

## Golden Gate location



## Celestial Navigation Work Form

Marine Education & Publications, Seattle, WA

Pub. 249 (Volumes 2 and 3) or Pub. 229 (All Volumes)

<b>1</b>	WT	11	h	02	m	2	s	date	10-Jul-1982	body	Sun L/L	Hs	49°	24.5	
	WE +S-F				m	00	s	DR Lat	37° 49' N	log	1066	index corr. + off, - on		00	
	ZD +W-E	+7						DR Lon	122° 28' W	HE ft	9	DIP	-	-2.9	
	GMT	18	h	02	m	2	s	GMT date / LOP label			C- 276 T	Ha	49°	21.6	
								<b>Golden Gate 10-Jul-1982</b>			S- 5.7 Kt				
<b>2</b>	GHA hr.	88	°	40.6	'	v moon planets	DEC hr	N22	°	12.7	'	d +-	-0.3	HP moon	
	GHA + m.s.	0	°	30.5	'	d corr.	+ -								
<b>3</b>	SHA + or v corr.	360	°		'	stars or moon, planets	DEC deg	N22	°	DEC min	12.7	additional altitude corr. moon, mars, venus altitude corr. all sights	+	+15.2	
	GHA	449	°	11.1	'	tens d	6.1	d upper				upper limb moon subtract 30'			
	a-Lon -W+E	122	°	11.1	'	units d	1.2	d lower				Ho	T	49°	36.8
	LHA	327	°	00' W/60' E		dsd corr.	+	dsd				Hc	A	57°	37.5
						d corr.	Pub. 229	7.5						a =	480.7 A
<b>4</b>	LHA	316				tab Hc	57°	30.0	d +-	35.6	Z	110.0		Zn =	110.0
	Dec deg	22	N	S	N	d corr.	Pub. 249 & 229	7.5	Dec min.	12.7				a - Lat =	38° N
	a-Lat	38	N	S	N	Hc	57°	37.5						a - Lon =	122° 11.1' W
<b>5</b>	tab Hc	57°	30.0	d +-	35.6	Z	110.0								
	d corr.	Pub. 249 & 229	7.5	Dec min.	12.7										
<b>6</b>	Hc	57°	37.5												

L.H.A. greater than 180 ..... Zn = Z  
L.H.A. less than 180 ..... Zn = 360 - Z

L.H.A. greater than 180 ..... Zn = 180 - Z  
L.H.A. less than 180 ..... Zn = 180 + Z

<b>1</b>	WT	13	h	34	m	46	s	date	10-Jul-1982	body	Sun L/L	Hs	74°	42.0	
	WE +S-F				m	00	s	DR Lat	37° 49' N	log	1082	index corr. + off, - on		0	
	ZD +W-E	+7						DR Lon	122° 28' W	HE ft	9	DIP	-	-2.9	
	GMT	20	h	34	m	46	s	GMT date / LOP label			C- 276 T	Ha	74°	39.1	
								<b>Golden Gate 10-Jul-1982</b>			S- 5.7 Kt				
<b>2</b>	GHA hr.	118	°	40.4	'	v moon planets	DEC hr	N 22	°	12.1	'	d +-	-0.3	HP moon	
	GHA + m.s.	8	°	41.5	'	d corr.	+ -								
<b>3</b>	SHA + or v corr.	360	°		'	stars or moon, planets	DEC deg	N 22	°	DEC min	11.9	additional altitude corr. moon, mars, venus altitude corr. all sights	+	+15.7	
	GHA	487	°	21.9	'	tens d	9.9	d upper				upper limb moon subtract 30'			
	a-Lon -W+E	122	°	21.9	'	units d	1.6	d lower				Ho	T	74°	54.8
	LHA	365	°	00' W/60' E		dsd corr.	+	dsd				Hc	A	73°	37.4
						d corr.	Pub. 229	11.5						a =	77.4' T
<b>4</b>	LHA	5				tab Hc	73°	25.9	d +-	58.1	Z	159.2		Zn =	197.0
	Dec deg	22	N	S	N	d corr.	Pub. 249 & 229	11.5	Dec min.	11.9				a - Lat =	38° N
	a-Lat	38	N	S	N	Hc	73°	37.4						a - Lon =	122° 21.9' W
<b>5</b>	tab Hc	73°	25.9	d +-	58.1	Z	159.2								
	d corr.	Pub. 249 & 229	11.5	Dec min.	11.9										
<b>6</b>	Hc	73°	37.4												

These two LOPs form a fix at 39° 5.6'N, 132° 30.0'W

**Sight Time****a-Lat****a-Lon****a-Value****Zn**

1 1:00:00

38

 N  
 S

122.111

 E  
 W

480.7

 A  T

110

2 1:00:00

38

 N  
 S

122.219

 E  
 W

77.4

 A  T

197

**Course(T)**

0

**Speed(knots)**

0

Calculate Fix

39.056 N, 132.300 W

**Conventions**

Fix is calculated for time of second sighting.

Degrees are in 'DD.MMddd' convention

(12.345 = 12 degrees 34.5 minutes)

Time is on the 24 hour clock;

2:06:13pm = 14:06:13

time2 &gt; time1; seconds are optional

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Now use fix from last plot as new DR and complete the form again.



Celestial Navigation Work Form

Marine Education & Publications, Seattle, WA

Pub. 249 (Volumes 2 and 3) or Pub. 229 (All Volumes)

<b>1</b>	WT	11	h	02	m	2	s	date	10-Jul-1982	body	Sun L/L	Hs	49°	24.5		
	WE +S-F				m	00	s	DR Lat	39° 06' N	log	1066	index corr. + off, - on		00		
	ZD +W-E	+7						DR Lon	132° 30' W	HE ft	9	DIP	-	-2.9		
	GMT	18	h	02	m	2	s	GMT date / LOP label			C- 276	T	Ha	49°	21.6	
							Golden Gate 2 10-Jul-1982			S- 5.7	Kt					
<b>2</b>	GHA hr.	88	°	40.6	'	v moon planets	DEC hr	N22	°	12.7	'	d +-	-0.3	HP moon		
	GHA + m.s.	0	°	30.5	'	d corr.	+ -			0	'					
<b>3</b>	SHA + or v corr.	360	°	71.1	'	stars or moon, planets	DEC deg	N22	°	DEC min	12.7		additional altitude corr. moon, mars, venus altitude corr. all sights	+ +-	15.2	
	GHA	449	°	11.1	'	tens d	6.3	d upper					upper limb moon subtract 30'			
	a-Lon -W+E	132	°	11.1	'	units d	0.8	d lower					Ho	T	49°	36.8
	LHA	317	°	00' W/60' E		dsd corr.	+	dsd					Hc	A	49°	49.4
						d corr.	Pub. 229	7.1							a =	12.6 A
<b>4</b>	LHA	316				tab Hc	49°	42.3	d +-	34.0	Z	102.1			Zn =	102.1
	Dec deg	22	N	N		d corr.	Pub. 249 & 229	7.1	Dec min.	12.7					a - Lat =	39° N
	a-Lat	39	N	N		Hc	49°	49.4							a - Lon =	132° 11.1' W
<b>5</b>																
<b>6</b>																

L.H.A. greater than 180 ..... Zn = Z  
L.H.A. less than 180 ..... Zn = 360 - Z

L.H.A. greater than 180 ..... Zn = 180 - Z  
L.H.A. less than 180 ..... Zn = 180 + Z

<b>1</b>	WT	13	h	34	m	46	s	date	10-Jul-1982	body	Sun L/L	Hs	74°	42.0		
	WE +S-F				m	00	s	DR Lat	39° 06' N	log	1082	index corr. + off, - on		0		
	ZD +W-E	+7						DR Lon	132° 30' W	HE ft	9	DIP	-	-2.9		
	GMT	20	h	34	m	46	s	GMT date / LOP label			C- 276	T	Ha	74°	39.1	
							Golden Gate 2 10-Jul-1982			S- 5.7	Kt					
<b>2</b>	GHA hr.	118	°	40.4	'	v moon planets	DEC hr	N 22	°	12.1	'	d +-	- 0.3	HP moon		
	GHA + m.s.	8	°	41.5	'	d corr.	+ -			-0.2	'					
<b>3</b>	SHA + or v corr.	360	°	81.9	'	stars or moon, planets	DEC deg	N 22	°	DEC min	11.9		additional altitude corr. moon, mars, venus altitude corr. all sights	+ +-	+15.7	
	GHA	487	°	21.9	'	tens d	9.9	d upper					upper limb moon subtract 30'			
	a-Lon -W+E	132	°	21.9	'	units d	1.7	d lower					Ho	T	74°	54.8
	LHA	355	°	00' W/60' E		dsd corr.	+	dsd					Hc	A	72°	39.8
						d corr.	Pub. 229	11.6							a =	135.0' T
<b>4</b>	LHA	355				tab Hc	72°	28.2	d +-	58.4	Z	164.4			Zn =	164.4
	Dec deg	22	N	N		d corr.	Pub. 249 & 229	11.6	Dec min.	11.9					a - Lat =	39° N
	a-Lat	39	N	N		Hc	72°	39.8							a - Lon =	132° 21.9' W
<b>5</b>																
<b>6</b>																

this forms a fix at 36° 29.6'N, 133° 09.2' W but we still have one large a-value 135', so we have to do one more iteration.

## Sight Time

1 1:00:00

## a-Lat

39  N S

## a-Lon

132.111  E W

## a-Value

12.6  A  T

## Zn

102.1

2 1:00:00

39  N S132.219  E W135  A  T

164.4

## Course(T)

0

## Speed(knots)

0

Calculate Fix

36.296 N, 133.092 W

## Conventions

Fix is calculated for time of second sighting.

Degrees are in 'DD.MMddd' convention

(12.345 = 12 degrees 34.5 minutes)

Time is on the 24 hour clock;

2:06:13pm = 14:06:13

time2 > time1; seconds are optional

Now use fix from last plot as new DR and complete the form again.



Celestial Navigation Work Form

Marine Education & Publications, Seattle, WA

Pub. 249 (Volumes 2 and 3) or Pub. 229 (All Volumes)

1	WT	11	h	02	m	2	s	date	10-Jul-1982	body	Sun L/L	Hs	49°	24.5
	WE +S-F				m	00	s	DR Lat	36° 29.6' N	log	1066	index corr. + off, - on		00
	ZD +W-E	+7						DR Lon	133° 09.2' W	HE ft	9	DIP	-	-2.9
	GMT	18	h	02	m	2	s	GMT date / LOP label	Golden Gate 3 10-Jul-1982	C- S-	276 5.7	T Kt	Ha	49°

2	GHA hr.	88	°	40.6	'	v moon planets	DEC hr	N22	°	12.7	'	d +-	-0.3	HP moon
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3	GHA + m.s.	0	°	30.5	'		d corr.	+ -		0	'	additional altitude corr. moon, mars, venus		
	SHA + or v corr.	360	°		'	stars or moon, planets	DEC deg	N22	°	DEC min	12.7	'	altitude corr. all sights	

4	GHA	449	°	11.1	'		tens d	4.2	d upper			upper limb moon subtract 30'			
	a-Lon -W+E	133	°	11.1	'		units d	2.1	d lower			Ho	T	49°	36.8
	LHA	316	°	00' W/60' E			dsd corr.	+	dsd			Hc	A	49°	32.9
	LHA	316	°				d corr.	Pub. 229	6.3						a =

5	tab Hc	49	°	26.6	'	d +-	29.7	Z	97.9						
	d corr.	Pub. 249 & 229	6.3	DEC min.	12.7										
	Hc	49	°	32.9	'										

6	a - Lat =	36° N													
	a - Lon =	133° 11.1' W													

L.H.A. greater than 180 ..... Zn = Z

L.H.A. less than 180 ..... Zn = 360 - Z

L.H.A. greater than 180 ..... Zn = 180 - Z

L.H.A. less than 180 ..... Zn = 180 + Z

We used a -0.3 Zn correction. See Pub 229 instructions.

1	WT	13	h	34	m	46	s	date	10-Jul-1982	body	Sun L/L	Hs	74°	42.0
	WE +S-F				m	00	s	DR Lat	36° 29.6' N	log	1082	index corr. + off, - on		0
	ZD +W-E	+7						DR Lon	133° 9.2' W	HE ft	9	DIP	-	-2.9
	GMT	20	h	34	m	46	s	GMT date / LOP label	Golden Gate 3 10-Jul-1982	C- S-	276 5.7	T Kt	Ha	74°

2	GHA hr.	118	°	40.4	'	v moon planets	DEC hr	N 22	°	12.1	'	d +-	- 0.3	HP moon
---	------------	-----	---	------	---	----------------------	-----------	------	---	------	---	---------	-------	------------

3	GHA + m.s.	8	°	41.5	'		d corr.	+ -		-0.2	'	additional altitude corr. moon, mars, venus		
	SHA + or v corr.	360	°		'	stars or moon, planets	DEC deg	N 22	°	DEC min	11.9	'	altitude corr. all sights	

4	GHA	487	°	21.9	'		tens d	9.9	d upper			upper limb moon subtract 30'			
	a-Lon -W+E	133	°	21.9	'		units d	1.3	d lower			Ho	T	74°	54.8
	LHA	354	°	00' W/60' E			dsd corr.	+	dsd			Hc	A	75°	14.7
	LHA	354	°				d corr.	Pub. 229	11.2						a =

5	tab Hc	75	°	03.5	'	d +-	56.4	Z	157.9						
	d corr.	Pub. 249 & 229	11.2	DEC min.	11.9										
	Hc	75	°	14.7	'										

6	a - Lat =	36° N													
	a - Lon =	133° 21.9' W													

We have all small lines now, and this forms a fix at 36° 28.3' N, 133° 01.6' W, which is our true position, so it took 3 iterations using a DR that was about 500 miles wrong.

https://www.starpath.com/cgi-bin/web\_card/lop\_plot\_checker.pl

	Sight Time	a-Lat	a-Lon	a-Value	Zn
1	<input type="text" value="1:00:00"/>	<input type="text" value="36"/> <input checked="" type="radio"/> N <input type="radio"/> S	<input type="text" value="133.111"/> <input type="radio"/> E <input checked="" type="radio"/> W	<input type="text" value="3.9"/> <input type="radio"/> A <input checked="" type="radio"/> T	<input type="text" value="97.6"/>
2	<input type="text" value="1:00:00"/>	<input type="text" value="36"/> <input checked="" type="radio"/> N <input type="radio"/> S	<input type="text" value="133.219"/> <input type="radio"/> E <input checked="" type="radio"/> W	<input type="text" value="19.9"/> <input checked="" type="radio"/> A <input type="radio"/> T	<input type="text" value="157.6"/>
	<b>Course(T)</b> <input type="text" value="0"/>	<b>Speed(knots)</b> <input type="text" value="0"/>	<input type="button" value="Calculate Fix"/> <input type="text" value="36.283 N, 133.016 W"/>		

### Conventions

Fix is calculated for time of second sighting.

Degrees are in 'DD.MMddd' convention

(12.345 = 12 degrees 34.5 minutes)

Time is on the 24 hour clock;

2:06:13pm = 14:06:13

time2 > time1; seconds are optional

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