per acre is: _____ (5)
- B. The Sampling Error (95% confidence) for this cruise is: _____% (5)
- C. The Coefficient of Variation for this cruise is: _____% (2)
11. You have completed a segmented strip cruise using 1 chain wide strips and 2 chain segment

lengths on a 40 acre tract. The tally and segment volumes for the ten (10) segments are shown below.

A. The mean sawtimber volume per acre is _____ board feet (5)

B. The stand table entry for 16 inch dbh trees is _____ (5)

C. The stock table entry for 16 inch dbh trees is _____ (5)

Segment	DBH	Vol/tree	Trees	Total Vol	Segment	DBH	Vol/tree	Trees	Total Vol	
1	10	20	1	20	6	14	100	4	400	
	12	50	3	150		12	50	4	200	
	14	100	1	100		16	160	3	480	
	16	160	3	480					11	1080
	18	260	1	260						
			9	1010						
2	16	160	2	320	7	16	160	1	160	
	14	100	5	500		12	50	3	150	
	12	50	4	200		18	260	3	780	
	10	20	5	100		14	100	3	300	
				16		1120				10
3	18	260	2	520	8	18	260	3	780	
	16	160	3	480		14	100	2	200	
	12	50	1	50		16	160	1	160	
	14	100	3	300		12	50	3	150	
				9		1350	10	20	2	40
								11	1330	
4	14	100	1	100	9	10	20	2	40	
	12	50	2	100		18	260	3	780	
	16	160	2	320		16	160	2	320	
	18	260	2	520		14	100	2	200	
				7		1040				9
5	14	100	2	200	10	18	260	2	520	
	18	260	3	780		14	100	3	300	
	12	50	1	50		12	50	4	200	
				6		1030	10	20	2	40
								11	1060	

Partial Computations: (segment/plot basis)

$$\sum_{k=1}^n x_i = 11,750$$

$$\sum_{k=1}^n x_i^2 = 14,026,100$$

Bonus: 5 points, all or none.

You are standing 122 feet from a tree that is actually 98 ft in height when measured with the percent scale on your Suunto clinometer. What would be the total reading (top - bottom values) on the clinometer if you used the topographic scale to measure the tree height at that distance?

Statistical Formulas

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

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

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

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

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

Student's t-Table
Forest Description and Analysis

The Distribution of Probability

<u>df</u>	<u>0.5</u>	<u>0.4</u>	<u>0.3</u>	<u>0.2</u>	<u>0.1</u>	<u>0.05</u>	<u>0.02</u>	<u>0.01</u>	<u>0.001</u>
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