ES302 Quiz 3 Open Book Problem Solving (30 Pts) Name KEY

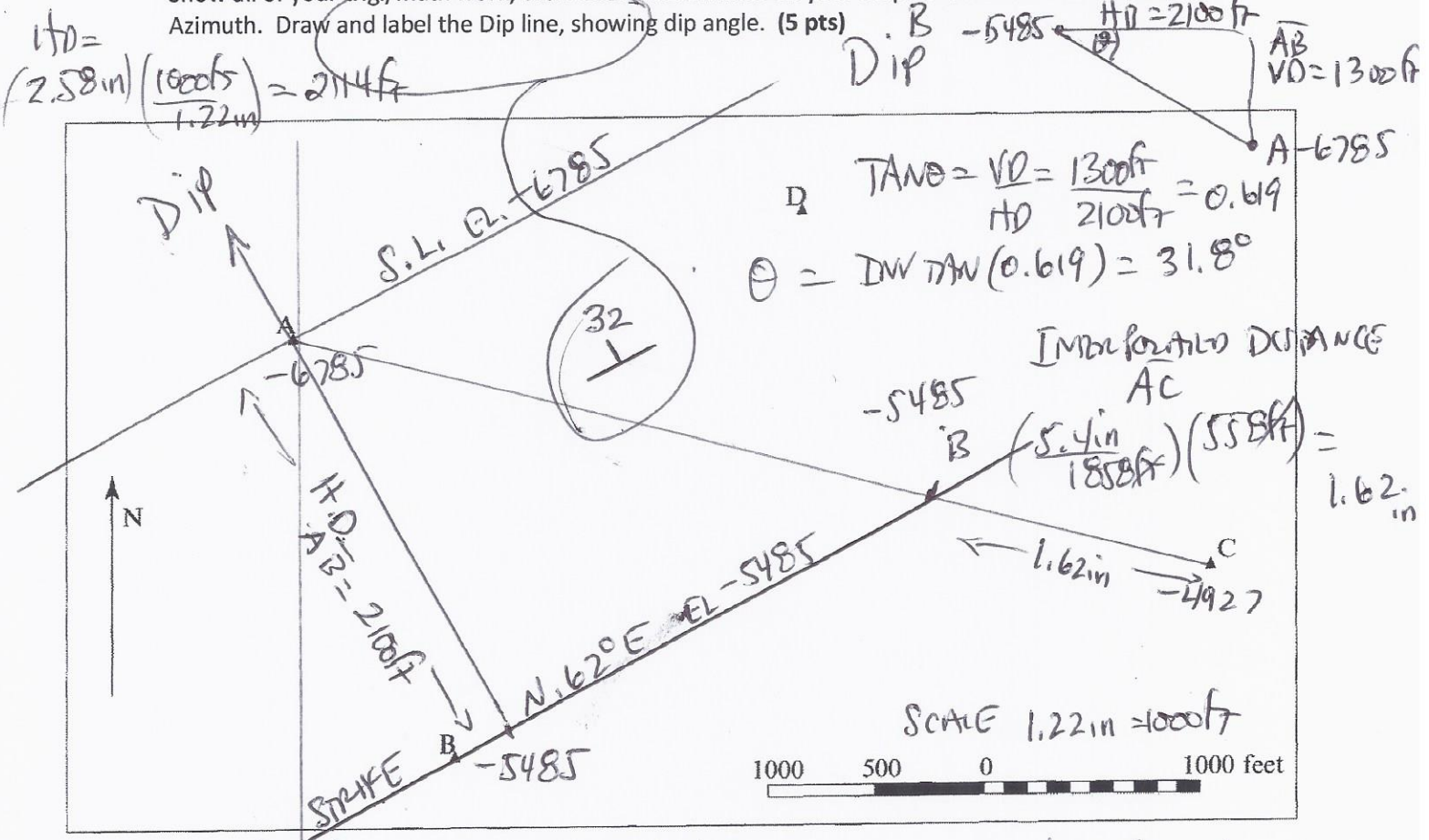
1. Examine the base map below. Points A, B, and C are mapped locations of drill holes in which the target is an oil-bearing Eocene sandstone bed. The surface elevation (ft) of the drill holes are as follows: A = 1280 AMSL, B = 963 AMSL, C = 1147 AMSL. Drilling logs indicate the following depths to the top of the sandstone bed: A = 8065 ft, B = 6448 ft, C = 6074 ft.

A. Determine the elevation of the top of sandstone bed for each well **(3 Pts):**

A. Top SS Bed Elev = -6785 (1280 − 8065 = −6785) B. Top SS Bed Elev. = -5485 (963 − 6448 = −5485) C. Top SS Bed Elev. = -4927 (1147 − 6074 = −4927)

B. Determine the strike and dip of the sandstone: Strike: N. 62° E / 62° Dip: 32° NW

Show all of your trig./math work; draw construction lines on your map. Draw the strike line and label with Azimuth. Draw and label the Dip line, showing dip angle. **(5 pts)**



LOW (MIN) A — MIDDLE ELEV. B — HIGH (MAX) C

-4927 − x

DIP (

-5485 − x

-6785 − x

6785 − 4922

DIP IS TOWARDS PT. A

TOTAL Vertical Dist AC = 1858 ft RATIO 5.4 in / 1858 ft

Horizontal Dist $\overline{AC}$ = 5.4 inch

Vertical Dist $\overline{CB}$ = 5485 − 4927 = 558 ft

2. By hand, using a red pencil or marker, plot the following soil texture data of the fine-grained component on a triangular diagram below:

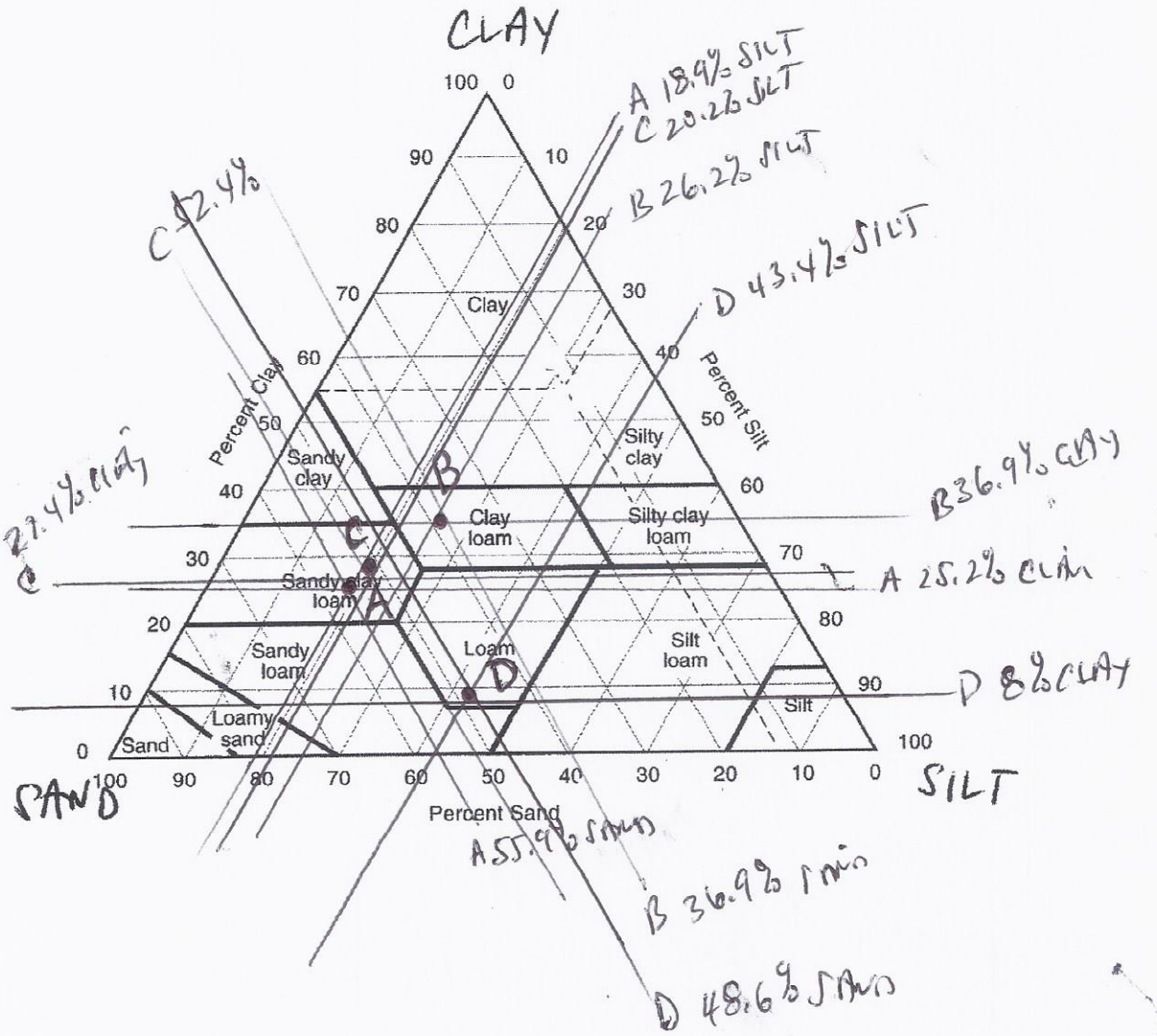
Clay

Sand Silt

Neatly label all of your data points with sample numbers. Identify the soil class for each sample and fill in the table below (**5 Pts).**

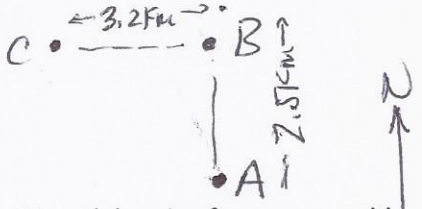
Soil Texture Data (grams of each class as a result of sieve analysis)

Sample No.	Σ		Silt (g)	clay (g)	sand (g)	% SILT	% CLAY	% SAND	Σ	Soil Classification
A	127	=	24	32	71	18.9%	25.2%	55.9%	100%	SANDY CLAY LOAM
B	141	=	37	52	52	26.2%	36.9%	36.9%	100%	CLAY LOAM
C	84	=	17	23	44	20.2%	27.4%	52.4%	100%	SANDY CLAY LOAM
D	212	=	92	17	103	43.4%	8%	48.6%	100%	LOAM



3. You are located at point A, at a field site. Point B is located 2.5 km directly north of your position. Point C is located 3.2 km directly west of Point B.

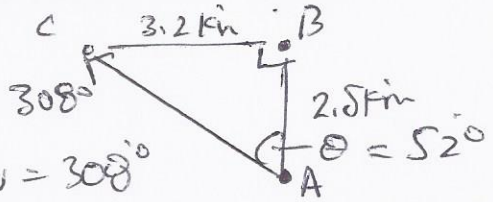
a. Draw a sketch map showing the relationships. **(2 pts)**



b. Use a trigonometric solution to determine the compass Azimuth bearing from your position point A to point C. Show all of your math work and trigonometric relations. **(5 pts)**

$\tan\theta = \frac{opp}{adj} = \frac{BC}{AB} = \frac{3.2Km}{2.5Km} = 1.28$

$\theta = \text{INV. TAN}(1.28) = 52°$



$\text{BEARING } \overline{AC} = 360 - 52° = 308°$

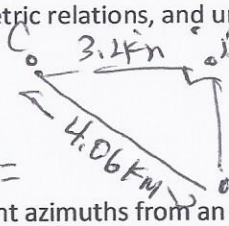
$\text{BEARING} = 308°$

c. Using a trigonometric solution, determine the distance between point A and C in kilometers and feet; show of your math work, trigonometric relations, and unit algebra. **(5 pts)**

PYTHAGOREAN THEOREM

$\sqrt{(AB)^2 + (BC)^2} = \sqrt{(AC)^2}$

$AC = \sqrt{AB^2 + BC^2} = \sqrt{(2.5Km)^2 + (3.2Km)^2} =$



DIST. $\overline{AC}$ = HYPOTENUSE OF RT. $\triangle$

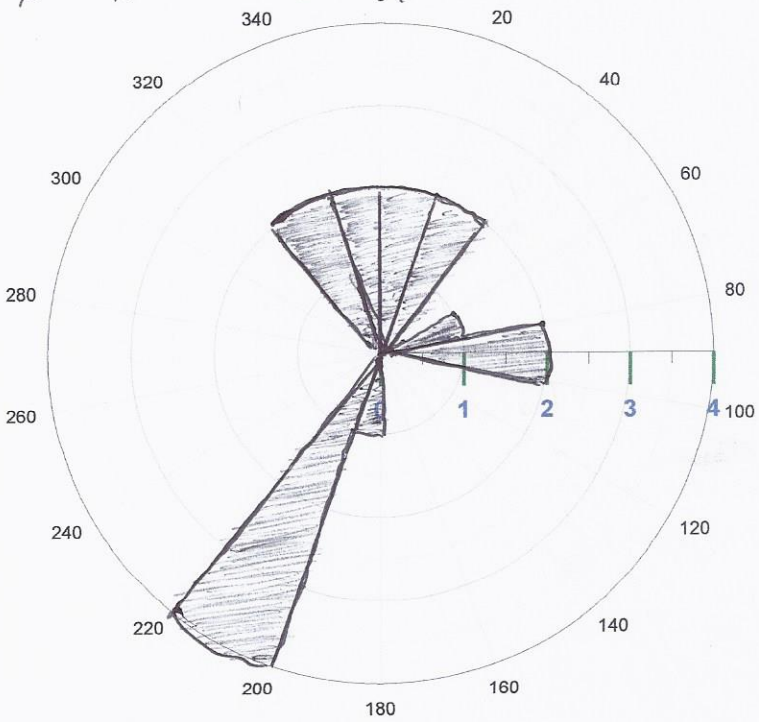
$AC = \sqrt{6.25Km^2 + 10.24Km^2} = \sqrt{16.49Km^2}$

$AC = 4.06Km$

$4.06Km \left(\frac{1000m}{1Km}\right)\left(\frac{3.28ft}{m}\right) = 13,317ft$

4. The following data represent paleocurrent azimuths from an upper Eocene sandstone bed in central Oregon. Using a 20 degree frequency bin, plot a rose diagram showing data distribution on the graph below **(5 Pts)**.

4 2 1 85 90 215 355 220 214 214 33
75 190 23 345 330 331
0



0-20 III = 2
20-40 II = 2
40-60 = 0
60-80 I = 1
80-100 II = 2
100-120 = 0
120-140 = 0
140-160 = 0
160-180 = 0
180-200 I = 1
200-220 IIII = 4
220-240 = 0
240-260 = 0
260-280 = 0
280-300 = 0
300-320 = 0
320-340 II = 2
340-360 II = 2

$16.49 = \sqrt{}$

$6.25 + 10.24 = 16.49$