

Solution to Problem 73

First, calculate bearings from the given angles with the backsight bearing given (shown in ~~strikeout~~ type in column 2 in the table). There is no built-in check for this, so be careful!

Second, calculate the latitudes and departures for each course (shown in ~~strikeout~~ type in columns 4 & 6 in the table). Sum the latitudes and departures algebraically. The sum of the latitudes is -123.5569 and should be -125.4342, therefore the correction to the latitudes is -1.8773; the sum of the departures is +1192.5654 and should be +1193.4263, therefore the correction to the departures is +0.8609.

Third, calculate the correction to each course (columns 5 & 7 in the table). The correction to the latitude/departure of any course is to the total correction of the latitude/departure as the length of the course is to the total traverse. Note that the total correction in latitude /departure divided by the length of the traverse is a constant. The constant times the length of the course gives the correction for the course.

Fourth, apply the corrections to the latitudes and departures (columns 4 & 6 in the table). Verify that the sum is correct before continuing. Course 7-8, the longest, was given an additional -0.0001 correction in latitude due to rounding errors.

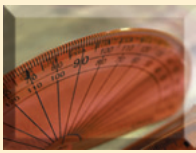
Fifth, calculate coordinates if needed (columns 8 & 9 in table).

Sixth, recalculate bearings and distances from corrected latitudes and departures (columns 2 & 3).

You may want to recalculate angles from corrected bearings and compare them to your original angles. (The corrected angles, in order, are 153°49'16", 173°35'26", 129°17'14", 142°27'52", 129°14'56", 100°04'25", and 39°44'13".)

(The gross misclosure for this problem is for illustrative purposes. This traverse closes worse than 1:1,000!)

PT. #	BEARING	DISTANCE	LATITUDE	Δ	DEPARTURE	Δ	NORTH	EAST
1	N84°37'44"E	246.810'	23.4030	-0.2301	246.7263	0.1055	0.0000	0.0000
	N84°41'04"E	246.894'	22.8729		245.8318			
2	S88°57'33"E	159.436'	-2.8607	-0.1483	159.4097	0.0680	23.0403	245.7263
	S88°54'22"E	159.207'	-3.0390		159.1777		22.8729	245.8318
3	N40°19'40"E	345.678'	263.5292	-0.3222	223.7088	0.1478	20.2423	404.8360
	N40°22'52"E	345.528'	263.2070		223.8566		19.8339	405.0095
4	N77°51'34"E	333.555'	70.1502	-0.3109	326.9949	0.1426	283.7415	628.5448
	N77°55'00"E	333.629'	69.8393		326.2375		283.0409	628.8661
5	S51°21'31"E	309.903'	-193.5174	-0.2889	242.0558	0.1325	353.8917	954.6397
	S51°19'56"E	310.187'	-193.8060		242.1883		352.8802	955.1036
6	S28°38'28"W	411.118'	-360.8142	-0.3833	-197.0583	0.1757	160.3746	1196.6955
	S28°35'39"W	411.371'	-361.1975		-196.8826		159.0742	1197.2919
7	N68°16'24"E	207.683'	76.8827	-0.1936	192.9282	0.0888	-200.4396	999.6372
	N68°19'52"E	207.694'	76.6891		193.017		-202.1233	1000.4093
8	S24°38'08"E	2.0653'	-0.3669	-1.8773	0.0000	0.8609	-123.5569	1192.5654
	S24°38'08"E	2.0653'	-0.3669		0.0000		-125.4342	1193.4263
8'							(-125.4342)	(+1193.4263)
		SUM=2013.884	SUM=-123.5569		SUM=1192.5654		-123.5569	1192.5654
			SUM=-125.4342		SUM=1193.4263		-125.4342	1193.4263



Solution to Problem 74



PT.#	ORIG. N.	ORIG. E.	CORREC. N.	CORREC. E.	BEARING	DISTANCE	STATION	$\frac{\text{STA} \times 2.0653}{2013.884}$
1	0.0000	0.0000	0.0000	0.0000		0.000	0+00.00	0.0000
2	23.0103	245.7263	22.8729	245.8318	S 24°37'53" E	0.253	2+46.810	0.2531
3	20.2123	404.8360	19.8339	405.0095	S 24°37'55" E	0.416	4+05.946	<u>0.4163</u>
4	283.7415	628.5448	283.0409	628.8661	S 24°38'11" E	0.771	7+51.624	0.7708
5	353.8917	954.6397	352.8802	955.1036	S 24°38'15" E	1.113	10+85.179	1.1129
6	160.3746	1196.6955	159.0742	1197.2919	S 24°38'15" E	1.431	13+95.082	1.4307
7	- 200.4396	999.6372	- 202.1233	1000.4093	S 24°38'06" E	1.852	18+06.201	1.8523
8	- 123.5569	1192.5654	- 125.4342	1193.4263	S 24°38'08" E	2.065	20+13.884	2.0653

The original misclosure was S 24°38'08" E 2.0653'. The misclosure can be "proportioned" along the traverse in the direction of the original misclosure. Such is the geometry of the compass, or bowditch, adjustment.

