

Problem #1

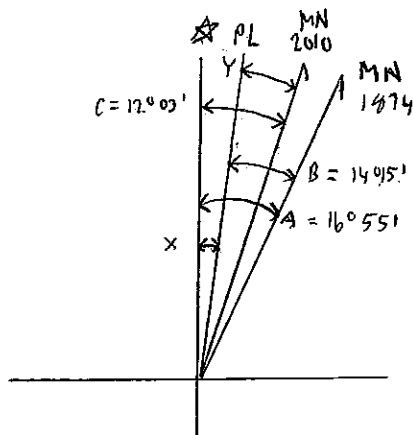
Calibration Correction

$$6.12 \text{ tape lengths} \quad 6.12 * .03 = 0.18$$

Temperature Correction

$$C_T = .00000645 (T - 64) L = .00000645 (92 - 64) 612.77 = 0.09$$

$$\text{Actual Distance} = 612.77 - 0.18 + 0.09 = \boxed{612.68 \text{ ft}}$$

Problem #2

$$\begin{aligned} \text{(X) True bearing} &= A - B \\ &= 16^\circ 55' - 14^\circ 15' \\ &= \boxed{N 02^\circ 40' E} \end{aligned}$$

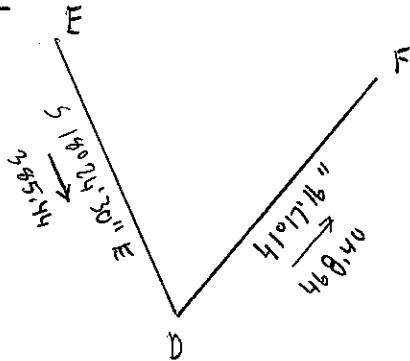
$$\begin{aligned} \text{(Y) 2010 Magnetic bearing} &= C - X \\ &= 12^\circ 03' - 2^\circ 40' \\ &= \boxed{N 09^\circ 23' W} \end{aligned}$$

Problem #3

$$1 \text{ chain} = 100 \text{ links} = 66 \text{ feet}$$

$$47 \text{ chains } 13 \text{ links} = 47.13 \text{ chains}$$

$$47.13 \text{ chains} \times 66 = \boxed{3110.58 \text{ feet}}$$

Problem #4

$$\begin{aligned} \text{Lat DE} &= \cos 18^\circ 24' 30'' \times 385.44 \\ &= 365.72 \end{aligned}$$

$$\begin{aligned} \text{Dep DE} &= \sin 18^\circ 24' 30'' \times 385.44 \\ &= -121.72 \end{aligned}$$

$$\begin{aligned} \text{Lat DF} &= \cos 41^\circ 17' 16'' \times 468.40 \\ &= 351.96 \end{aligned}$$

$$\begin{aligned} \text{Dep DF} &= \sin 41^\circ 17' 16'' \times 468.40 \\ &= 309.07 \end{aligned}$$

Coordinates	N	E
E	1365.72	878.28
F	1351.96	1309.07

$$\text{Brgng EF} = \text{atan} \left| \frac{\text{dep EF}}{\text{lat EF}} \right| = \text{atan} \left| \frac{430.79}{413.76} \right| = \boxed{S 88^\circ 10' 14'' E}$$

$$\text{Az EF} = 180^\circ - 88^\circ 10' 14'' = \boxed{91^\circ 49' 46''}$$

$$\text{Dist EF} = \sqrt{(\text{lat EF})^2 + (\text{dep EF})^2} = \sqrt{(-121.72)^2 + (430.79)^2} = \boxed{431.01 \text{ ft}}$$

Problem #5

Balance Angles

$38^{\circ} 30'$
 $100^{\circ} 38'$
 $149^{\circ} 49'$
 $86^{\circ} 00'$
 $165^{\circ} 03'$

 $540^{\circ} 00'$

$\sum \text{int angles} = (140)(n-2) = (140)(3) = 540^{\circ}$

Angles are already balanced

Azimuth/Bearings

Az AB $340^{\circ} 00'$
 - 180°

 back Az $160^{\circ} 00'$
 angle B $+ 100^{\circ} 38'$

 Az BC $260^{\circ} 38'$
 - 180°

 back Az $80^{\circ} 38'$
 angle C $+ 149^{\circ} 49'$

 Az CD $230^{\circ} 27'$
 - 180°

 back Az $50^{\circ} 27'$
 angle D $+ 86^{\circ} 00'$

 Az DE $136^{\circ} 27'$
 + 180°

 back Az $316^{\circ} 27'$
 angle E $+ 165^{\circ} 03'$

 $481^{\circ} 30'$
 - 360°

 Az EA $121^{\circ} 30'$
 + 180°

 back Az $301^{\circ} 30'$
 angle A $38^{\circ} 30'$

 Az AB $340^{\circ} 00'$ checks

Bearings
 N $20^{\circ} 00'$ W

 S $80^{\circ} 38'$ W

 S $50^{\circ} 27'$ W

 S $43^{\circ} 33'$ E

 S $58^{\circ} 30'$ E

(E 113
Fall Semester

Exam #1

Bearing	Distance	Latitude	Departure	Lat Corr	Dep Corr	Bal Lat	Bal Dep	N	E	
A	N 20°00' W	3708.85	+3485.18	-1268.50	-0.08	+0.12	+3485.10	-1268.38	1000.00	1000.00
B	S 80°38' W	1111.76	-180.94	-1096.96	-0.02	+0.04	-180.96	-1096.90	4485.10	-268.38
C	S 50°21' W	1390.72	-885.54	-1072.34	-0.03	+0.04	-885.57	-1072.30	4304.14	-1365.28
D	S 43°33' E	1031.20	-747.39	+710.48	-0.02	+0.04	-747.41	+710.51	3485.57	-2437.58
E	S 58°30' E	3198.27	-1671.09	+2226.97	-0.07	+0.10	-1671.16	+2227.07	2671.16	-1727.07
A		10440.8	+0.22	-0.33	-0.22	+0.33	0.00	0.00	1000.00	1000.00

checks

$$\text{Closure Error} = \sqrt{.22^2 + .12^2} = \boxed{0.40}$$

$$\text{Accuracy Ratio} = \frac{.96}{10440.8} = 1:126100 \approx \boxed{1:25000}$$

Fall Semester 2010

* Problem #6

Polygon ABCDE

	1000	A	1000	
	1200000	1200	B	400
	960000	2400	C	600
	1500000	2500	D	2500
	3250000	1300	E	1800
	1400000	1000	A	1000
	<hr/>			
	8710000			
				<hr/>
				12920000

$$12920000 - 8710000 = 4210000$$

$$\div 2 = 2105000 \text{ ft}^2$$

Circular segment

$$\frac{\Delta}{360} = \frac{L}{C} = \frac{917}{2\pi(710)} = \frac{917}{4461.06} \quad \Delta = 74^{\circ}00'01''$$

$$A = \frac{\Delta}{360} \pi r^2 = r^2 \frac{\sin \Delta}{2} = \frac{74^{\circ}00'01''}{360^{\circ}} \pi 710^2 - 710^2 \frac{\sin 74^{\circ}00'01''}{2}$$

$$= 83247 \text{ ft}^2$$

$$\text{Total Area} = 2105000 + 83247 = 2188247 \text{ ft}^2$$

$$\div 43560 = \boxed{50.24 \text{ acres}}$$

Problem #7

$$\text{Elev L} = \text{Elev K} + HI + \cos Z * SD - R$$

$$= 5435.46 + 4.60 + \cos(93^{\circ}20') * 440.77 - 4.88 = \boxed{5409.53 \text{ ft}}$$

Problem #8

BS +	HI	FS -	Elev	Point
8.47	4422.91		4414.44	B.M. Q
		1.27	4421.64	R
11.88	4433.52		4421.64	R
		1.99	4431.53	S
6.01	4437.54		4431.53	S
		10.88	4426.66	T
1.20	4427.86		4426.66	T
		12.66	<u>4415.20</u>	U