

Instructions

Do the following problems without peeking at the presentation material

Problem (1)

What are the differences between True, Geodetic, Magnetic, Grid, and Astronomic norths?

Problem (2)

The magnetic bearing of line AB in 1885 was recorded as $N58^{\circ}45'E$ and the declination was $5^{\circ}20' E$.
What is the true bearing of the line?

Problem (3)

The magnetic bearing of line PQ in 1925 was recorded as $S86^{\circ}35'W$. The present true bearing of the line is $S79^{\circ}50'W$. What was the declination in 1925?

Problem (4)

The magnetic bearing of line ST in 1963 was recorded as $N38^{\circ}55'W$.

The present magnetic bearing of the line is $N31^{\circ}50'W$ and declination is $3^{\circ}20'W$.

Part (a) What is the true bearing of the line?

Part (b) What was the declination in 1963?

Problem (5)

In 1890:

Mag brng of AB = $S30^{\circ}50'E$

Mag brng of BC = $N85^{\circ}30'E$

Decl = $3^{\circ}00'E$

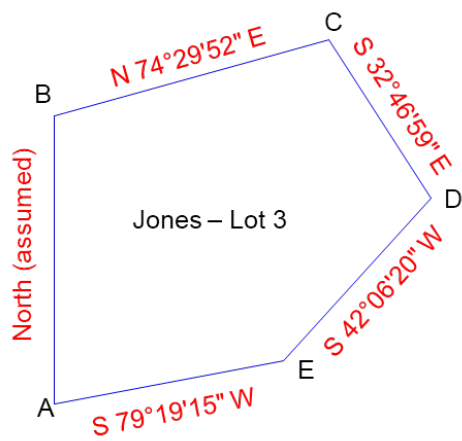
In 1960

Mag brng AB = $S21^{\circ}10'E$

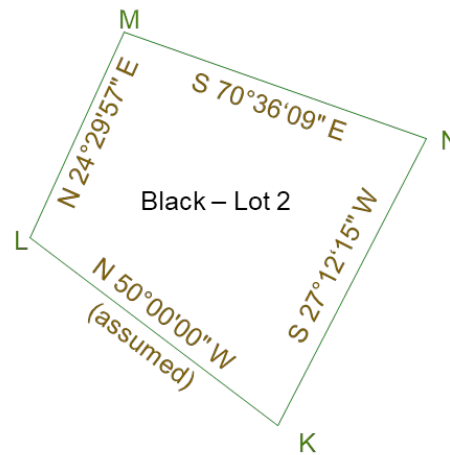
Mag brng BC = ?

Problem (6)

Surveyor Jones surveyed Lot 3. He assumed the direction of one line (AB) as due North. The resulting directions around the Lot are:



Surveyor Black surveyed Lot 2 next door. She assumed the direction of one line (KL) as $N50^{\circ}00'00''W$. The resulting directions around the Lot are:



Black's line ML is the same as Jones' line DE.

What is the bearing of line BC in Black's system?

Problem (7)

NSRS point *Platteville* is located in southwestern Wisconsin. Part of its survey datasheet is shown below.

```

NJ0866 DESIGNATION - PLATTEVILLE
NJ0866 *CURRENT SURVEY CONTROL
NJ0866
NJ0866* NAD 83(1996) POSITION- 42 44 07.57581(N) 090 28 43.06363(W) ADJUSTED
NJ0866* NAVD 88 ORTHO HEIGHT - 303. (meters) 994. (feet) SCALED
NJ0866
NJ0866 GEOID HEIGHT - -32.860 (meters) GEOID18
NJ0866 LAPLACE CORR - -1.72 (seconds) DEFLEC18
NJ0866 HORZ ORDER - FIRST
NJ0866
NJ0866; North East Units Scale Factor Converg.
NJ0866;SPC WI S - 81,813.433 560,805.351 MT 0.99999958 -0 19 43.9
NJ0866;SPC WI S - 268,416.24 1,839,908.89 sFT 0.99999958 -0 19 43.9
NJ0866;UTM 15 - 4,734,519.181 706,397.710 MT 1.00012413 +1 42 41.9
NJ0866
NJ0866! - Elev Factor x Scale Factor = Combined Factor
NJ0866!SPC WI S - 0.99995765 x 0.99999958 = 0.99995723
NJ0866!UTM 15 - 0.99995765 x 1.00012413 = 1.00008177
NJ0866
NJ0866: Primary Azimuth Mark Grid Az
NJ0866:SPC WI S - PLATTEVILLE AZ MK 202 04 40.3
NJ0866:UTM 15 - PLATTEVILLE AZ MK 200 02 14.5
NJ0866
NJ0866 U.S. NATIONAL GRID SPATIAL ADDRESS: 15TYH0639734519(NAD 83)
NJ0866
NJ0866|-----|
NJ0866| PID Reference Object Distance Geod. Az |
NJ0866| dddmmss.s |
NJ0866| NJ0870 PLATTEVILLE ST MARYS CH SPIRE 170.514 METERS 00413 |
NJ0866| NJ0869 PLATTEVILLE FIRST CONG CH 25.341 METERS 03206 |
NJ0866| NJ0867 PLATTEVILLE ST PAULS LUTH CH APPROX. 0.6 KM 1001100.3 |
NJ0866| NJ0859 CUBA CITY MUNICIPAL TANK APPROX.14.9 KM 1641538.5 |
NJ0866| NJ0860 CUBA CITY CHURCH SPIRE APPROX.14.7 KM 1645646.9 |
NJ0866| CJ1868 PLATTEVILLE RM 1 27.267 METERS 19528 |
NJ0866| CJ1867 PLATTEVILLE AZ MK 2014456.4 |
NJ0866| NJ0930 DICKEYSVILLE HOLY GHOST CHURCH APPROX.15.3 KM 2183355.3 |
NJ0866| NJ0871 PLATTEVILLE PIONEER S T C STK APPROX. 0.6 KM 2585500.0 |
NJ0866| CJ1869 PLATTEVILLE RM 2 27.094 METERS 28637 |
NJ0866| NJ0872 PLATTEVILLE WATER WORKS TANK 231.429 METERS 30005 |
NJ0866| NJ0921 LANCASTER ST CLEMENTS CATH CH APPROX.22.8 KM 3030447.2 |
NJ0866| NJ0922 LANCASTER CO COURTHOUSE DOME APPROX.22.7 KM 3032252.0 |
NJ0866|-----|
    
```

Part (a) What is the grid azimuth in the Wis State Plane Coordinate South Zone (SPC WI S) from *Platteville* to *Lancaster Co Courthouse Dome*?

Part (b) The WIS SPC South Zone grid azimuth from point *Platteville* to point *A5* is $135^{\circ}18'25''$. What is the line's grid azimuth in the UTM Zone 15 system?

Problem (8)

Surveying Trivia:

Shown below is part of the survey datasheet for NSRS point *Korte* which is located in western Colorado. What is the LaPlace correction for?

AI3564	*****					
AI3564	DESIGNATION	-	KORTE			
AI3564	PID	-	AI3564			
AI3564	STATE/COUNTY	-	CO/BOULDER			
AI3564	COUNTRY	-	US			
AI3564	USGS QUAD	-	LYONS (2019)			
AI3564						
AI3564			*CURRENT SURVEY CONTROL			
AI3564						
AI3564*	NAD 83(2011) POSITION	-	40 10 18.56182(N) 105 22 00.20530(W)			ADJUSTED
AI3564*	NAD 83(2011) ELLIP HT	-	2008.916 (meters)		(06/27/12)	ADJUSTED
AI3564*	NAD 83(2011) EPOCH	-	2010.00			
AI3564*	NAVD 88 ORTHO HEIGHT	-	2023.4 (meters)		6638. (feet)	GPS OBS
AI3564						
AI3564	NAVD 88 orthometric height was determined with geoid model					GEOID96
AI3564	GEOID HEIGHT	-	-14.487 (meters)			GEOID96
AI3564	GEOID HEIGHT	-	-14.466 (meters)			GEOID18
AI3564	NAD 83(2011) X	-	-1,293,699.857 (meters)			COMP
AI3564	NAD 83(2011) Y	-	-4,707,424.731 (meters)			COMP
AI3564	NAD 83(2011) Z	-	4,093,878.100 (meters)			COMP
AI3564	LAPLACE CORR	-	-27.80 (seconds)			DEFLEC18