#7.1 ① Interior angles are observed on the inside of a closed polygon.

② Angles to the right are measured clockwise from the rear to the forward station.

③ Deflection angles are observed from an extension of the back line to the forward station.

#7.2 The direction of a line is defined by the horizontal angle between the line and arbitrarily chosen reference line called a meridian.

#7.3 ① East declination: the magnetic meridian is east of geodetic north. (positive)

② West declination: the magnetic meridian is west of geodetic north (negative)

#7.4 Before the advent of total stations, directions of lines and angles were determined using compasses.

#7.6

$43^\circ 00' 36'' = 43.01^\circ \rightarrow N\ 43.01^\circ E$

$141^\circ 25' 34'' = 141.43^\circ \rightarrow S\ 38.57^\circ E$

$230^\circ 12' 20'' = 230.21^\circ \rightarrow S\ 50.21^\circ W$

$330^\circ 35' 46'' = 330.60^\circ \rightarrow N\ 29.40^\circ W$

#7.7

$98^\circ 12' 55'' = 98.22^\circ \rightarrow S\ 81.78^\circ E$

$153^\circ 26' 40'' = 153.44^\circ \rightarrow S\ 26.56^\circ E$

$192^\circ 56' 22'' = 192.94^\circ \rightarrow S\ 12.94^\circ W$

$288^\circ 12' 50'' = 288.21^\circ \rightarrow N\ 71.79^\circ W$

#7.8

$N\ 44^\circ 50' 36'' E \rightarrow 44^\circ 50' 36''$

$S\ 38^\circ 42' 54'' E \rightarrow 141^\circ 17' 06''$

$S\ 45^\circ 06' 02'' W \rightarrow 225^\circ 06' 02''$

$N\ 13^\circ 24' 30'' W \rightarrow 346^\circ 35' 30''$

#7.9

$N\ 32^\circ 42' 38'' E \rightarrow 32^\circ 42' 38''$

$S\ 54^\circ 02' 02'' E \rightarrow 125^\circ 57' 58''$

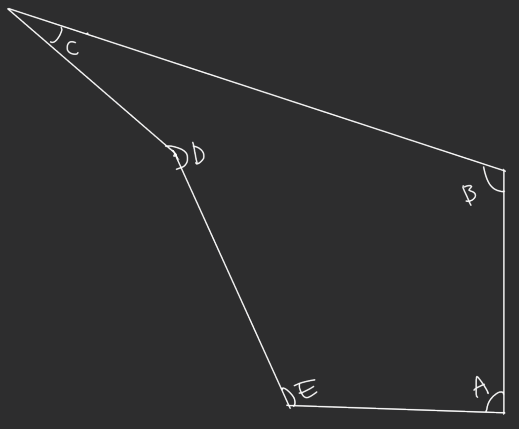
$S\ 22^\circ 42' 56'' W \rightarrow 202^\circ 42' 56''$

$N\ 44^\circ 35' 26'' W \rightarrow 315^\circ 24' 34''$

#7.15

Angles to the right	Course	Bearing
$0^\circ\ 00' = AB$	AB	North
$+180^\circ\ 00'$	BC	$N74^\circ 24' 42'' W$
$180^\circ\ 00' = BA$	CD	$S44^\circ 39' 36'' E$
$+106^\circ\ 35' 18''$	DE	$S19^\circ 24' 40'' E$
$286^\circ\ 35' 18'' = BC$	EA	$S82^\circ 46' 45'' E$
$-180^\circ\ 00'$	AB	North
$106^\circ 35' 18'' = CB$		
$+28^\circ\ 45' 06''$		
$135^\circ\ 20' 24'' = CD$		
$+180^\circ 00'$		
$315^\circ\ 20' 24'' = DC$		
$+205^\circ\ 14' 56''$		
$520^\circ\ 35' 20'' - 360^\circ = 160^\circ\ 35' 20'' = DE$		
$-180^\circ\ 00'$		
$340^\circ\ 35' 20'' = ED$		
$+117^\circ\ 11' 25''$		
$457^\circ\ 46' 45'' - 360^\circ = 97^\circ\ 46' 45'' = EA$		
$-180^\circ\ 00'$		
$277^\circ\ 46' 45'' = AE$		
$+82^\circ\ 13' 15''$		
$360^\circ\ 00' = 0^\circ\ 00' = AB$		

Image



#7.26 a)

Magnetic Field

Model Used:	WMM-2020
Latitude:	42.97444444° N
Longitude:	77.21° W
Elevation:	310.0 m Mean Sea Level

Date	Declination (+E | -W)	Inclination (+D | -U)	Horizontal Intensity	North Comp (+N | -S)	East Comp (+E | -W)	Vertical Comp (+D | -U)	Total Field
2020-01-01	-11.5292°	68.5843°	19,359.0 nT	18,968.4 nT	-3,869.2 nT	49,358.6 nT	53,019.3 nT
Change/year	0.0354°/yr	-0.1001°/yr	51.4 nT/yr	52.8 nT/yr	1.4 nT/yr	-122.6 nT/yr	-95.4 nT/yr
Uncertainty	0.39°	0.21°	128 nT	131 nT	94 nT	157 nT	145 nT

b)

Magnetic Field

Model Used:	WMM-2020
Latitude:	37.94555556° N
Longitude:	110.844444° W
Elevation:	1500.0 m Mean Sea Level

Date	Declination (+E | -W)	Inclination (+D | -U)	Horizontal Intensity	North Comp (+N | -S)	East Comp (+E | -W)	Vertical Comp (+D | -U)	Total Field
2020-01-01	10.4300°	63.6800°	22,180.1 nT	21,813.6 nT	4,015.3 nT	44,838.6 nT	50,024.6 nT
Change/year	-0.0969°/yr	-0.0242°/yr	-27.7 nT/yr	-20.5 nT/yr	-41.9 nT/yr	-103.8 nT/yr	-105.3 nT/yr
Uncertainty	0.36°	0.21°	128 nT	131 nT	94 nT	157 nT	145 nT

c)

Magnetic Field

Model Used:	WMM-2020
Latitude:	41.30416667° N
Longitude:	76.00722222° W
Elevation:	240.0 m Mean Sea Level

Date	Declination (+E | -W)	Inclination (+D | -U)	Horizontal Intensity	North Comp (+N | -S)	East Comp (+E | -W)	Vertical Comp (+D | -U)	Total Field
2020-01-01	-11.8330°	67.0884°	20,266.4 nT	19,835.7 nT	-4,155.8 nT	47,950.3 nT	52,057.2 nT
Change/year	0.0302°/yr	-0.1045°/yr	49.3 nT/yr	50.4 nT/yr	0.4 nT/yr	-127.3 nT/yr	-98.1 nT/yr
Uncertainty	0.38°	0.21°	128 nT	131 nT	94 nT	157 nT	145 nT

☆ WMM-2020 is used instead of 2013.

#7.39

Wt 1: 89° 43' 42"
Wt 2: 89° 43' 38"
Wt 3: 89° 43' 30"

avg. → 89° 43' 37"

Wt 2 is the most probable angle