S UDENT _____   January 31, 2007

4 oints   (1)   Is the difference between NGVD29 and NAVD88 linear or non-linear? Explain by
                        example. What is the approximate difference in elevation in Atlanta Georgia
                        between NGVD29 and NAVD88?

· non-linear; difference varies b/c gravity
varies depending on location
        example: mountain v. coast
· difference b/w NGVD29 and NAVD88 in Atl, GA:
        ⅟₁₀ ft.

5 oints   (2)   Give five types of surveys that professional land surveyors are responsible for.

hydrographic   1- control   Cadastral, land,
topographical   2- topographic   property, photogrammetric
aerial   3- hydrographic
control   4- boundary
construction   5- aerial
                      (6- construction)

4 oints   (3)   Show the symbology used for a horizontal control point, and a vertical control
po t.   point.

        △ horizontal
        ⊙ vertical
        △ horizontal & vertical

4 ints   (4)   List 4 ways to measure the distance between 2 points.

1- tape   GPS
2- odometer   odometer ✓   chains
3- radial
4- pacing   GPS
                                         EDM ✓
                                 noms   tape ✓
                                         pacing ✓

1

15 points   (5)   Complete the following set of level notes

Station	BS	HI	FS	Elevation
BM Lowe 99	3.06	991.18		988.12 (fixed)
TP1	7.52	986.11	12.59	978.59
TP2	10.92	988.46	8.57	977.54
TP3	18.01	995.89	10.58	977.88
TP4	7.52	989.80	13.61	982.28
BM BSJ 07			3.06	986.74

5 legs

The fixed (published) elevation of BM PBSJ 07 is 986.84. What is the error in this level hoop? If we distribute the error equally to each of the TP's, what would the corrected elevations be for TP 3? Use this space to draw a picture of the situation if necessary.

error: $986.84 - 986.74 = .10$

error factor: $.10/5 = .02$

TP3 adj: $977.88 + 3(.02) = \boxed{977.94}$

10 points   (6)   You are surveying a portion of the Grand Canyon, and you have recorded the following vertical angles and slope distances. Compute the mean vertical angles and use them to compute the horizontal distances.
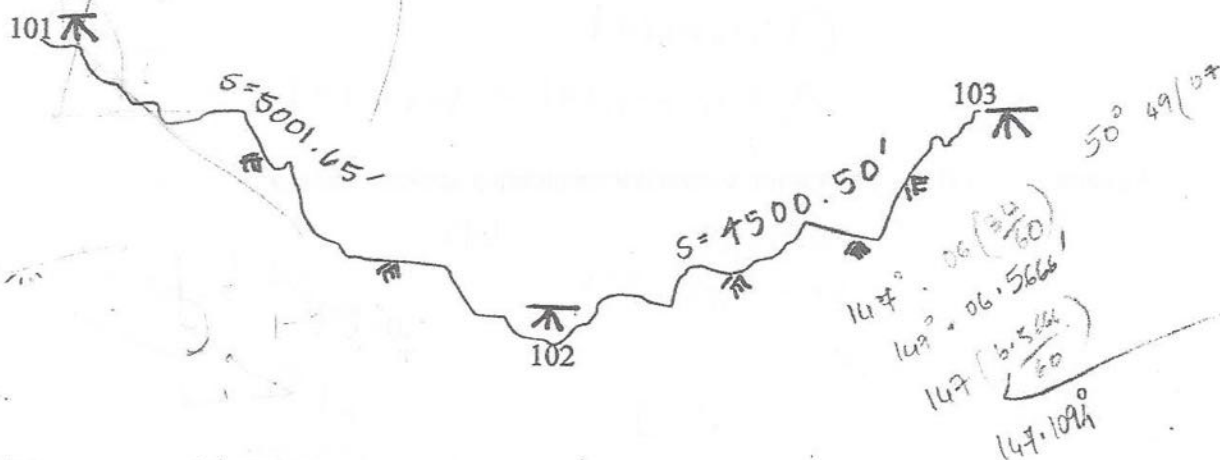
101 to 102	=	147° 06' 37"	102 to 103	50° 49' 07"
		147° 06' 31"		50° 48' 57"

mean = 147° 06' 34"   mean = 50° 49' 02"

147.109444   = 50.8172222

$D = 5001.65 (\sin 147.109444)$ $D = 4500.50 (\sin 50.8172222)$

$\boxed{= 2716.076'}$ $\boxed{= 3488.493'}$

5 points (7) Convert the following angle from degrees, minutes and seconds to decimal parts of a degree:

198° 03' 31" = <u>198.0586111</u>°

Convert the following:

5281.61 feet	= <u>1,609.838</u>	meters	5281.61/3.280833?
40 chains	= <u>2,640</u>	feet	40 × 66
10.045 acres	= <u>437,560.20</u>	square feet	10.045 × 43560
1 mile	= <u>80</u>	chains	

4 points (8) If we were establishing vertical control for a 28 mile stretch of levee system on a large engineering project for the Corps of Engineers, what <u>ORDER</u> of work should we follow according to the NGS Classification, Standards of Accuracy, and General Specifications for Vertical Control?
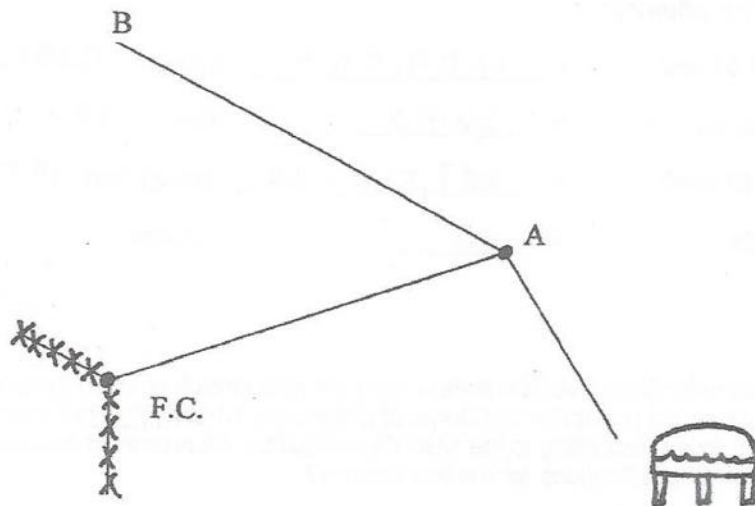
2nd Order

8 points (9) Provide the complete name for:

NGVD29 = <u>National Geodetic Vertical Datum of 1929</u>

NAVD88 = <u>North American Vertical Datum of 1988</u>

NGS = <u>National Geodetic Survey</u>

NOAA = <u>National Oceanic & Atmospheric Administration</u>

3

**10 points**   **(10)** Complete the following notes from the mean angles using the sketch shown.

N.T.S.

INSTRUMENT AT STATION A

Station	D/R	Circle Reading	Mean R/R	Mean
B (backsight)	D R	00° 00' 10" 180° 00' 20" −180 00 20	00° 00' 15"	n/a
			−15"	
Water Tank	D R	255° 36' 02" 75° 36' 10" 8	255° 36' 06"	255° 35' 51"
			−15"	
Fence Corner	D R	329° 07' 38" 149° 08' 00"	329° 07' 49"	329° 07' 34"

16 points   **(11)**   Using the following figure below, determine the following bearings or azimuths as required:

ROW Marker

F.C.

210°07'07"

125°51'55"

121°57'04"

43°09'31"

13

12

14

251°06'23

N

N.T.S.
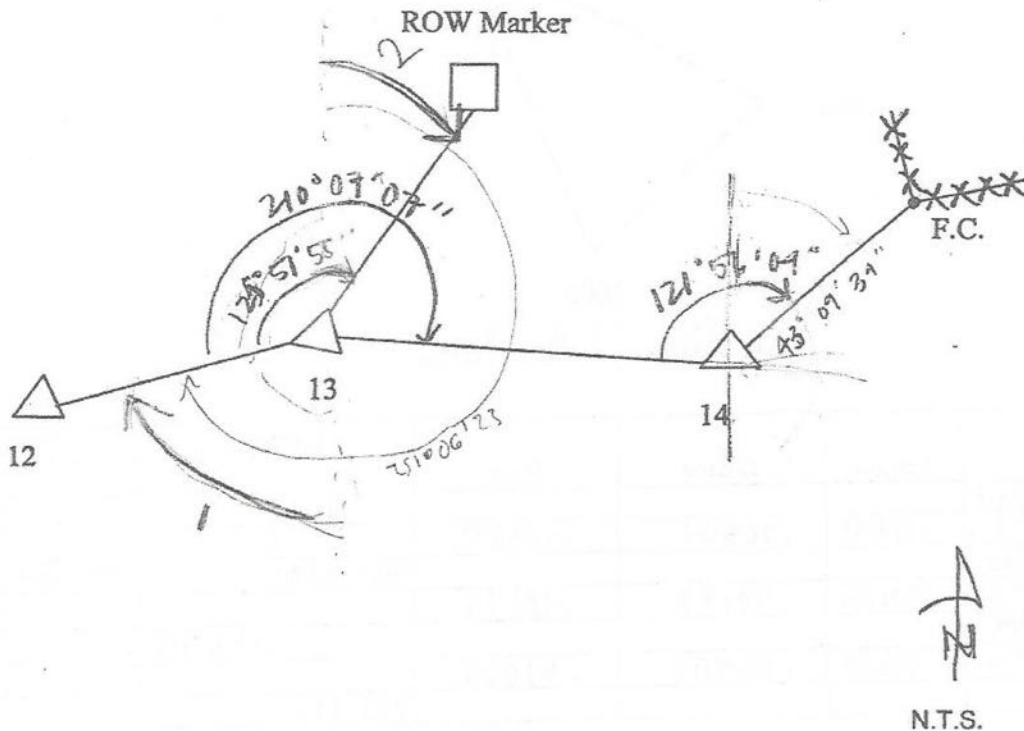
Given: (1) The azimuth from PT 13 to PT 12 = 251° 06' 23"
        (2) Sitting on 13, the angle right to ROW marker = 125° 51'55"
        (3) Sitting on 13, the angle right to PT 14 = 210° 07'07"
        (4) Sitting on 14, the angle right to fence corner = 121° 56' 04"

Determine: (1) Backazimuth from PT 13 to PT 12 = 71° 06' 23"

              (2) The azimuth to the ROW marker = 12° 58' 18"

              (3) The azimuth to PT 14 = 101° 13' 30"

              (4) The bearing to the fence corner = N 43°09' 34" E

```
1) 251 01 23       2) 71 06 23        3) 71 06 23       4) 101 13 30
   180               + 121 61 55         + 210 07 07       + 121 56 04
   -------           ----------          ----------        ----------
   71 06 23          192 58 18           281 13 30         223 09 34
                     -180                -180              -180
                     ----------          ----------        ----------
                     12 58 18            5                 43 09 34
                                         ----------
                                         101 13 30
```

12. Use the figure below and compute the latitude and departure table below:
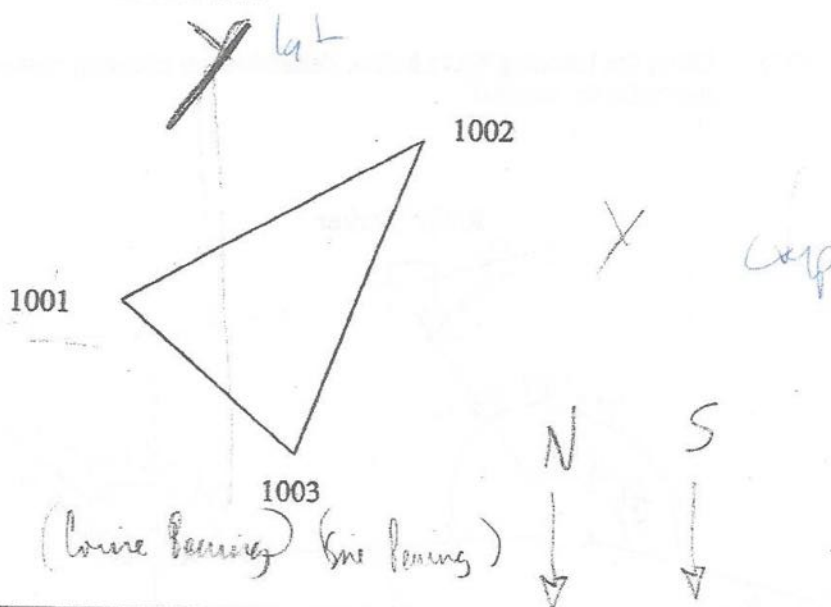
Point	Bearing	Length	Cosine	Sine	Latitude (+)	Latitude (0)	Departure (+)	Departure (−)
1001	45 1269444							
	N 45 07'37" E	1116.61	.70554	.70867				
1002	25 588888				787.813		791.308	
	S 25 35'20" W	1301.44	.90192	.48191				
1003	30 705555					1173.79		562.105
	N 30 02'20" W	449.10	.85980	.51063				
					386.136			229.324

Length × Cosine = Latitude = X

Length × Sine = Departure = X = long

STUD NT _Luis Balladares_   January 30, 2008

4 poir s   (1)   Is the difference between NGVD29 and NAVD88 linear or non-linear? Explain by
example. What is the approximate difference in elevation in Atlanta Georgia
between NGVD29 and NAVD88?

Non-Linear, changed to update elevations ex. high hills of mountains
to plains or sealevel 1/10 Ft?

3 poi ts   (2)   Give five types of surveys that professional land surveyors are responsible for.

construction
control
hydrographic
topographic
boundary

4 poi s   (3)   Show the symbology used for a horizontal control point, and a vertical control
point.

horizontal → △
vertical → ⊙

4 poi ts   (4)   List 4 ways to measure the distance between 2 points.

GPS
tapes
chains
pacing

1

15 points   (5)   Complete the following set of level notes

Station	BE	HI	FS	Elevation
BM Lowe 99	10.42	1167.33		1156.91 (fixed)
TP1	10.11	1168.33	9.11	1158.22
TP2	10.92	1177.19	2.06	1166.27
TP3	14.51	1179.64	12.06	1165.13
TP4	7.52	1173.55	13.61	1166.03
BM PBSJ 07			1.85	1171.7

The fixed (published) elevation of BM PBSJ 07 is 1171.80. What is the error in this level hoop? If we distribute the error equally to each of the TP's, what would the corrected elevations be for TP 3? Use this space to draw a picture of the situation if necessary.

5

$$1171.80 - 1171.7 = .1$$

$$\text{error} = \frac{.1}{5} = .02$$

$$1165.13 + .02 + .02 + .02 = 1165.19$$

10 points   (6)   You are surveying a portion of the Grand Canyon, and you have recorded the following vertical angles and slope distances. Compute the mean vertical angles and use them to compute the horizontal distances.
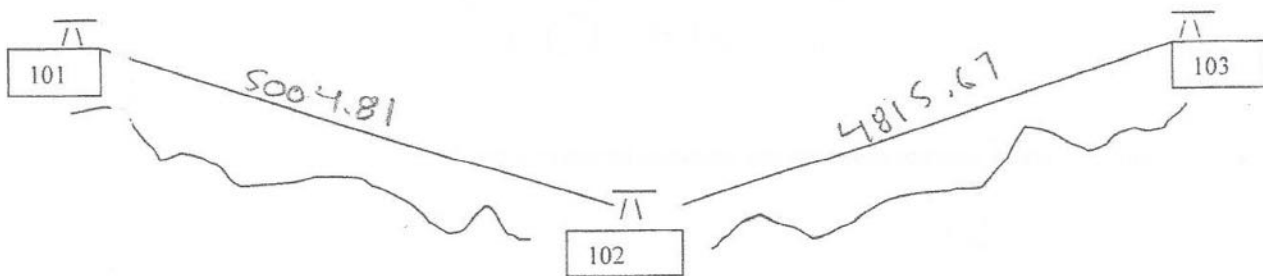
	101 to 102	=	137° 26' 59"	102 to 103	=	43° 21' 50"
			137° 27' 01"			43° 21' 58"
Slope	101 to 102	=	5004.81'	Slope 102 to 103	=	4815.67'

$$mean = 137° 27' 00''$$
$$DD = 137.45°$$
$$H\ dist = 5004.81' \sin (137.45)^2$$
$$= 3384.42'$$

$$mean = 43° 21' 54''$$
$$DD = 43.365°$$
$$H\ dist = 4815.67 \sin (43.365)$$
$$= 3306.65'$$

5 poii s   **(7)**   Convert the following angle from degrees, minutes and seconds to decimal parts of a degree:

333°27' 15" = _____ $333.454\overline{166}°$ _____

Convert the following:

1010.66 feet	=	308.13	meters
80 chains	=	5280	feet
12.66 acres	=	551,469.6	square feet
5 chains	=	500	links

328 ft/m

66 ft = 1 chain = 100 links
80 chains = 1 mile
5280 ft = mile
43560 ft²/acre

4 poi :s   **(8)**   If we were establishing vertical control for a small GA DOT road project, what <u>ORDER</u> of work should we follow according to the NGS Classification, Standards of Accuracy, and General Specifications for Vertical Control?

3rd order

4 poi ts   **(9)**   Provide the complete name for:

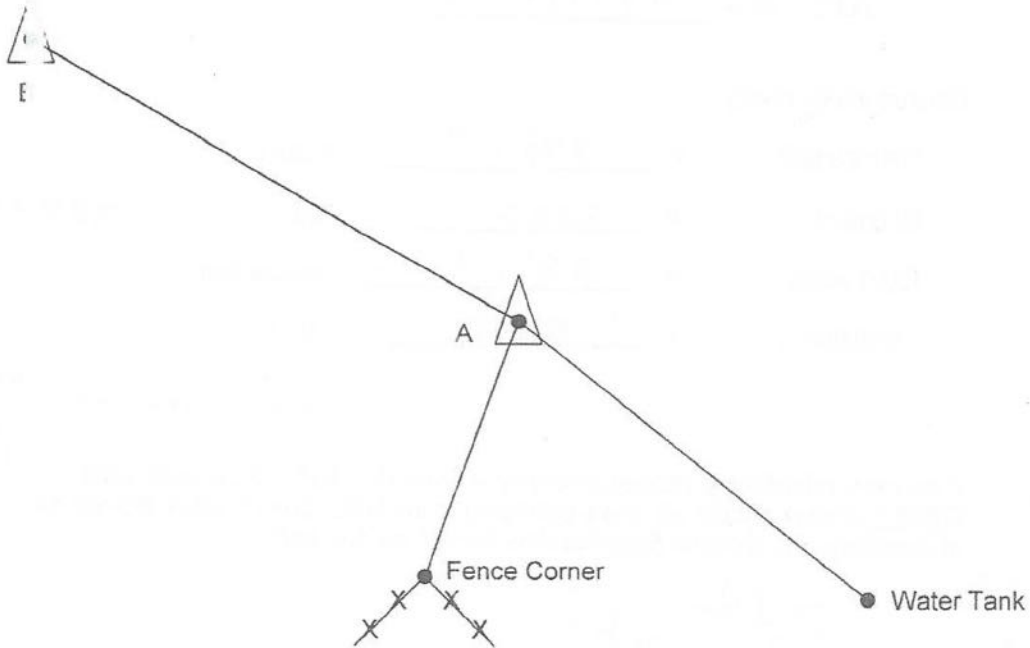NGVD29 = National Geodetic Vertical Datum of '29

NAVD88 = North American Vertical Datum of '88

USC&GS = Unstates States coastal & geological survey

NOAA = National Oceanic & Atmospheric Administration

3

10 po nts   (10)   Complete the following notes from the mean angles using the sketch shown.
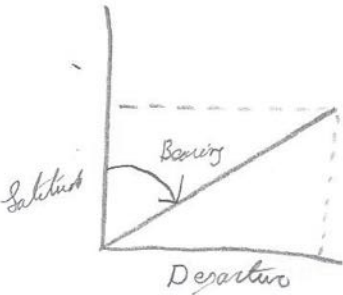

INSTRUMENT AT STATION A

Station	D/R	Circle Reading	Mean R/R	Mean
B (backsight)	D R	00° 00' 15" 180° 00' 21" > 6/2:3	00°00' 18"	n/a
Wate Tank	D R	186° 03' 55" > 4 /2:2 6° 03' 59"	186° 03' 57" — 18"	186°03' 39"
Fenc Corner	D R	227° 05' 04" > 6/2:1 47° 05' 10"	227°05'07" −18"	227°04'49"

4

16 points   (11)   Using the following figure below, determine the following bearings or azimuths as required:

ROW Marker

N.T.S.

Given: (1) The azimuth from PT 13 to PT 12 = 248° 51'07"
        (2) Sitting on 13 backsighting 12, the angle right to ROW marker = 124° 07'14"
        (3) Sitting on 13 backsighting 12, the angle right to PT 14 = 210° 07'07"
        (4) Sitting on 14 backsighting 13, the angle right to fence corner = 124° 03'51"

Determine: (1) Backazimuth from PT 13 to PT 12 = $248°51'07" - 180° = 68°51'07"$

          (2) The azimuth to the ROW marker = $124°07'14" + 68°51'07" - 180° = 12°58'21"$

          (3) The azimuth to PT 14 = $210°07'07" + 68°51'07" - 180° = 98°58'14"$

          (4) The bearing to the fence corner = $124°03'51" + 98°58'14" - 180° = 73°02'05" E$

  N $73°02'05"$ E

$$124° \ 07' \ 14"$$
$$68° \ 51' \ 07"$$
$$\overline{192° \ 58' \ 21"}$$
$$-180$$
$$\overline{12°58'21}$$

$$210° \ 07' \ 07"$$
$$+ \ 68° \ 51' \ 07"$$
$$\overline{278° \ 58' \ 14"}$$
$$-180$$
$$\overline{98° \ 58' \ 14"}$$

$$124°03'51"$$
$$98°58'14"$$
$$\overline{223° \ 02 \ 05"}$$
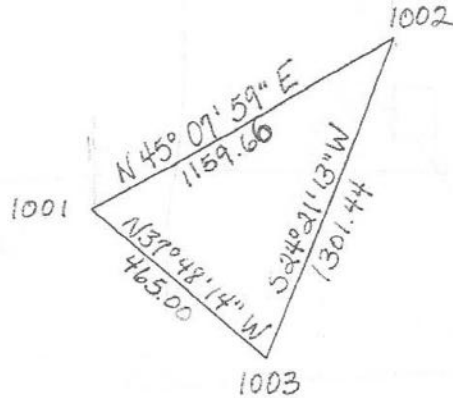$$-180°$$
$$\overline{73°02'05"}$$

5

12. Use the figure below and compute the latitude and departure table below:

lat

α = bearing angle
L = length of AB

dep

Latitude = $L \cos \alpha$
Departure = $L \sin \alpha$

Point	Bearing	Length	Cosine	Sine	Latitude +	Latitude −	Departure +	Departure −
1001								
	N 45° '59" E	1159.66	.70546279	.708746957	818.80		821.905	
1002								
	S 24° '13" W	1301.44	.91101767	.41236096		1185.64		536.66
1003								
	N 37° '14" W	465.00	.79011341081	.6129606 8956	367.40			285.07

13. What is the L.E.C. for Problem #12?

$$LEC = \sqrt{(\Sigma DEP)^2 + (\Sigma LAT)^2}$$

$$
\begin{array}{r}
818.10 \\
+\;367.40 \\
-\;1185.64 \\
\hline
-.14
\end{array}
\qquad
\begin{array}{r}
821.905 \\
-\;536.66 \\
-\;285.07 \\
\hline
.225
\end{array}
$$

$\tan^{-1}\left(\dfrac{.225}{.14}\right)$

$\tan \theta = \dfrac{\text{dep}}{\text{lat}}$

Is this your answer?

$\boxed{.265}$ $= \sqrt{(-.14)^2 + (.225)^2}$

$\theta = -58.11°$

GEOMATICS
CEE 3010
Surveying Test No. 1

STUDENT _Jonathan Duarte_   February 2, 2009

5 points   (1)   Is the difference between NGVD29 and NAVD88 linear or non-linear? Explain by example. What is the approximate difference in elevation in Atlanta Georgia between NGVD29 and NAVD88?

- Non-linear
- Top off mountains to the coast. Need to revise elevation
- 1/10 ft

5 points   (2)   Give five types of surveys that professional land surveyors are responsible for.

- Control (Cadastral)
- Hydrographic
- Topographic
- Aerial
- Construction

5 points   (3)   Show the symbology used for a horizontal control point, and a vertical control point.

△ — Horizontal

⊙ — Vertical

△ — Horizontal & Vertical

4 points   (4)   List 4 ways to measure the distance between 2 points.

- Tape
- Chain
- GPS
- Pacing

1

15 points   (5)   Complete the following set of level notes

Elev+bs   -11-75

Station	BE	HI	FS	Elevation
BM owe 99	6.50	997.35		990.85 (fixed)
TP1	7.52	991.65	13.22	984.13
TP2	10.92	994.00	8.57	983.08
TP3	14.51	996.45	12.06	981.94
TP4	7.52	990.36	13.61	982.84
BM BSJ 07			1.85	988.51

The fixed (published) elevation of BM PBSJ 07 is 991.22. What is the error in this level hoop? If we distribute the error equally to each of the TP's, what would the corrected elevations be for TP 3? Use this space to draw a picture of the situation if necessary.

Error = 991.22 - 988.51 = 2.71

$$\frac{2.71}{5} = .542 \qquad So, \qquad TP_3^{el} = 981.94 + .542(3) = 9$$

$$= 983.57$$

10 points   (6)   You are surveying a portion of the Grand Canyon, and you have recorded the following vertical angles and slope distances. Compute the mean vertical angles and use them to compute the horizontal distances.

101 ⊼   ⊼ 103

4083.15'   4501.66'

⊼ 102
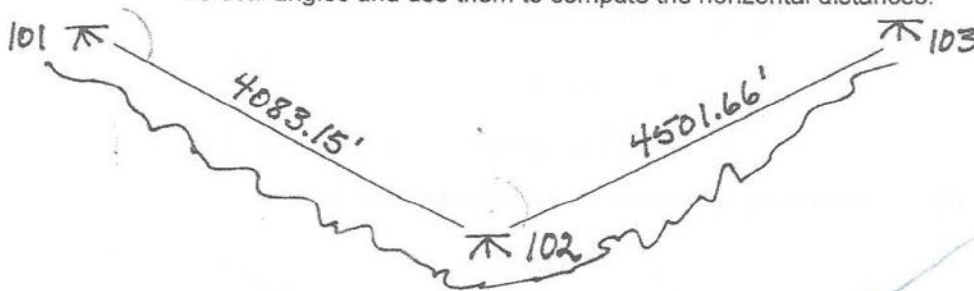
| 101 to 102 | = | 137° 26' 59" | 102 to 103 | 43° 21' 50" |
| | | 137° 27' 01" | | 43° 21' 58" |

mean = 137°27'00"   mean = 43°21'54"

or 137.45°   or 43.365°

h = 4083.15 sin(137.45)   h = 4501.66 sin(43.365)

= 2761.162   = 3091.036

2

5 points   **(7)**   Convert the following angle from degrees, minutes and seconds to decimal parts of a degree:

1 acre = 43560 sq ft

113°56' 09" = __113.9358__

Convert the following:

1 chain = 66 ft

3416.55 feet	=	1041.364	meters
40 chains × 66	=	2640	feet
10.51 acres ×	=	457,815.6	square feet
80 chains ×	=	8000	links

5 points   **(8)**   If we were establishing vertical control for a project in California to measure seismic movement, what <u>ORDER</u> of work should we follow according to the NGS Classification, Standards of Accuracy, and General Specifications for Vertical Control?

1st Order

4 points   **(9)**   Provide the complete name for:

NGVD29 = National Geodetic Vertical Datum of 1929

NAVD88 = North American Vertical Datum of 1988

USC&GS = United States Coastal & Geological Survey

NGS = National Geodetic Survey

3

10 points   (10) Complete the following notes from the mean angles using the sketch shown.

Water Tank

Fence Corner

N.T.S.

INSTRUMENT AT STATION A

Station	D/R	Circle Reading	Mean R/R	Mean
B (backsight)	D	00° 00' 12"	00°00' 15"	n/a
	R	180° 00' 18" −15"		
Water Tank	D	218° 22' 56"	218°22' 59"	218°22' 44"
	R	38° 23' 02" −15"		
Fence Corner	D	271° 50' 27" −15"	271°50'24"	271°50'09"
	R	91° 50' 21"		

4

16 points   (11)   Using the following figure below, determine the following bearings or azimuths as required:

ROW Marker

N.T.S.

Given: (1) The azimuth from PT 13 to PT 12 = 260° 11'55"
            (2) Sitting on 13 backsighting 12, the angle right to ROW marker = 123° 07'07"
            (3) Sitting on 13 backsighting 12, the angle right to PT 14 = 210° 07'07"
            (4) Sitting on 14 backsighting 13, the angle right to fence corner = 124° 03'51"

Determine: (1) Backazimuth from PT 13 to PT 12 = $260°11'55" - 180° = 80°11'55"$

              (2) The azimuth to the ROW marker = $123°07'07" + 80°11'55" - 180 = 23°19'2"$

              (3) The azimuth to PT 14 = $210°07'07" + 86°11'55" - 180 = 110°19'2"$

              (4) The bearing to the fence corner = $N 54°22'53" E$

$$124°03'51" + 110°19'2" - 120$$
$$= 54°22'53"$$

5

16 points

12. Use the figure below and compute the latitude and departure table below:
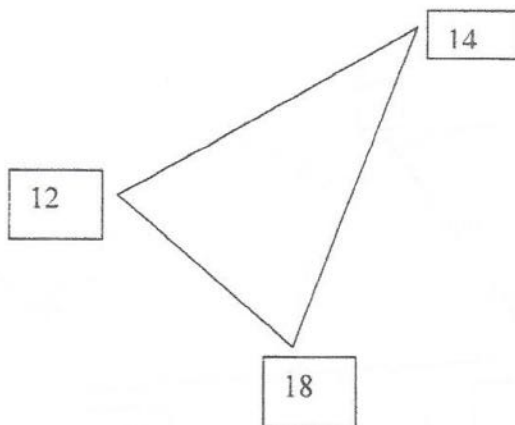
Point	Bearing	Length	Cosine	Sine	Latitude +	Latitude -	Departure +	Departure -
12								
	N 4. 55'14" E	1204.41	.6830	.7364	822.626		879.701	
14								
	S 2! 25'28" W	1301.44	.9032	.4293		1175.398		558.734
18								
	N 4. 19'01" W	477.10	.7394	.6732	352.783		321.198	

Lat (6)
Dep Sin

GEOMATICS
CEE 3010
Surveying Test No. 1

84

STUDENT Jonathan Peter Martinez   September 11, 2013

5 points   (1)   Is the difference between NGVD29 and NAVD88 linear or non-linear? Explain by example. What is the approximate difference in elevation in Atlanta Georgia between NGVD29 and NAVD88?

The difference is NON-Linear.

NAVD88 takes into account the geodetic curvature of the earth

The approximate difference is 0.8'

5 points   (2)   Give five types of surveys that professional land surveyors are responsible for.

plot layout.
road layout.
pipe install layout.
Topographic mapping survey.
Locating BM's & establishing either vertical &/or horizontal controls

4 points   (3)   Show the symbology used for a horizontal control point, and a vertical control point.

△   ⊙
Horizontal   Vertical

4 points   (4)   List 4 ways to measure the distance between 2 points.

Steel Tape
EDM (electronic device measurement)
Device that uses light reflection then divide by speed of sound
Device that uses microwaves

1

20 points   (5)   Complete the following set of level notes

Station	BE	HI	FS	Elevation
BM Lowe 99	1.36	1122.25		1120.89 (fixed)
TP1	8.07	1117.47	12.85	1109.4 1109.42 .02
TP2	10.92	1126.33	2.06	1115.41 2(.02)
TP3	14.51	1128.78	12.06	1114.27 3(.02)
TP4	7.52	1122.69	13.61	1115.17
BM PBSJ 07			1.85	1120.84

The fixed (published) elevation of BM PBSJ 07 is 1120.74. What is the error in this level hoop? If we distribute the error equally to each of the TP's, what would the corrected elevations be for TP 3? Use this space to draw a picture of the situation if necessary.

$$error\ of\ PBSJ\ 07 = 0.10$$

$$\frac{0.10}{5} = 0.02 \qquad 5 = number\ of\ stations$$

$$TP_3 = 1114.33\ \text{corrected elevation} \quad X \quad -3$$

14 points   (6)   You are surveying a portion of the Grand Canyon, and you have recorded the following vertical angles and slope distances. Compute the mean vertical angles and use them to compute the horizontal distances.
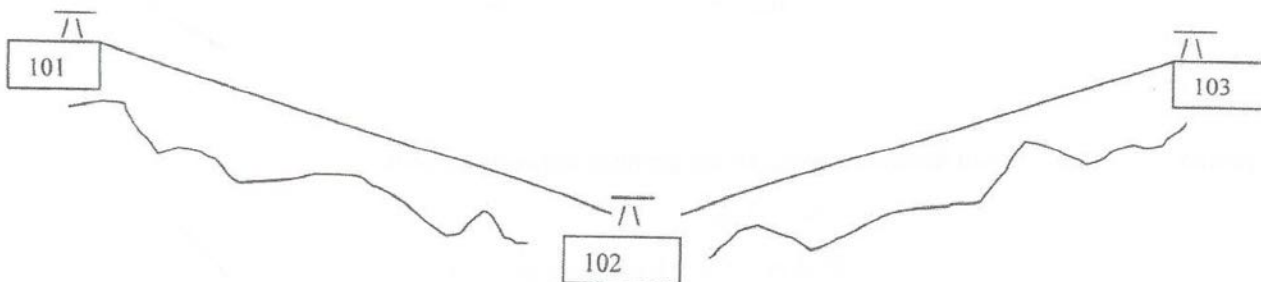
101 to 102 = 128° 59' 38"
128° 59' 26"

101 to 102 mean = 128° 59' 32"

Slope Distance from
101 to 102 = 3982.54'

128.992

$(sin(128.59\overline{32}))(3982.54)$

101 to 102 Horizontal Distance = 3095.36'

102 to 103 = 45° 07' 51"
45° 07' 47"

102 to 103 mean = 45° 07' 49"

Slope Distance from
102 to 103 = 4209.55'   45.13037

$(sin(45.13037))(4209.55)$

102 to 103 Horizontal Distance = 2983.36'

2

5 points   **(7)**   Convert the following angle from degrees, minutes and seconds to decimal parts of a degree:

$$327°10'10" = \underline{\quad 327.169\bar{4} \quad}$$

Convert the following:

1010.66 feet $\times \frac{m}{ft} =$	_3315.806983_	meters	3.2808333
40 chains $\times \frac{ft}{chain} =$	_2640_	feet	1 chain = 66'
12.002 acres $\times \frac{ft^2}{acre} =$	_522,807.12_	square feet	43560
40 links $\times \frac{chain}{links} =$	_0.4_	chains	100 links

4 points   **(8)**   If we were establishing vertical control for a small GA DOT road project, what ORDER of work should we follow according to the NGS Classification, Standards of Accuracy, and General Specifications for Vertical Control?

First Order   since establishing a central
    due to NGS classification & Standards

4 points   **(9)**   Provide the complete name for:

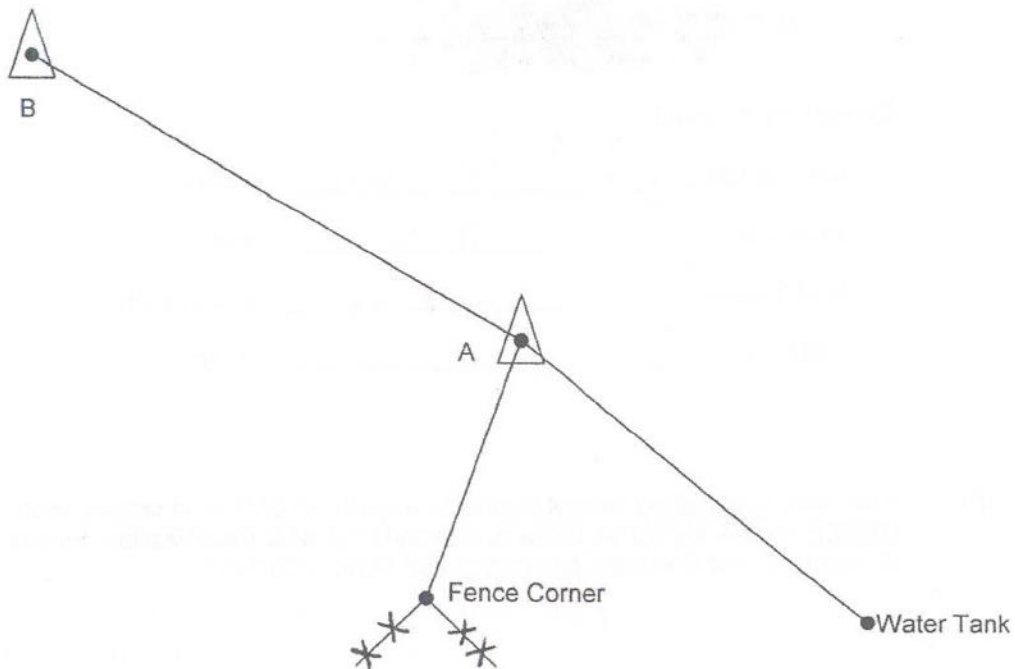NGVD29 = _National Geodetic Vertical Datum of 1929_

NAVD88 = _North American Vertical Datum of 1988_

USC&GS = _United States Coast and Geodetic Survey_

NOAA = _North Oceanic Atmospheric and Altitude_ ✗

✓

**15 points**   (10)   Complete the following notes from the mean angles using the sketch shown.

INSTRUMENT AT STATION A

Station	D/R	Circle Reading	Mean R/R	Mean
B (backsight)	D	00° 00' 13"	00° 00' 18"	n/a
	R	180° 00' 23"		
Water Tank	D	185° 27' 27"	185° 27' 29"	185° 27' 11"
	R	5° 27' 31"		
Fence Corner	D	248° 59' 58"	248° 59' 54"	248° 59' 36"
	R	68° 59' 50"		

4

20 points   (11)   Using the following figure below, determine the following bearings or azimuths as required:

ROW Marker

N

F.C.

13

12

14

N.T.S.
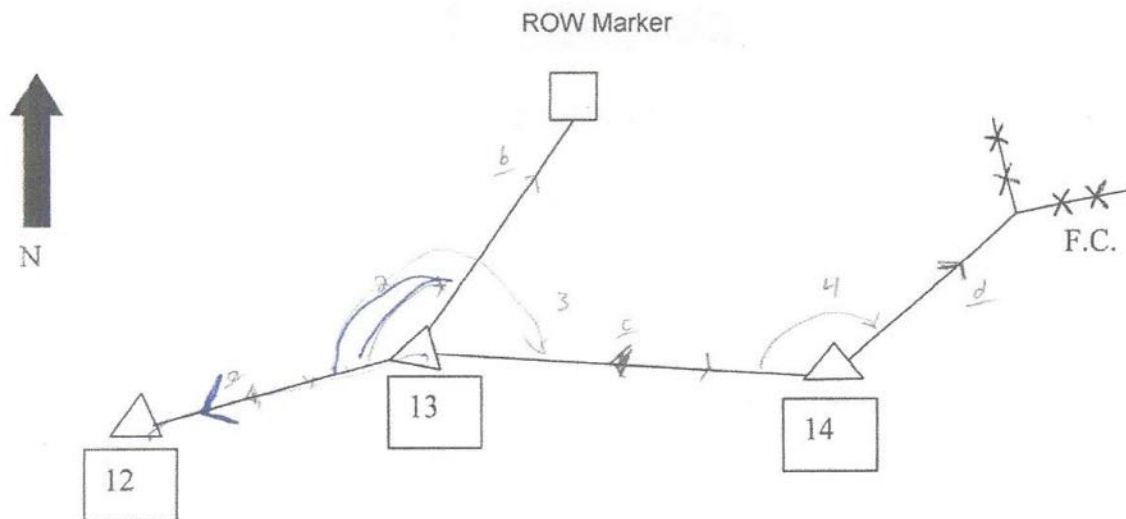
Given: (1) The azimuth from PT 13 to PT 12 = 261° 57' 39"
(2) Sitting on 13 backsighting 12, the angle right to ROW marker = 129° 04' 26"
(3) Sitting on 13 backsighting 12, the angle right to PT 14 = 209° 27' 13"
(4) Sitting on 14 backsighting 13, the angle right to fence corner = 124° 03'51"

Determine:

(1) Backazimuth from PT 13 to PT 12 =   81° 57' 39"

(2) The azimuth to the ROW marker =   211° 01' 55" ✗

(3) The azimuth to PT 14 =   60° 29' 08" ✗

(4) The bearing to the fence corner =

N 4° 32' 59" E ✗

a.
261° 57' 39"
− 180   0'   0"
———————————
81°   57' 39"

+ 129   04   26
———————————
b.   211° 01' 55"

211° 01' 55"
209° 27' 13"
———————————
420° 29' 08"
− 360°   0'   0"
———————————
60° 29' 08"

+180

c.   240° 29' 08"
+ 124° 03' 51"
———————————
364° 32' 59"
− 360
———————————
4° 32' 59"

5

$100°$ good

STUDENT Jonathan Duarte   **February 23, 2009**

8 points   1.   What is GPS? Give a brief explanation of how GPS works. Include the name of the constellation of satellites, what is critical to GPS observations, how are the satellites put in orbit, etc. Also, what is the Russian version of our GPS?

- Global Positioning System. It works by using the ellipsoid relative height. Observations of satellites in order to find one's location.
- The constellation of satellites is called Navstar. Satellites are put in orbit using rockets
- The russian version of NAVSTAR is GLONASS

5 points   2.   Using the Classification, Standards of Accuracy, and General Specifications for Horizontal Control, give the closure length (after angle and side conditions have been satisfied) for:

Order AA   = 1: 100, 000,000
Order A   = 1: 10, 000, 000
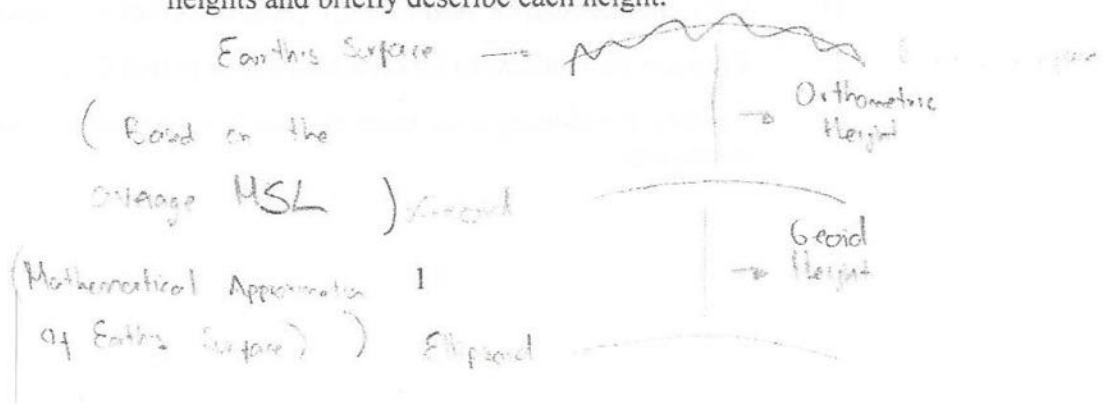Order B   = 1: 1, 000, 000

Why were these higher standards for accuracy necessary?

- Need for more accuracy on certain projects (military, gov't, etc)
- Need for surveys to be more accurate
- The technology existed to be more accurate

8 points   3.   Illustrate the relationship between the geoid, the ellipsoid, and the earth's surface. Also indicate which of these are used for GPS derived heights and briefly describe each height.

Earth's Surface →

Orthometric Height

(Based on the average MSL) geoid

Geoid Height

(Mathematical Approximation of Earth's Surface) Ellipsoid

5 points   4.   List 5 items that are shown and available on each geodetic control data sheet for each NGS triangulation mark/monument.

Location
Description
Latitude
Longitude
Horizontal / Vertical Accuracy

5 points   5.   List 5 engineering or surveying projects where you could use GPS data collection.

- _Building an oil well offshore_
- _Build. Reservoir camp in Lousiana_
- _Build. 2-tower complex w/ a garage_
- _Sue Mapping of Lake Lanier_
- _Surveying of the Appalachian mountains_

10 points   6.   Circle T or F for the following statements:

A.	NAD27 stands for North American Datum of 1927.	**T** F
B.	The NAD27 is based on the center of the earth.	T **F**
C.	Latitude is common to the equator.	**T** F
D.	State Plane Coordinates can be based on NAD27 or NAD83.	**T** F
E.	WGS84 coordinates can be used in Moscow and New York.	**T** F
F.	The ellipsoid is based on the mean elevation of the world's oceans.	T **F**
G.	Currently, the GPS causes no more than 100 meters of possible error.	T **F**
H.	GPS satellites can be used for only geodetic surveying purposes.	T **F**
I.	Civilians have access to all GPS signal data in real time.	T **F**
J.	Relative positioning is the method of GPS operations we use for surveying.	**T** F

2

7 points   7.   NAD27 was the first horizontal datum used in the U.S.
NAD27 was replaced with what datum? ___NAD83___

Explain why NAD27 was replaced and why the new datum was
needed and give several advantages of the new datum.
- Replaced by NAD83.
- NAD27 was not measured from the center of
  the Earth while NAD83 is.
- GPS made NAD83 possible.
- NAD83 is more flexible and allows to
  enter new points as they become available and
  allows update of current ones as new technology
  is developed

7 points   8.   What is the international datum that is being considered in the
near future to replace the currently used datum? Why is it
necessary? Approximately how many plates make up the land
masses of the world? Geodetically speaking, what is the sum of
their movement?
- International Terrestrial Reference Frame (ITRF)
- Need to have common datum for any part
  of the world.
- There are about 7 plate tectonic plates
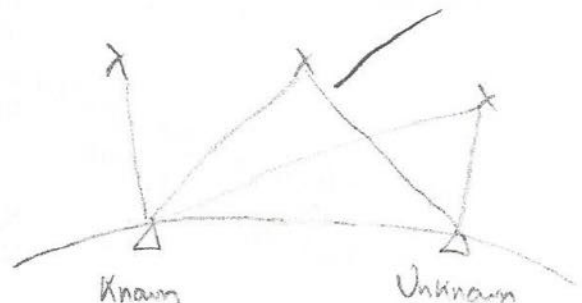 in the world which are always in constant
  movement.

8 points   9.   Illustrate the difference between GPS point positioning
methodology versus GPS relative positioning methodology.
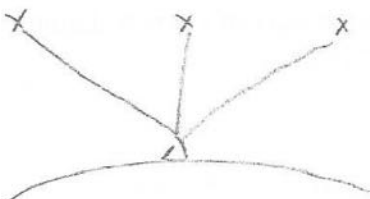

Point Positioning

Relative Positioning

Known   Unknown
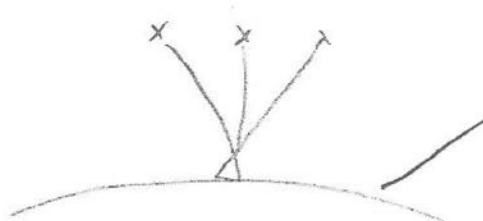
3

8 points 10. Illustrate the difference between <u>good</u> GPS PDOP and <u>bad</u> GPS PDOP.

Good

Bad

4 points 11. The following NAD27 geographic position is given for an AT&T tower in New Orleans, LA.

Latitude N = y 29° 58' 36.22" =   907,362.44'
Longitude E = X 89° 52' 50.41" =   2,218,507.82'

Fill in the correct coordinates for the:

X = $89°52'50.41" = 2,218,507.82'$

Y = $29°58'36.22" = 907,362.44'$

N = $29°58'36.22" = 907,362.42'$

E = $89°52'50.41" = 2,218,507.82'$
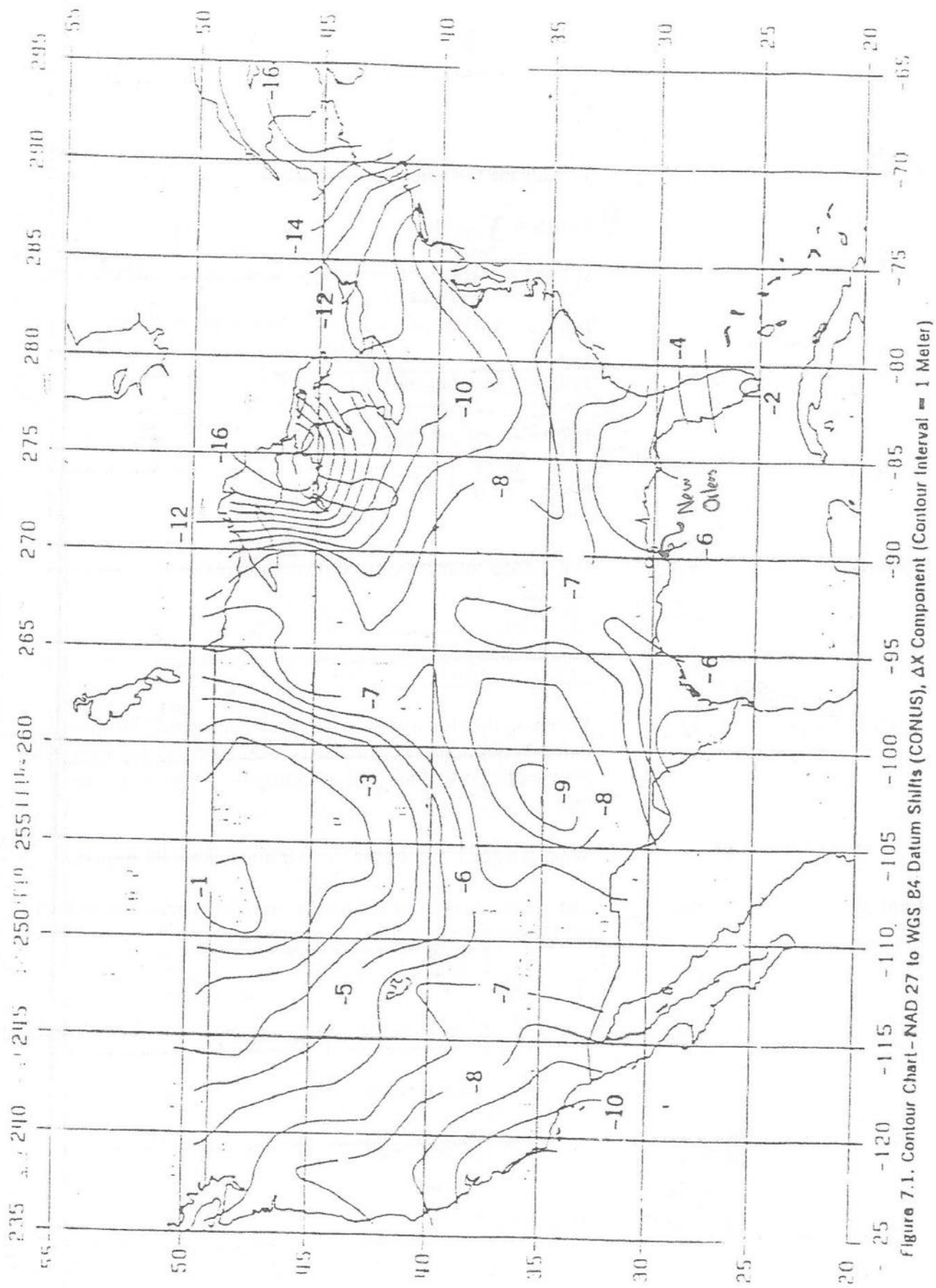
8 points 12. Using the coordinates of the AT&T tower in question 10, provide the northing and easting for NAD83. The change from NAD27 to NAD83 in New Orleans is found on the attached figures/charts.

$\Delta x = -6.1m = -20.0129$ ft
$\Delta y = 158.1m = 518.6945$

NAD83 Northing (feet) = $907,881.1345$
NAD83 Easting (feet) = $2,218,487.807$

4

Figure 7.1. Contour Chart—NAD 27 to WGS 84 Datum Shifts (CONUS), ΔX Component (Contour Interval = 1 Meter)

6 points

13.

Provide the full name or wording for:

CORS = Continuously Operating Reference Station

HARN = High Accuracy Reference Network

ITRF = International Terrestrial Reference Frame

MSL = Mean Sea Level

U.T.M. = Universal Traverse Mercator

SA = Selective Availability

3 points

14.

List 3 different methods of GPS data collection.

Static

Kinematic

Differential

4 points

15.

We are in the civil and environmental engineering business to make money and to help make the world a better and safer place. How much profit do civil engineering firms typically make on a job? _A lot._

What is a good "multiplier" on our direct labor for projects? 2.5

4 points

16.

List out the 4 levels of HAZMAT emergency response and what are the main basic requirement(s) for each level?

A Encapsulated Suit

B Self-contained Breathing Apparatus (Unknown Chemical Spill)

C Respirator On

D Lowest Level (Landfill)