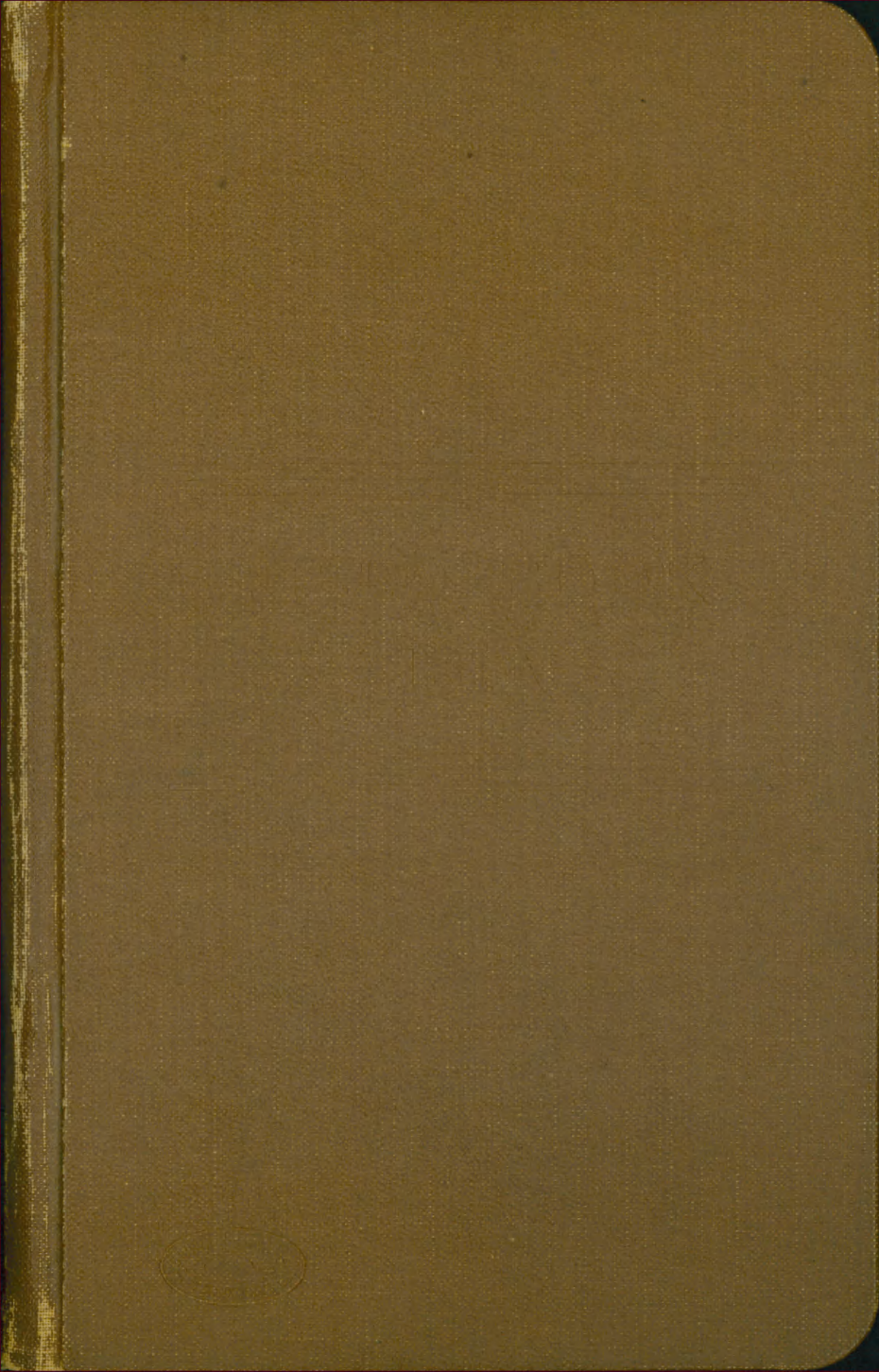
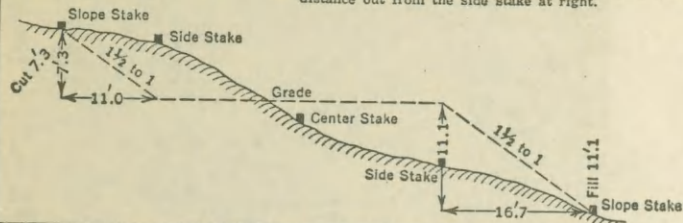




DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

1950-51

Date	Dimensions	Cords	Destination
Dec 27 to Feb 1 incl		204.29	Dawson Plant.
Feb 6	4.0 x 8.0 x 16	4.0	B.C. Mess Hse
8	4.0 x 8.0 x 16	4.0	#4 Mess
9	3.6 x 8.0 x 16	3.6	#4 Mess
	4.0 x 8.0 x 16	4.0	B.C. Mess
10	4.5 x 8.0 x 16	4.5	- -
11	4.0 x 8.0 x 16	4.0	- -
12	4.0 x 8.0 x 16	4.0	- -
	5.2 x 8.0 x 14	4.55	#4 Dredge
	4.0 x 8.0 x 16	4.0	#4 Mess
13	5.2 x 8.0 x 14	4.55	#4 Dredge
	4.0 x 8.0 x 16	4.0	B.C. Mess
	4.0 x 8.0 x 16	4.0	#4 Mess
	5.3 x 8.0 x 14	4.64	#4 Dredge
14	5.3 x 8.0 x 14	4.64	- -
	3.7 x 8.0 x 16	3.70	B.C. Mess
	5.35 x 8.0 x 14	4.68	#4 Dredge
	4.0 x 8.0 x 16	4.0	#4 Mess
15	4.0 x 8.0 x 16	4.0	B.C. Mess
	5.9 x 8.0 x 14	5.16	#4 Dredge
	4.0 x 8.0 x 16	4.0	#4 Mess
	5.3 x 8.0 x 14	4.64	#4 Dredge
End.		292.95	

①

Contractor	Hauled by	Measured by
Morgan	Morgan	Warner
✓	✓	Barrett
✓	(Fraser)	Creamer
✓	- -	Comfort
✓	✓ -	Harding
✓	- -	Barrett
✓	- -	Harding
✓	- -	Creamer
✓	(Morgan)	✓
✓	(Fraser)	Harding
✓	(Morgan)	✓
✓	(Fraser)	✓
✓	- -	✓
✓	- M	✓
✓	- -	Creamer
✓	✓ F	-
✓	✓ M	Harding
✓	✓ F	-
✓	✓ F	Creamer
✓	✓ M	Harding
✓	✓ F	✓
✓	✓ M	✓

1950-51

Date	Dimensions	Cords	Destination
Forward		292.95	
Feb 16	5.3 x 8 x 14	4.64	#4 Dredge
	✓ 4.0 x 8 x 16	4.00	B.C. Mess
	✓ 4.0 x 8 x 16	4.00	#4 Mess
	✓ 5.35 x 8 x 14	4.68	#4 Dredge
17	5.35 x 8 x 14	4.68	-
	✓ 5.47 x 8 x 14	4.78	-
	✓ 4.0 x 8 x 16	4.0	#4 Mess
18	5.3 x 8 x 14	4.64	#4 Wood Yd.
	✓ 4.0 x 8 x 16	4.00	#11 Camp
	✓ 5.3 x 8 x 14	4.64	#4 Wood Yd.
	✓ 4.0 x 8 x 16	4.00	B.C. Wood Yd.
19	3.7 x 8 x 16	3.70	#11 Camp
	✓ 4.0 x 8 x 16	4.00	B.C. Wd Yd.
	✓ 5.2 x 8 x 14	4.55	#4 Wd. Yd.
20	5.7 x 8 x 14	4.99	-
	✓ 4.0 x 8 x 16	4.00	B.C. Wd. Yd.
	✓ 5.6 x 8 x 14	4.90	#10 Camp
22	5.6 x 8 x 14	4.90	-
	✓ 4.0 x 8 x 16	4.00	✓
23	5.5 x 8 x 14	4.81	-
	✓ 4.0 x 8 x 16	4.00	B.C. Wood Yd.
	✓ 4.5 x 8 x 16	4.50	#10 Camp
	✓ 5.6 x 8 x 14	4.90	✓
Forward		394.26	

Contractor	Hauled by	Measured by
Morgan	Morgan	M. Creamer
✓	-	F ✓
✓	-	F Harding
✓	-	M ✓
✓	-	M ✓
-	-	M Barrett
-	-	F Creamer
✓	-	M ✓
✓	-	F ✓
✓	-	M ✓
✓	-	F ✓
✓	✓	F ✓
✓	-	F Harding
✓	-	M Creamer
✓	-	M ✓
✓	✓	F ✓
✓	-	M Harding
✓	✓	M Creamer
✓	-	F ✓
✓	-	M ✓
✓	✓	F ✓
✓	-	F Harding
✓	-	M ✓

1950-51

Date	Dimensions	Cords	Destination
Forward		394.26	
Feb 15 th - 21 st	21' x 4' x 7.9'	52.34	Dredge #3
Feb 24	4' x 8' x 16'	4.00	#11 Camp
✓	5.5' x 8' x 14'	4.81	#10 Camp
✓	4.0' x 8' x 16'	4.00	#11 Camp
✓	5.5' x 8' x 14'	4.81	#4 Wood Vd
✓	4.0' x 8' x 16'	4.00	#11 Camp
25	4.0' x 8' x 16'	4.00	- -
✓	3.8' x 8' x 16'	3.80	- -
✓	5.5' x 8' x 14'	4.81	#4 Camp
26	4.0' x 8' x 16'	4.00	#11
✓	5.3' x 8' x 14'	4.64	#4 Wd. Vd.
✓	5.6' x 8' x 14'	4.90	- -
✓	5.1' x 8' x 13'	4.14	- -
27	5.4' x 8' x 14'	4.72	- -
✓	5.0' x 8' x 13'	4.06	- -
✓	5.6' x 8' x 14'	4.90	- -
✓	5.1' x 8' x 13'	4.14	- -
28	5.5' x 8' x 14'	4.81	- -
✓	5.0' x 8' x 13'	4.06	- -
✓	5.5' x 8' x 14'	4.81	- -
✓	5.0' x 8' x 13'	4.06	- -
Mar 1	5.2' x 8' x 14'	4.55	- -
✓	4.8' x 8' x 13'	3.90	- -
End		542.52	

(3)

Contractor	Hauled by	Measured by
Morgan	Night Shift	Creamer + Harding
✓	Fraser	Creamer
✓	M	-
✓	F	✓
✓	M	✓
✓	F	✓
✓	F	-
✓	F	-
✓	M	Barrett
✓	F	Creamer
✓	M	✓
✓	M	Harding
✓	F	-
✓	M	Creamer
✓	F	✓
✓	M	Harding
✓	F	✓
✓	M	Creamer
✓	F	✓
✓	M	Harding
✓	F	-
✓	M	Creamer
✓	F	✓

1950-51

Date	Dimensions	Cords	Destination
End		542.52	
Mar 1	5.6 x 8 x 14	4.90	#4 Wood Yd
	✓ 4.9 x 8 x 13	4.00	✓
✓ 1	5.3 x 8 x 14	4.64	✓
	4.9 x 8 x 13	3.98	✓
Total =		560.04	

(4)

Contractor	Hauled by	Missured by
Morgan	M	Harding
✓	F	✓
✓	M	Creamer
✓	F	✓

95.79

[illegible]

19.52 Wood (4')

Date	Dimensions	Cords	Destination
Feb 11	8x14x5.0	4.37	#11 Camp
	8x14x5.1	4.46	✓
	8x13x5.4	4.38	✓
	8x14x5.2	4.55	✓
	8x13x5.0	4.06	✓
12	8x14x5.1	4.46	✓
	8x13x5.0	4.06	✓
	8x14x5.1	4.46	Or #11
	8x13x5.0	4.06	✓
	8x14x5.0	4.37	✓
	8x13x5.0	4.06	✓
13	8x14x4.8	4.20	✓
	8x13x5.4	4.38	✓
	8x14x5.0	4.37	#11 Wood Yd
	8x13x5.0	4.06	✓
14	8x13x5.3	4.30	✓
	8x13x5.2	4.22	✓
15	8x13x5.2	4.22	#10 Camp
	8x13x5.2	4.22	✓
16	8x14x4.9	4.29	#6 Camp
	8x13x5.0	4.06	✓
17	8x14x5.0	4.37	✓
	8x14x4.9	4.29	✓
		98.27	

98.27

①

[illegible]

1952 Wood (H')

Date	Dimensions	Cords	Destination
Feb 21	8x13x5.2	4.22	#6 Camp
	8x13x5.2	4.22	✓
22	8x14x5.0	4.37	✓
	8x14x5.1	4.46	✓
27	4x200x7.6	47.50	Dr #4
	8x13x5.0	4.06	✓
	8x14x5.1	4.46	✓
	8x13x5.0	4.06	✓
28	8x14x5.2	4.55	✓
	8x13x4.8	3.90	✓
29	8x13x5.0	4.06	#8 Camp
	8x13x5.0	4.06	✓
	8x18x6.5	7.31	✓
Mar 1	8x13x5.1	4.14	Dr #3
	8x14x5.0	4.37	✓
2	8x13x5.0	4.06	#11 Wood Yd
	8x14x5.2	4.55	✓
	8x14x5.1	4.46	✓
3	8x14x5.1	4.46	✓
	8x13x5.0	4.06	✓
4	8x14x4.9	4.29	Dr #3
	8x13x5.0	4.06	✓
	8x13x5.1	4.14	#11 Wood Yd
5	8x13x5.0	4.06	✓

147.88

341.94

(2)

Contractor	Hauled by	Measured by
Morgan	Morgan	Creamer
✓	✓	✓
✓	✓	✓
(by gangplank)	✓	✓
(Behind Boat)	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓

These x/loads measured on 5/19/6 -
came in during night

1 load to Creamer 4.7x8x13.3.82

1 ✓ ✓ ✓ 4.8x8x13-3.90

1952 Wood (4')

Date	Dimensions	Cords	Destination	Contractor
Feb 13 to x		56.46	Davison Plant	Morgan
Fwd from page 5		95.79		
" " 6		98.27		
" " 7		147.88		
Total 4' Wood = 398.40 Cords.				

16' Wood

Mar 14/52	4.0 x 8 x 16	4.00	B.C. Wood M.	
"	4.0 x 8 x 16	4.00	✓	
" 13	4.0 x 8 x 16	4.00	✓	
"	3.5 x 8 x 16	3.50	✓	
" 14	4.0 x 8 x 16	4.00	✓	
"	3.85 x 8 x 16	3.85	✓	
" 15	3.92 x 8 x 16	3.92	✓	
"	4.0 x 8 x 16	4.00	✓	
"	3.7 x 8 x 16	3.70	✓	
" 16	3.7 x 8 x 16	3.70	✓	
"	3.8 x 8 x 16	3.80	✓	
" 17	4.0 x 8 x 16	4.00	✓	
"	3.7 x 8 x 16	3.70	✓	
"	4.0 x 8 x 16	4.00	✓	
" 18	3.97 x 8 x 16	3.97	✓	
"	3.85 x 8 x 16	3.85	✓	
Fwd -		61.99		

Contractor
Morgan

Morgan

Some 20' sticks in this load

1952 - 16' Wood

6278

Date	Dimensions	Cords	Destination
Mar 20	3.85 x 8 x 16	3.85	B.C. Wood Yd.
✓	3.87 x 8 x 16	3.87	✓
✓	3.90 x 8 x 16	3.90	✓
✓	4.42 x 8 x 16	4.42	✓
✓	4.0 x 8 x 16	4.00	✓
✓	3.75 x 8 x 16	3.75	✓
✓	3.85 x 8 x 16	3.85	✓
✓	3.82 x 8 x 16	3.82	✓
✓	3.83 x 8 x 16	3.83	✓
✓	3.75 x 8 x 16	3.75	✓
✓	3.93 x 8 x 16	3.93	✓
✓	3.85 x 8 x 16	3.85	✓
✓	3.70 x 8 x 16	3.70	✓
✓	4.00 x 8 x 16	4.00	✓
✓	4.20 x 8 x 16	4.20	✓
✓	3.60 x 9 x 16	4.04	✓
✓	3.85 x 8 x 16	3.85	✓
		66.61	
	Fwd	61.99	
	Total	128.60	

Contractor

Morgan

Last Delivery

1953 Wood - (Nelson -

Date	Dimensions	Cords	Destination
------	------------	-------	-------------

O'Neil-Johnson)

Contractor Hauled by Measured by

Coal Deliveries by Cole Bros

Date	Tons	Destination
Oct 9	16.0	N ^o 4 Camp
10	6.5	Machine Shop
11	15.0	N ^o 4 Camp
16	17.0	N ^o 4 ✓
20	16.0	N ^o 4 ✓
70.5		Turned into the Acct Office Nov 1-57

Jan 13 ¹⁹⁵⁸	✓ 13.0	Machine Shop - 1644
21	✓ 15.0	N ^o 4 Camp - 1651
24	✓ 15.0	✓ ✓ - 1654
28	✓ 15.0	✓ ✓ - 1657
29	✓ 15.0	✓ ✓ - 1659
30	✓ 15.0	✓ ✓ - 1662

Feb 5	✓ 15.0	N ^o 4 Camp - 1663
7	✓ 16.0	✓ - 1665
10	✓ 15.0	N ^o 11 ✓ - 1667
14	✓ 15.0	✓ - 1669
25	✓ 15.0	✓ - 1671

Mar 3	✓ 17.0	Bear Cr. - 1672
10	✓ 16.0	N ^o 11 Camp - 1677
17	✓ 15.0	Bear Cr. - 1679
19	✓ 15.0	✓ - 1680
21	✓ 17.0	N ^o 11 Camp - 1681
Total = 244.0		

1957-1958

Driver
H. R. Campbell

→ Chgd to Machine Shop direct
Turned into Acct. Office
Feb 6-58

All Coal chgd to N^o 4 Feb 58 -
Turned into Acct. Office March 58
212000 #

Turned into Acct. Office March 25-58

1957 -	70.5 tons
1958 -	244.0 ✓
Total =	314.5 ✓

Coal Deliveries by Gauthier

Date	Tons	Destination	No
Feb 7	4.73	Machine Shop	—
10	8.10	✓	—
Mar 12	8.00	B.C. Mass	—
Apr 25	8.00	✓ —	✓

1959

Driver

Gauthier } Turned in to Post Office
Feb 24-59

McDiarmid }
Gauthier } Turned into Post Office
Apr 25-59

Dimensions

 $5 \times 8 \times 16$

= ✓ CDS.

Cont.

6.23

6.30

✓. 90

6.70

6.60

6.10

6.20

6. 2w-

50.28

12. # 9

Company - Miller

Wld. Cutter

Wood Hauler

Tyner

Gutierrez

/

1

1

—

7

1

✓

✓

✓

✓

✓

2

✓

1

1

—

1

1

1

10

1

Dawson

Mayo, Y. T.,

Feb 7

19

M

X. C. G. C.

Dawson

1st Load

In Account With

R. GAUTHIER

Wood & Timber Dealer

4.73 tons Bulk Coal

Delivered to Machine Shop

Received by

Robinson

Dawson
Mayo, Y. T., Feb 10, 1919

M J. C. G. C.

Dawson

In Account With

R. GAUTHIER

Wood & Timber Dealer

2nd load

8.10 Tons Coal - Bulk

Delivered to Machine Shop

Received by

Robinson

Dawson

Mayo, Y. T.,

March 11

19

M

Y. C. G. C.

Dawson

In Account With

3rd load

R. GAUTHIER

Wood & Timber Dealer

8:00 Tons Bulk Coal

B. C. Mess House

Received by

P. L. Sumner

Mayo, Y. T., Apr 25, 1919

M Y. C. G. C.

Dawson Y.T.

In Account With

4th load.

R. GAUTHIER

Wood & Timber Dealer

8:00 Tons Bulk Coal

B. C. Mass House

Received by

P. L. Lamm

Coal from Gauthier - Feb 9 - 59

$$7 \times 2.9 \times 8 = 162.4 \text{ Cu Ft}$$

$$4 \times 1.5 \times 8 = \frac{48}{210.4 \times 45^{\frac{4}{5}}} = \frac{9468}{2000}$$

1st load

= 4.73 Tons

Delivered to Machine Shop

Feb 10 - 59

$$\frac{15 \times 8 \times 3 \times 45^{\frac{4}{5}}}{2000} = \underline{8.10} \text{ tons} \quad \text{2nd load}$$

Delivered to Machine Shop

Mar 12 - 59

$$\frac{15 \times 8 \times 2.95 \times 45}{2000} = 8.00 \text{ tons} \quad \text{3rd load}$$

B.C. Mass

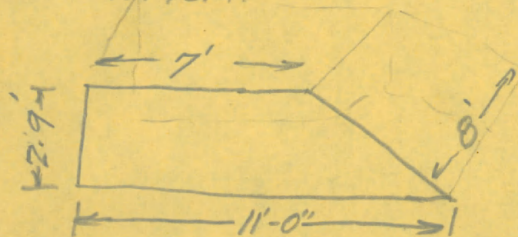
Apr 25 - 59 4th Load

8.00 Tons

B.C. Mass

7 x 2'9" solid x 8' wide

11' on bottom



Feb 7-59

Del. to H.S.

Hauled by Gauthier

THE YUKON CONSOLIDATED GOLD CORPORATION, LIMITED

INTER - OFFICE MEMO.

To: Phil Creamer

Date, January 4, 1957.

From: C. Gloslie

Subject: Coal.

What do you think of this?

During the Winter Distribute Coal as follows:

⑦		No. 4 Camp	7	loads (about 15 tons each)	105 tons	- 106 Tons - 2-7-58
⑤		No. 11 Camp	5	" (" " " ")	75 "	
④		Bear Creek	3	" (" " " ")	45 "	- 13 Tons M.S. 1-13-58
		Dawson Plant	2	" (" " " ")	30 "	

Total

255 Tons

70
325

2000

315030

(157.5)

2000

11503

10000

15030

14000

10300

Tyner's 4' Wood cut at N. F.
1959 - Gillespie Hauler

Oct 22 -	6.63 cds.	to Dr #4	} chad Nov 59
24 -	6.83 -	✓	
Nov 2 -	6.43 -	✓	
7 -	7.08 -	✓	
Total -		26.97 -	

Nov 3 -	5.78 cds	to Dr #11	} chg Nov 59
3 -	5.17 -	✓	
4 -	6.40 -	-	
Total -		17.35	

Dec 2 -	6.23 cds	to B.C. Camp	} chad Dec 1959
2 -	6.30 -	✓	
3 -	5.90 -	✓	
3 -	6.70 -	✓	
4 -	6.60 -	✓	
4 -	6.10 -	✓	
5 -	6.20 -	✓	
5 -	6.25 ✓	✓	
Total		50.28	

SHIPPING BILL

Date Jan / 58

Shipped via Vehicle No.

Shipped by Harvey Pelland

Deliver at ✓ ✓ Bonanza ✓

✓ 20.7

$$\frac{5.2 \times 8 \times 13}{128} = 4.23 \text{ cords}$$

1st Load

Received by

Driver Harvie Pelland

Received by
R. Mc Laren

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

No. 3419 A

SHIPPING BILL

Date Jan 30/58

For #4 Camp

Shipped via Vehicle No.

Charge to L L

Shipped by Harvey Pelland

Deliver at L L Bonanza

PIECES	ITEM	WEIGHT
5.2	13' ft	
5.5		
5.4		
5.2		
4 x 1.3		
$5.3 \times 8 \times 13 = 4.3 \times 65$		
148		
2nd Load		
TOTAL		

Driver

Harvey Pelland

Received by

R. E. Lavin

SHIPPING BILL

Date Feb 3 1958

Shipped via Vehicle No.

Shipped by Harvey Pelland

Deliver at ✓ ✓ Bonanza

Driver

Received by

Driver
Harri Pelland

Received by
R. Mc Laren

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

No 3421 A

SHIPPING BILL

Date Feb 4 1958

For #4 Camp

Shipped via Vehicle No.

Charge to

Shipped by Harvie Pelland

Deliver at Bonanza

PIECES	ITEM	WEIGHT
5.3	13' Bark	
5.3		
5.3		
5.4		
17.3		
$5.3 \times 8 \times 13 = 4.3 \times \text{Cords}$ 1×8		
4th load		
TOTAL		

Driver

Received by

Harvie Pelland

R. McLaren

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

No 3422 A

SHIPPING BILL

Date Feb 1/38

For #4 Camp

Shipped via Vehicle No.

Charge to 2

Shipped by Harvie Pelland

Deliver at 2 2 Bonanza

PIECES	ITEM	WEIGHT
5.3	13 ft	4.23 cdo
5.2		4.32 ✓
5.2		4.27 ✓
5.3		4.32 ✓
4.10		4.27 ✓
$5.25 \times 8 \times 13 = 4.27 \text{ Cords}$ 128		Total = 21.41 ✓
		Avg = 4.28 cds. per load
		5th Load
TOTAL		

Driver

Received by

Harvie Pelland

R. McFarlane

SHIPPING BILL

Date

Shipped via Vehicle No.

Shipped by

Charge to

Delivered at

WEIGHT

ITEM

PIECES

1/2-1/2 Camp

#4 Camp
21.41 cds.

TOTAL

Received by

Driver

Coal Deliveries up to and
including Oct 31-57

N: 4 Camp - 64 Tons

Machine Shop - 6.5 ✓

Total 70.5 ✓

Delivered by Cole Bros.

THE YUKON CONSOLIDATED GOLD CORPORATION, LIMITED

INTER - OFFICE MEMO

To: MR. A. BAIRD

Date: Nov 1 1957

From: ENG. DEPT

Subject: COAL DELIVERIES.

THE FOLLOWING COAL HAS BEEN DELIVERED AS
FOLLOWS UP TO AND INCLUDING OCT. 31ST 1957.

NO 4 CAMP	-	64 TONS
MACHINE SHOP	-	6.5 TONS
TOTAL		70.5 TONS

DELIVERED BY COLE BROS.

C.C. MR. C. GLOSLIE.

A. G. Baird

3136✓

139✓

34970

15

400

1000

120

15

600

120

1800

6

11.1

3/90

90

972✓

2790

693✓

11340

279

8550

Dr H11 Time Book

4 TRIPS - 1 @ 1⁴³
1 @ 1³⁸
2 @ 1²³ { 1 hr plus load
Total 4 hrs

loc in stock salt 2 hrs.

THE YUKON CONSOLIDATED GOLD CORPORATION, LIMITED

INTER - OFFICE MEMO

To: J. J. SMITH

Date: APRIL 25 1959

From: ENG DEPT

Subject: COAL DELIVERIES

THE FOLLOWING COAL HAS BEEN DELIVERED TO THE
BEAR CREEK MESS BY MR. R. GAUTHIER

MARCH 11th 1959 - 8.00 TONS

APRIL 25 1959 - 8.00 ✓

TOTAL - 16.00 TONS

CC - P. H. KAVANAGH.

A. G. Barrett

SHIPPING BILL

Date. March 4-08

Shipped via Vehicle No.

Shipped by H. Pelland

Deliver at

Driver Harvie Pelland

Received by Blumer

SHIPPING BILL

Date 17 March 1950

Shipped via Vehicle, No.

Shipped by W. T. Telford

Deliver at

Driver Ken Moore

Received by Robinson

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

No 3344 A

SHIPPING BILL

Date March 5-18

For Bear Cr. Camp

Shipped via Vehicle No. _____

Charge to _____

Shipped by H. Pelland

Deliver at _____

PIECES	ITEM	WEIGHT
	5.1	
	5.6	
	5.4	
	5.5	
	5.6	
	5.5	
6	33.1	
	5.51 x 8 x 13 = 5.51 cds	
	5.3	
	5.5	
	5.3	
	5.4	
	5.4	
	5.4 x 8 x 13 = 4.39 cds	
	5.4	
6	33.4	
	TOTAL	

This load to be charged to
B.C. Bank Use & cut to 24"

Driver

Received by

Harvie Pelland

Pelland

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

Nº 9648 A

SHIPPING BILL

Date Mar 8-18

For B.C. Camp

Shipped via Vehicle No. _____

Charge to _____

Shipped by J. Pelland

Deliver at _____

PIECES	ITEM	WEIGHT
	<u>5.5 Cds. 16' Wood</u>	
	TOTAL	

Driver Harvie Pelland

Received by Pelland

SHIPPING BILL

Date March 3-58

Shipped via Vehicle No.

Shipped by H. Pelland

Deliver at

Driver

Received by

Harriet Pelland

y *Chen*

A 3341 No

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

SHIPPING BILL

Date

Shipped via Pacific No

Shipped by

For

Charge to

Deliver at

WEIGHT

ITEM

PRICE

Bear Cr. Camp
24.60 cts
5.50
30.10 ✓
X

TOTAL

Received by

Driver

SHIPPING BILL

Date March 10-20

For Mr. Dodge

Shipped via Vehicle No.

Charge to

Shipped by H. Pullman

Deliver at

Driver

Received by

Harriet Pelland

by *C. Odgaard*

Nº 3346 A

Date 11 / 1 / 1950

Shipped via Vehicle No.

Shipped by Harvey Kellam

PIECES	ITEM	WEIGHT
	5-	
	5-2	
	5-3	
	5-5	
	5-2	
	5-3	
631	.5 16' long on truck	
	5.25 x 8 x 16 = 5.25 cords 178	
	TOTAL	

Driver

Received by

Harriet Belland

Received by J. D. Shepard

Nº 3347 A

SHIPPING BILL

Date _____

For *Shipped via Vehicle No.*

Charge to " " " " Shipped by H. Volland

Deliver at

PIECES	ITEM	WEIGHT
	~~5' - 5'~~	
	~~5' - 7'~~	
	5' - 2'	
	5' - 1'	
	5' - 5'	
	5' - 3'	
	5' - 4'	
	5' - 5'	
	16' ft. long	
	6 32.0	
	5.33 x 8 x 16 = 5.33	
	1.78 Cords.	
	TOTAL	

Driver

Received by

THE YUKON CONSOLIDATED GOLD CORPORATION
LIMITED

No 3348 A

SHIPPING BILL

Date *Mich. 11-1958*

For *#1 Rudge*

Shipped via Vehicle No.

Charge to *..... / Hunter Co.*

Shipped by *H. Pelland*

Deliver at *..... / Hunter Co.*

PIECES	ITEM	WEIGHT
	5'-3'	
	5'-2'	
	5'-6'	
	5'-4'	
	5'-2'	
	5'-6'	
6	32 3/16' ft. long	
	5.38 x 8 x 16 = 5.38 Cords	
	148	
	TOTAL	

Driver

Harvi Pelland

Received by

H. Pelland

SHIPPING BILL

Date March 13, 20

For Wm. H. Hunker Shipped via Vehicle No. 11
Charge to Wm. H. Hunker Shipped by H. C. Cland
Deliver at Wm. H. Hunker

Driver

Received by

No 3349 A

THE YUKON CONSOLIDATED GOLD CORPORATION

LIMITED

SHIPPING BILL

Date

Shipped via

Shipped by

Delivered at

WEIGHT

ITEM

PIECES

Dr #11
27.27 Cords.

TOTAL

Received by

Driver

SHIPPING BILL

Nº 3339 A

Date 1-10-21

For 2-11 Camp

Shipped via Vehicle No.

Charge to

Shipped by A. Pelland

Deliver at

PIECES	ITEM	WEIGHT
✓ 5.4		
✓ .3		
✓ .2		
✓ .3		
✓ .3		
✓ .4		
6 (319	X 8 X 13 = 4.32 cts.	
✓ .31		
TOTAL		

Driver

Received by

SHIPPING BILL

Nº 3338 A

Date Feb 20/50

For # 11 Camp

Shipped via Vehicle No.

Charge to

Shipped by H. Pelland

Deliver at 8/25

PIECES	ITEM	WEIGHT
	5.5	
	5.3	
	5.4	
	5.3	
	8' x 13' = 4.37 ads.	
	TOTAL	

Driver

Received by

SHIPPING BILL

Nº 3337 A

Date Feb 17/58

For # 11 Camp

Shipped via Vehicle No.

Charge to

Shipped by H. Pellond.

Deliver at

[illegible]

Driver

Received by

Nº 3336 A

Date. Feb 14 - 1908

For H^o 11 Camp

Shipped via Vehicle No.

Charge to

Shipped by H. Pelland

Deliver at

Driver Harve Pelland

Received by P. Bremer

Nº 3340 A

Date Feb 22-18

Shipped via Vehicle No.

Shipped by H. Pelland

Deliver at

$\frac{1}{4} \times 8 \times 13 = 4.35 \text{ gds.}$

Received by

Driver Harvie Pelland

Received by *P. Schuman*

No 3340

THE YUKON CONSOLIDATED GOLD CORPORATION

LIMITED

SHIPPING BILL

31

Date

Shipped via Vehicle No.

Shipped by

For

Charge to

Delivery of

WEIGHT

ITEM

PIECES

11/11 Camp
21.57 lbs

TOTAL

Received by

Driver

CURVE TABLES.

HOW TO USE CURVE TABLES.

Table I. contains Tangents and External to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.
 To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.
 To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.
 To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20' to the R. at Station 542+72.

Ext. in Tab. I opposite 23° 20' = 120.87
 $120.87 \div 12 = 10.07$. Say a 10° Curve.

Tan. in Tab. I opp. 23° 20' = 118.31
 $118.31 \div 10 = 11.831$.

Correction for A. 23° 20' for a 10° Cur. = 0.16
 $11.831 + 0.16 = 11.991$ = corrected Tangent.

(If corrected Ext. is required find in same way)
 Ang. 23° 20' = 23.33° $\div 10 = 2.3333$ = L. C.

2° 19½' = def. for sta.	542	I. P. = sta.	542+72
4° 49½' = " " "	+50	Tan. =	11.991
7° 19½' = " " "	543	B. C. = sta.	541+53.53
9° 49½' = " " "	+50	L. C. =	2 × 33.33
11° 40' = " " "	543+	E. C. = Sta.	543+86.86
	86.86		

$100 - 53.53 = 46.47 \times 3' \text{ (def. for 1 ft. of } 10^\circ \text{ Cur.)} = 139.41' =$

2° 19½' = def. for sta. 542.

Def. for 50 ft. = 2° 30' for a 10° Curve.

Def. for 36.86 ft. = 1° 50½' for a 10° Curve.

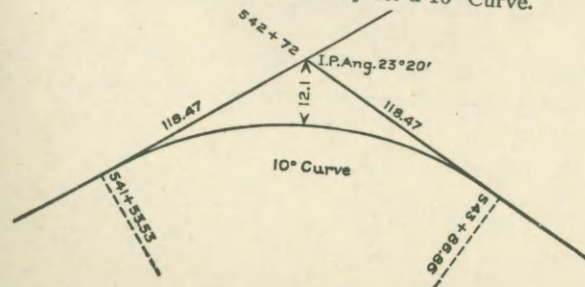


TABLE I. — Tangents and Externals to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
1°	50.00	.22	8°	400.66	13.99	15°	754.32	49.44
10'	58.34	.30	10'	409.03	14.58	20'	762.80	50.55
20'	66.67	.39	20'	417.41	15.18	30'	771.29	51.68
30'	75.01	.49	30'	425.79	15.80	40'	779.77	52.82
40'	83.34	.61	40'	434.17	16.43	50'	788.26	53.97
50'	91.68	.73	50'	442.55	17.07		796.75	55.13
2	100.01	.87	9	450.93	17.72	16	805.25	56.31
10	108.35	1.02	10	459.32	18.38	20	813.75	57.50
20	116.68	1.19	20	467.71	19.06	30	822.25	58.70
30	125.02	1.36	30	476.10	19.75	40	830.76	59.91
40	133.36	1.55	40	484.49	20.45	50	839.27	61.14
50	141.70	1.75	50	492.88	21.16		847.78	62.38
3	150.04	1.96	10	501.28	21.89	17	856.30	63.63
10	158.38	2.19	10	509.68	22.62	20	864.82	64.90
20	166.72	2.43	20	518.08	23.38	30	873.35	66.18
30	175.06	2.67	30	526.48	24.14	40	881.88	67.47
40	183.40	2.93	40	534.89	24.91	50	890.41	68.77
50	191.74	3.21	50	543.29	25.70		898.95	70.09
4	200.08	3.49	11	551.70	26.50	18	907.49	71.42
10	208.43	3.79	10	560.11	27.31	20	916.03	72.76
20	216.77	4.10	20	568.53	28.14	30	924.58	74.12
30	225.12	4.42	30	576.95	28.97	40	933.13	75.49
40	233.47	4.76	40	585.36	29.82	50	941.69	76.86
50	241.81	5.10	50	593.79	30.68		950.25	78.26
5	250.16	5.46	12	602.21	31.56	19	958.81	79.67
10	258.51	5.83	10	610.64	32.45	20	967.38	81.09
20	266.86	6.21	20	619.07	33.35	30	975.96	82.53
30	275.21	6.61	30	627.50	34.26	40	984.53	83.97
40	283.57	7.01	40	635.93	35.18	50	993.12	85.43
50	291.92	7.43	50	644.37	36.12		1001.7	86.90
6	300.28	7.88	13	652.81	37.07	20	1010.3	88.39
10	308.64	8.31	10	661.25	38.03	20	1018.9	89.89
20	316.99	8.76	20	669.70	39.01	30	1027.5	91.40
30	325.35	9.23	30	678.15	39.99	40	1036.1	92.92
40	333.71	9.71	40	686.60	40.99	50	1044.7	94.46
50	342.08	10.20	50	695.06	42.00		1053.3	96.01
7	350.44	10.71	14	703.51	43.03	21	1061.9	97.57
10	358.81	11.22	10	711.97	44.07	20	1070.6	99.16
20	367.17	11.75	20	720.44	45.12	30	1079.2	100.75
30	375.54	12.29	30	728.90	46.18	40	1087.8	102.35
40	383.91	12.85	40	737.37	47.25	50	1096.4	103.97
50	392.28	13.41	50	745.85	48.34		1105.1	105.60

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
5°	T=.02 E=.000	.03 .000	.05 .001	.06 .001	.08 .002	.10 .002	.11 .002	.13 .003	.15 .003	.16 .004	.18 .004	.20 .004	.21 .005	.23 .005
10°	T=.03 E=.001	.06 .003	.09 .004	.13 .006	.16 .007	.19 .009	.22 .009	.25 .011	.28 .012	.31 .014	.34 .015	.38 .017	.42 .018	.46 .020
15°	T=.04 E=.003	.10 .007	.14 .010	.19 .014	.24 .018	.29 .023	.34 .027	.39 .032	.45 .037	.51 .043	.53 .049	.58 .053	.63 .057	.68 .061
20°	T=.06 E=.006	.13 .011	.19 .017	.26 .022	.32 .028	.39 .034	.45 .040	.51 .046	.58 .052	.65 .058	.72 .064	.79 .070	.84 .076	.90 .083
25°	T=.08 E=.009	.16 .018	.24 .027	.33 .036	.41 .045	.49 .054	.58 .063	.67 .072	.75 .081	.83 .090	.91 .099	.99 .108	1.06 .117	1.14 .126

TABLE L. — Tangents and Externals to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
22°	1113.7	107.24	29°	1481.8	188.51	36°	1861.7	294.9
10'	1122.4	108.90	10'	1490.7	190.74	10'	1870.9	297.7
20'	1131.0	110.57	20'	1499.6	192.99	20'	1880.1	300.6
30'	1139.7	112.25	30'	1508.5	195.25	30'	1889.4	303.5
40'	1148.4	113.95	40'	1517.4	197.53	40'	1898.6	306.4
50'	1157.0	115.66	50'	1526.3	199.82	50'	1907.9	309.3
23	1165.7	117.38	30	1535.3	202.12	37	1917.1	312.2
10	1174.4	119.12	10	1544.2	204.44	10	1926.4	315.2
20	1183.1	120.87	20	1553.1	206.77	20	1935.7	318.1
30	1191.8	122.63	30	1562.1	209.12	30	1945.0	321.1
40	1200.5	124.41	40	1571.0	211.48	40	1954.3	324.1
50	1209.2	126.20	50	1580.0	213.86	50	1963.6	327.1
24	1217.9	128.00	31	1589.0	216.3	38	1972.9	330.2
10	1226.6	129.82	10	1598.0	218.7	10	1982.2	333.2
20	1235.3	131.65	20	1606.9	221.1	20	1991.5	336.3
30	1244.0	133.50	30	1615.9	223.5	30	2000.9	339.3
40	1252.8	135.35	40	1624.9	226.0	40	2010.2	342.4
50	1261.5	137.23	50	1633.9	228.4	50	2019.6	345.5
25	1270.2	139.11	32	1643.0	230.9	39	2029.0	348.6
10	1279.0	141.01	10	1652.0	233.4	10	2038.4	351.8
20	1287.7	142.93	20	1661.0	235.9	20	2047.8	354.9
30	1296.5	144.85	30	1670.0	238.4	30	2057.2	358.1
40	1305.3	146.79	40	1679.1	241.0	40	2066.6	361.3
50	1314.0	148.75	50	1688.1	243.5	50	2076.0	364.5
26	1322.8	150.71	33	1697.2	246.1	40	2085.4	367.7
10	1331.6	152.69	10	1706.3	248.7	10	2094.9	371.0
20	1340.4	154.69	20	1715.3	251.3	20	2104.3	374.2
30	1349.2	156.70	30	1724.4	253.9	30	2113.8	377.5
40	1358.0	158.72	40	1733.5	256.5	40	2123.3	380.8
50	1366.8	160.76	50	1742.6	259.1	50	2132.7	384.1
27	1375.6	162.81	34	1751.7	261.8	41	2142.2	387.4
10	1384.4	164.86	10	1760.8	264.5	10	2151.7	390.7
20	1393.2	166.95	20	1770.0	267.2	20	2161.2	394.1
30	1402.0	169.04	30	1779.1	269.9	30	2170.8	397.4
40	1410.9	171.15	40	1788.2	272.6	40	2180.3	400.8
50	1419.7	173.27	50	1797.4	275.3	50	2189.9	404.2
28	1428.6	175.41	35	1806.6	278.1	42	2199.4	407.6
10	1437.4	177.55	10	1815.7	280.8	10	2209.0	411.1
20	1446.3	179.72	20	1824.9	283.6	20	2218.6	414.5
30	1455.1	181.89	30	1834.1	286.4	30	2228.1	418.0
40	1464.0	184.09	40	1843.3	289.2	40	2237.7	421.4
50	1472.9	186.29	50	1852.5	292.0	50	2247.3	425.0

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
20°	T=.06 E=.006	.13 .011	.19 .017	.26 .022	.32 .028	.39 .034	.45 .038	.51 .045	.58 .051	.65 .057	.72 .063	.79 .070	.84 .076	.90 .083
25°	T=.08 E=.009	.16 .018	.24 .027	.33 .036	.40 .046	.49 .056	.58 .065	.67 .074	.75 .083	.83 .093	.90 .106	.99 .120	1.06 .127	1.14 .135
30°	T=.10 E=.013	.19 .025	.29 .038	.39 .051	.49 .065	.59 .078	.69 .090	.79 .103	.89 .116	.99 .129	1.09 .149	1.20 .170	1.29 .197	1.39 .204
35°	T=.11 E=.018	.22 .035	.34 .054	.47 .072	.58 .086	.69 .109	.80 .131	.93 .153	1.05 .175	1.17 .197	1.29 .213	1.42 .230	1.54 .247	1.66 .264
40°	T=.13 E=.023	.26 .046	.40 .070	.53 .093	.67 .117	.80 .141	.93 .172	1.06 .203	1.20 .234	1.34 .265	1.49 .297	1.64 .329	1.79 .361	1.94 .394
45°	T=.15 E=.030	.30 .060	.44 .093	.60 .119	.76 .153	.91 .184	1.06 .216	1.21 .254	1.37 .289	1.52 .325	1.70 .351	1.87 .378	2.04 .411	2.21 .445

TABLE I. — Tangents and External to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
43°	2257.0	428.5	50°	2671.8	592.3	57°	3110.9	790.1
10'	2260.6	432.0	10'	2681.9	596.6	10'	3121.7	795.2
20'	2276.2	435.6	20'	2692.1	600.9	20'	3132.6	800.4
30'	2285.9	439.2	30'	2702.3	605.3	30'	3143.4	805.6
40'	2295.6	442.8	40'	2712.5	609.6	40'	3154.2	810.9
50'	2305.2	446.4	50'	2722.7	614.0	50'	3165.1	816.1
44°	2314.9	450.0	51°	2732.9	618.4	58°	3176.0	821.4
10'	2324.6	453.6	10'	2743.1	622.8	10'	3186.9	826.7
20'	2334.3	457.3	20'	2753.4	627.2	20'	3197.8	832.0
30'	2344.1	461.0	30'	2763.7	631.7	30'	3208.8	837.3
40'	2353.8	464.6	40'	2773.9	636.2	40'	3219.7	842.7
50'	2363.5	468.4	50'	2784.2	640.7	50'	3230.7	848.1
45°	2373.3	472.1	52°	2794.5	645.2	59°	3241.7	853.5
10'	2383.1	475.8	10'	2804.9	649.7	10'	3252.7	858.9
20'	2392.8	479.6	20'	2815.2	654.3	20'	3263.7	864.3
30'	2402.6	483.4	30'	2825.6	658.8	30'	3274.8	869.8
40'	2412.4	487.2	40'	2835.9	663.4	40'	3285.8	875.2
50'	2422.3	491.0	50'	2846.3	668.0	50'	3296.9	880.8
46°	2432.1	494.8	53°	2856.7	672.7	60°	3308.0	886.4
10'	2441.9	498.7	10'	2867.1	677.3	10'	3319.1	892.0
20'	2451.8	502.5	20'	2877.5	682.0	20'	3330.3	897.5
30'	2461.7	506.4	30'	2888.0	686.7	30'	3341.4	903.2
40'	2471.5	510.3	40'	2898.4	691.4	40'	3352.6	908.8
50'	2481.4	514.3	50'	2908.9	696.1	50'	3363.8	914.5
47°	2491.3	518.2	54°	2919.4	700.9	61°	3375.0	920.2
10'	2501.2	522.2	10'	2929.9	705.7	10'	3386.3	925.9
20'	2511.2	526.1	20'	2940.4	710.5	20'	3397.5	931.6
30'	2521.1	530.1	30'	2951.0	715.3	30'	3408.8	937.3
40'	2531.1	534.2	40'	2961.5	720.1	40'	3420.1	943.1
50'	2541.0	538.2	50'	2972.1	725.0	50'	3431.4	948.9
48°	2551.0	542.2	55°	2982.7	729.9	62°	3442.7	954.8
10'	2561.0	546.3	10'	2993.3	734.8	10'	3454.1	960.6
20'	2571.0	550.4	20'	3003.9	739.7	20'	3465.4	966.5
30'	2581.0	554.5	30'	3014.5	744.6	30'	3476.8	972.4
40'	2591.0	558.6	40'	3025.2	749.6	40'	3488.3	978.3
50'	2601.1	562.8	50'	3035.8	754.6	50'	3499.7	984.3
49°	2611.2	566.9	56°	3046.5	759.6	63°	3511.1	990.2
10'	2621.2	571.1	10'	3057.2	764.6	10'	3522.6	996.2
20'	2631.3	575.3	20'	3067.9	769.7	20'	3534.1	1002.3
30'	2641.4	579.5	30'	3078.7	774.7	30'	3545.6	1008.3
40'	2651.5	583.8	40'	3089.4	779.8	40'	3557.2	1014.4
50'	2661.6	588.0	50'	3100.2	784.9	50'	3568.7	1020.5

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
40°	T=.13 E=.023	.26 .046	.40 .070	.53 .093	.67 .117	.80 .141	.93 .172	1.06 .203	1.20 .234	1.34 .265	1.49 .297	1.64 .329	1.79 .361	1.94 .394
45°	T=.15 E=.030	.30 .060	.44 .093	.60 .119	.76 .153	.91 .184	1.06 .216	1.21 .254	1.37 .289	1.52 .325	1.70 .351	1.87 .378	2.04 .411	2.21 .445
50°	T=.17 E=.037	.34 .075	.51 .116	.68 .151	.85 .189	1.02 .227	1.19 .266	1.36 .305	1.54 .345	1.72 .384	1.91 .425	2.10 .467	2.29 .508	2.48 .550
55°	T=.19 E=.046	.38 .093	.57 .142	.76 .188	.95 .236	1.14 .283	1.32 .332	1.52 .381	1.72 .420	1.92 .479	2.14 .530	2.35 .582	2.56 .641	2.77 .700
60°	T=.21 E=.056	.42 .112	.63 .168	.84 .225	1.05 .283	1.27 .340	1.49 .398	1.71 .457	1.94 .516	2.17 .575	2.38 .636	2.60 .697	2.83 .758	3.07 .819
65°	T=.23 E=.067	.46 .135	.69 .204	.93 .273	1.16 .343	1.40 .412	1.64 .483	1.88 .554	2.13 .625	2.38 .697	2.63 .771	2.88 .845	3.13 .922	3.39 .991
70°	T=.25 E=.080	.51 .159	.76 .240	1.02 .321	1.28 .403	1.54 .485	1.80 .568	2.06 .652	2.33 .735	2.60 .819	2.88 .906	3.16 .994	3.44 .108	3.72 .117
75°	T=.27 E=.095	.56 .182	.82 .256	1.12 .333	1.40 .420	1.69 .503	1.98 .586	2.27 .670	2.57 .757	2.87 .847	3.16 .937	3.47 .102	3.78 .117	4.09 .132
80°	T=.30 E=.110	.61 .220	.91 .332	1.22 .445	1.53 .558	1.84 .671	2.15 .787	2.46 .903	2.78 .102	3.10 .113	3.44 .125	3.78 .138	4.12 .150	4.46 .162
85°	T=.33 E=.128	.66 .259	.99 .391	1.33 .524	1.68 .657	2.02 .790	2.36 .926	2.70 .106	3.05 .120	3.40 .134	3.77 .147	4.14 .162	4.55 .176	4.89 .191

TABLE I. — Tangents and External to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
64°	3580.3	1026.6	71°	4086.9	1308.2	78°	4639.8	1643.0
10'	3591.9	1032.8	10'	4099.5	1315.6	10'	4653.6	1651.7
20'	3603.5	1039.0	20'	4112.1	1322.9	20'	4667.4	1660.5
30'	3615.1	1045.2	30'	4124.8	1330.3	30'	4681.3	1669.2
40'	3626.8	1051.4	40'	4137.4	1337.7	40'	4695.2	1678.1
50'	3638.5	1057.7	50'	4150.1	1345.1	50'	4709.2	1686.9
65°	3650.2	1063.9	72°	4162.8	1352.6	79°	4723.2	1695.8
10'	3661.9	1070.2	10'	4175.6	1360.1	10'	4737.2	1704.7
20'	3673.7	1076.6	20'	4188.5	1367.6	20'	4751.2	1713.7
30'	3685.4	1082.9	30'	4201.2	1375.2	30'	4765.3	1722.7
40'	3697.2	1089.3	40'	4214.0	1382.8	40'	4779.4	1731.7
50'	3709.0	1095.7	50'	4226.8	1390.4	50'	4793.6	1740.8
66°	3720.9	1102.2	73°	4239.7	1398.0	80°	4807.7	1749.9
10'	3732.7	1108.6	10'	4252.6	1405.7	10'	4822.0	1759.0
20'	3744.6	1115.1	20'	4265.6	1413.5	20'	4836.2	1768.2
30'	3756.5	1121.7	30'	4278.5	1421.2	30'	4850.5	1777.4
40'	3768.5	1128.2	40'	4291.5	1429.0	40'	4864.8	1786.7
50'	3780.4	1134.8	50'	4304.6	1436.8	50'	4879.2	1796.0
67°	3792.4	1141.4	74°	4317.6	1444.6	81°	4893.6	1805.3
10'	3804.4	1148.0	10'	4330.7	1452.5	10'	4908.0	1814.7
20'	3816.4	1154.7	20'	4343.8	1460.4	20'	4922.5	1824.1
30'	3828.4	1161.3	30'	4356.9	1468.4	30'	4937.0	1833.6
40'	3840.5	1168.1	40'	4370.1	1476.4	40'	4951.5	1843.1
50'	3852.6	1174.8	50'	4383.3	1484.4	50'	4966.1	1852.6
68°	3864.7	1181.6	75°	4396.5	1492.4	82°	4980.7	1862.2
10'	3876.8	1188.4	10'	4409.8	1500.5	10'	4995.4	1871.8
20'	3889.0	1195.2	20'	4423.1	1508.6	20'	5010.0	1881.5
30'	3901.2	1202.0	30'	4436.4	1516.7	30'	5024.8	1891.2
40'	3913.4	1208.9	40'	4449.7	1524.9	40'	5039.5	1900.9
50'	3925.6	1215.8	50'	4463.1	1533.1	50'	5054.3	1910.7
69°	3937.9	1222.7	76°	4476.5	1541.4	83°	5069.2	1920.5
10'	3950.2	1229.7	10'	4489.9	1549.7	10'	5084.0	1930.4
20'	3962.5	1236.7	20'	4503.4	1558.0	20'	5099.0	1940.3
30'	3974.8	1243.7	30'	4516.9	1566.3	30'	5113.9	1950.3
40'	3987.2	1250.8	40'	4530.4	1574.7	40'	5128.9	1960.2
50'	3999.5	1257.9	50'	4544.0	1583.1	50'	5143.9	1970.3
70°	4011.9	1265.0	77°	4557.6	1591.6	84°	5159.0	1980.4
10'	4024.4	1272.1	10'	4571.2	1600.1	10'	5174.1	1990.5
20'	4036.8	1279.3	20'	4584.8	1608.6	20'	5189.3	2000.6
30'	4049.3	1286.5	30'	4598.5	1617.1	30'	5204.4	2010.8
40'	4061.8	1293.6	40'	4612.2	1625.7	40'	5219.7	2021.1
50'	4074.4	1300.9	50'	4626.0	1634.4	50'	5234.9	2031.4

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
60°	T=.21 E=.056	.42 .112	.63 .168	.84 .225	1.05 .283	1.27 .340	1.49 .398	1.71 .457	1.94 .516	2.17 .575	2.38 .636	2.60 .697	2.83 .758	3.07 .819
65°	T=.23 E=.067	.46 .135	.69 .204	.93 .273	1.16 .343	1.40 .412	1.64 .483	1.88 .554	2.13 .625	2.38 .697	2.63 .771	2.88 .845	3.13 .922	3.39 .991
70°	T=.25 E=.080	.51 .159	.76 .240	1.02 .321	1.28 .403	1.54 .485	1.80 .568	2.06 .652	2.33 .735	2.60 .819	2.88 .906	3.16 .994	3.44 .108	3.72 .117
75°	T=.27 E=.095	.56 .182	.82 .256	1.12 .333	1.40 .420	1.69 .503	1.98 .586	2.27 .670	2.57 .757	2.87 .847	3.16 .937	3.47 .102	3.78 .117	4.09 .132
80°	T=.30 E=.110	.61 .220	.91 .332	1.22 .445	1.53 .558	1.84 .671	2.15 .787	2.46 .903	2.78 .102	3.10 .113	3.44 .125	3.78 .138	4.12 .150	4.46 .162
85°	T=.33 E=.128	.66 .259	.99 .391	1.33 .524	1.68 .657	2.02 .790	2.36 .926	2.70 .106	3.05 .120	3.40 .134	3.77 .147	4.14 .162	4.55 .176	4.89 .191

TABLE I. — Tangents and External to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
85°	5250.3	2041.7	92°	5933.2	2518.5	99°	6708.6	3092.7
10'	5265.6	2052.1	10'	5950.5	2531.0	10'	6728.4	3107.7
20	5281.0	2062.5	20	5967.9	2543.5	20	6748.2	3122.9
30	5296.4	2073.0	30	5985.3	2556.0	30	6768.1	3138.1
40	5311.9	2083.5	40	6002.7	2568.6	40	6788.1	3153.3
50	5327.4	2094.1	50	6020.2	2581.3	50	6808.2	3168.7
86°	5343.0	2104.7	93°	6037.8	2594.0	100°	6828.3	3184.1
10	5358.6	2115.3	10	6055.4	2606.8	10	6848.5	3199.6
20	5374.2	2126.0	20	6073.1	2619.7	20	6868.8	3215.1
30	5389.9	2136.7	30	6090.8	2632.6	30	6889.2	3230.8
40	5405.6	2147.5	40	6108.6	2645.5	40	6909.6	3246.5
50	5421.4	2158.4	50	6126.4	2658.5	50	6930.1	3262.3
87°	5437.2	2169.2	94°	6144.3	2671.6	101°	6950.6	3278.1
10	5453.1	2180.2	10	6162.6	2684.7	10	6971.3	3294.1
20	5469.0	2191.1	20	6180.2	2697.9	20	6992.0	3310.1
30	5484.9	2202.2	30	6198.3	2711.2	30	7012.7	3326.1
40	5500.9	2213.2	40	6216.4	2724.5	40	7033.6	3342.3
50	5517.0	2224.3	50	6234.6	2737.9	50	7054.5	3358.5
88°	5533.1	2235.5	95°	6252.8	2751.3	102°	7075.5	3374.9
10	5549.2	2246.7	10	6271.1	2764.8	10	7096.6	3391.2
20	5565.4	2258.0	20	6289.4	2778.3	20	7117.8	3407.7
30	5581.6	2269.3	30	6307.9	2792.0	30	7139.0	3424.3
40	5597.8	2280.6	40	6326.3	2805.6	40	7160.3	3440.9
50	5614.2	2292.0	50	6344.8	2819.4	50	7181.7	3457.6
89°	5630.5	2303.5	96°	6363.4	2833.2	103°	7203.2	3474.4
10	5646.9	2315.0	10	6382.1	2847.0	10	7224.7	3491.3
20	5663.4	2326.6	20	6400.8	2861.0	20	7246.3	3508.2
30	5679.9	2338.2	30	6419.5	2875.0	30	7268.0	3525.2
40	5696.4	2349.8	40	6438.4	2889.0	40	7289.8	3542.4
50	5713.0	2361.5	50	6457.3	2903.1	50	7311.7	3559.6
90°	5729.7	2373.3	97°	6476.2	2917.3	104°	7333.6	3576.8
10	5746.3	2385.1	10	6495.2	2931.6	10	7355.6	3594.2
20	5763.1	2397.0	20	6514.3	2945.9	20	7377.8	3611.7
30	5779.9	2408.9	30	6533.4	2960.3	30	7399.9	3629.2
40	5796.7	2420.9	40	6552.6	2974.7	40	7422.2	3646.8
50	5813.6	2432.9	50	6571.9	2989.2	50	7444.6	3664.5
91°	5830.5	2444.9	98°	6591.2	3003.8	105°	7467.0	3682.3
10	5847.5	2457.1	10	6610.6	3018.4	10	7489.6	3700.2
20	5864.6	2469.3	20	6630.1	3033.1	20	7512.2	3718.2
30	5881.7	2481.5	30	6649.6	3047.9	30	7534.9	3736.2
40	5898.8	2493.8	40	6669.2	3062.8	40	7557.7	3754.4
50	5916.0	2506.1	50	6688.8	3077.7	50	7580.5	3772.6

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
85°	T = .33 E = .128	.66 .259	1.00 .391	1.33 .524	1.68 .657	2.02 .790	2.36 .926	2.70 1.06	3.05 1.20	3.40 1.34	3.77 1.47	4.14 1.62	4.55 1.76	4.89 1.91
90°	T = .36 E = .149	.72 .299	1.09 .450	1.45 .603	1.83 .756	2.20 .910	2.57 1.07	2.94 1.22	3.32 1.38	3.70 1.54	4.10 1.70	4.50 1.87	4.91 2.03	5.32 2.20
95°	T = .39 E = .174	.79 .350	1.19 .522	1.55 .706	2.00 .955	2.40 1.06	2.80 1.25	3.20 1.43	3.61 1.62	4.02 1.80	4.49 1.99	4.98 2.18	5.38 2.38	5.83 2.53
100°	T = .43 E = .200	.86 .401	1.30 .604	1.74 .809	2.18 1.01	2.62 1.22	3.06 1.43	3.50 1.64	3.95 1.85	4.40 2.06	4.88 2.28	5.37 2.50	5.85 2.73	6.34 2.96
105°	T = .46 E = .230	.94 .470	1.42 .700	1.90 .938	2.38 1.17	2.87 1.42	3.36 1.65	3.84 1.90	4.33 2.14	4.83 2.39	5.32 2.64	5.83 2.90	6.34 3.16	6.93 3.41

TABLE I. — Tangents and External to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
106°	7603.5	3791.0	111°	8336.7	4386.1	116°	9169.4	5082.7
10'	7626.6	3809.4	10'	8362.7	4407.6	10'	9199.1	5107.9
20	7649.7	3827.9	20	8388.9	4429.2	20	9229.0	5133.3
30	7672.9	3846.5	30	8415.1	4450.9	30	9259.0	5158.8
40	7696.3	3865.2	40	8441.5	4472.7	40	9289.2	5184.5
50	7719.7	3884.0	50	8468.0	4494.6	50	9319.5	5210.3
107°	7743.2	3902.9	112°	8494.6	4516.6	117°	9349.9	5236.2
10	7766.8	3921.9	10	8521.3	4538.8	10	9380.5	5262.3
20	7790.5	3940.9	20	8548.1	4561.1	20	9411.3	5288.6
30	7814.3	3960.1	30	8575.0	4583.4	30	9442.2	5315.0
40	7838.1	3979.4	40	8602.1	4605.6	40	9473.2	5341.5
50	7862.1	3998.7	50	8629.3	4628.3	50	9504.4	5368.2
108°	7886.2	4018.2	113°	8656.6	4651.3	118°	9535.7	5395.1
10	7910.4	4037.8	10	8684.0	4674.2	10	9567.2	5422.1
20	7934.6	4057.4	20	8711.5	4697.2	20	9598.9	5449.2
30	7959.0	4077.2	30	8739.2	4720.3	30	9630.7	5476.5
40	7983.5	4097.1	40	8767.0	4743.6	40	9662.6	5504.0
50	8008.0	4117.0	50	8794.9	4766.9	50	9694.7	5531.7
109°	8032.7	4137.1	114°	8822.9	4790.4	119°	9727.0	5559.4
10	8057.4	4157.3	10	8851.0	4814.1	10	9759.4	5587.4
20	8082.3	4177.5	20	8879.3	4837.8	20	9792.0	5615.5
30	8107.3	4197.9	30	8907.7	4861.7	30	9824.8	5643.8
40	8132.3	4218.4	40	8936.3	4885.7	40	9857.7	5672.3
50	8157.5	4239.0	50	8965.0	4909.9	50	9890.8	5700.9
110°	8182.8	4259.7	115°	8993.8	4934.1	120°	9924.0	5729.7
10	8208.2	4280.5	10	9022.7	4958.6	10	9957.5	5758.6
20	8233.7	4301.4	20	9051.7	4983.1	20	9991.0	5787.7
30	8259.3	4322.4	30	9080.9	5007.8	30	10025.0	5817.0
40	8285.0	4343.6	40	9110.3	5032.6	40	10059.0	5846.5
50	8310.8	4364.8	50	9139.8	5057.6	50	10093.0	5876.1

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
100°	T = .43 E = .200	.86 .401	1.30 .604	1.74 .809	2.18 1.01	2.62 1.22	3.06 1.43	3.50 1.64	3.95 1.85	4.40 2.06	4.88 2.28	5.37 2.50	5.85 2.73	6.34 2.96
105°	T = .46 E = .230	.94 .470	1.42 .700	1.90 .938	2.38 1.17	2.87 1.42	3.36 1.65	3.84 1.90	4.35 2.14	4.84 2.39	5.35 2.64	5.87 2.90	6.40 3.16	6.93 3.41
110°	T = .50 E = .260	1.03 .535	1.55 .808	2.08 1.08	2.60 1.36	3.14 1.63	3.66 1.91	4.21 2.19	4.76 2.49	5.31 2.61	5.86 3.05	6.43 3.35	7.01 3.65	7.59 3.95
115°	T = .54 E = .307	1.13 .624	1.70 .939	2.29 1.26	2.86 1.57	3.45 1.89	4.03 2.21	4.63 2.54	5.23 2.87	5.83 3.20	6.44 3.53	7.07 3.88	7.70 4.23	8.35 4.58
120°	T = .61 E = .339	1.25 .720	1.89 1.08	2.52 1.45	3.16 1.82	3.81 2.20	4.44 2.56	5.11 2.95	5.78 3.33	6.44 3.72	7.11 4.10	7.80 4.50	8.51 4.91	9.21 5.32

TABLE II. — Radii, Ordinates and Deflections. Chord = 100 ft.

Deg.	Radius	Mid. Ord.	Tan. Dist.	Def. for 1 Ft.	Def. for 1 Ft.	Deg.	Radius	Mid. Ord.	Tan. Dist.	Def. for 1 Ft.	Def. for 1 Ft.
	ft.	ft.	ft.	ft.	ft.		ft.	ft.	ft.	ft.	ft.
0° 10'	34377.7	.036	.145	.291	0.05	7°	819.0	1.528	6.105	12.21	2.10
20	17189.	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	50	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.260	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	50	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	50	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	10	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	11	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	12	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	13	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	16	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.718	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.826	7.852	1.35	17	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	19	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1.50	20	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1.55	21	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	22	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	23	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	24	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	25	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	29	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	30	193.2	6.583	25.88	51.76	9.00

The middle ordinate in inches for any cord of length (C) is equal to .0012 C² multiplied by the middle ordinate taken from the above table. Thus, if it desired to bend a 30 ft. rail to fit a 10 degree curve, its middle ordinate should be .0012×900×2.183 or 2.36 inches.

TABLE III. Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50	$\frac{1}{2}$ sub chord = sin of $\frac{1}{2}$ def. angle				Length of arc for 100 ft.
	sin. $\frac{1}{2}$ def. ang.	12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	
30°	.193.18	1° 51'	2° 17'	2° 58'	3° 43'	101.15
32°	.181.39	1° 59'	2° 25'	3° 10'	3° 58'	101.33
34°	.171.01	2° 06'	2° 33'	3° 21'	4° 12'	101.48
36°	.161.80	2° 13'	2° 41'	3° 33'	4° 26'	101.66
38°	.153.58	2° 20'	2° 49'	3° 44'	4° 40'	101.85
40°	.146.19	2° 27'	2° 57'	3° 55'	4° 54'	102.06
42°	.139.52	2° 34'	3° 05'	4° 07'	5° 08'	102.29
44°	.133.47	2° 41'	3° 13'	4° 18'	5° 22'	102.53
46°	.127.97	2° 48'	3° 21'	4° 29'	5° 36'	102.76
48°	.122.92	2° 55'	3° 29'	4° 40'	5° 50'	103.00
50°	.118.31	3° 02'	3° 38'	4° 51'	6° 04'	103.24
52°	.114.06	3° 09'	3° 46'	5° 02'	6° 17'	103.54
54°	.110.11	3° 16'	3° 54'	5° 13'	6° 31'	103.84
56°	.106.50	3° 22'	4° 02'	5° 23'	6° 44'	104.14
58°	.103.14	3° 29'	4° 10'	5° 34'	6° 57'	104.43
60°	.100.00	3° 35'	4° 18'	5° 44'	7° 11'	104.72

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$	$R = T \cot. \frac{1}{2} I$	Chord def. = $\frac{\text{chord}^2}{R}$
$T = \frac{50 \tan \frac{1}{2} I}{\sin. \frac{1}{2} D}$	$R = \frac{50}{\sin. \frac{1}{2} D}$	No. chords = $\frac{I}{D}$
$\sin. \frac{1}{2} D = \frac{50}{R}$	$E = R \text{ ex. sec } \frac{1}{2} I$	Tan. def. = $\frac{1}{2}$ chord def.
$\sin. \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$	$E = T \tan \frac{1}{2} I$	

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft. see Table II.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 = \text{Base}$.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574 d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{1}{8} d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3 , etc. are the discrepancies of various results from the mean, and if $\Sigma d^2 =$ the sum of the squares of these differences and $n =$ the number of observations, then the probable error of the mean =

$$\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$$

SOLAR EPHEMERIS. Attention is called to the Solar Ephemeris for the current year, published by Keuffel & Esser Co., and furnished free of charge upon request, which is $3\frac{1}{2} \times 5\frac{1}{2}$ in., with about 90 pages of data very useful to the Surveyor; such as the adjustments of transits, levels and solar attachments; directions and tables for determining the meridian and the latitude from observations on the sun and Polaris; stadia measurements; magnetic declination; arithmetic constants; English and Metric conversions; trigonometric formulas; Natural and Logarithmic Functions; and Logarithms of Numbers.

TABLE IV. — Minutes in Decimals of a Degree.

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

TABLE V. — Inches in Decimals of a Foot.

1-16	3-32	$\frac{1}{8}$	3-16	$\frac{1}{4}$	5-16	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$	
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Natural Trigonometrical Functions

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

°	0	1	2	3	4	5	6	7	8	9
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0017	0.0029	0.0042	0.0054	0.0066	0.0078	0.0090	0.0102	0.0114	0.0126
20	0.0035	0.0058	0.0081	0.0104	0.0126	0.0148	0.0170	0.0192	0.0214	0.0236
30	0.0053	0.0087	0.0121	0.0154	0.0187	0.0220	0.0253	0.0286	0.0319	0.0352
40	0.0071	0.0116	0.0161	0.0206	0.0251	0.0296	0.0341	0.0386	0.0431	0.0476
50	0.0089	0.0145	0.0201	0.0257	0.0313	0.0369	0.0425	0.0481	0.0537	0.0593
60	0.0107	0.0175	0.0243	0.0311	0.0379	0.0447	0.0515	0.0583	0.0651	0.0719
70	0.0125	0.0204	0.0283	0.0362	0.0441	0.0520	0.0599	0.0678	0.0757	0.0836
80	0.0143	0.0233	0.0323	0.0413	0.0503	0.0593	0.0683	0.0773	0.0863	0.0953
90	0.0161	0.0262	0.0363	0.0464	0.0565	0.0666	0.0767	0.0868	0.0969	0.1070

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

°	0	1	2	3	4	5	6	7	8	9
8	0.1392	0.1405	0.10098	7.185	7.115	9.0027	82			
10	0.1421	0.1435	0.10102	7.040	6.968	9.0806	50			
20	0.1449	0.1465	0.10107	6.900	6.827	9.0894	40			
30	0.1478	0.1495	0.10111	6.760	6.691	9.0802	30			
40	0.1507	0.1524	0.10115	6.636	6.561	9.0858	20			
50	0.1536	0.1554	0.10120	6.512	6.435	9.0814	10			
60	0.1564	0.1584	0.10125	6.394	6.314	9.0769	81			
70	0.1593	0.1614	0.10129	6.277	6.197	9.0723	50			
80	0.1622	0.1644	0.10134	6.166	6.084	9.0676	40			
90	0.1650	0.1673	0.10139	6.059	5.976	9.0629	30			
100	0.1679	0.1703	0.10144	5.955	5.871	9.0580	20			
110	0.1708	0.1733	0.10149	5.855	5.769	9.0531	10			
120	0.1736	0.1763	0.10154	5.759	5.671	9.0481	80			
130	0.1765	0.1793	0.10160	5.665	5.576	9.0430	50			
140	0.1794	0.1823	0.10165	5.575	5.485	9.0378	40			
150	0.1822	0.1853	0.10170	5.488	5.396	9.0325	30			
160	0.1851	0.1883	0.10176	5.403	5.309	9.0272	20			
170	0.1880	0.1914	0.10181	5.320	5.226	9.0218	10			
180	0.1908	0.1944	0.10187	5.241	5.145	9.0163	79			
190	0.1937	0.1974	0.10193	5.164	5.066	9.0107	50			
200	0.1965	0.2004	0.10199	5.089	4.989	9.0050	40			
210	0.1994	0.2035	0.10205	5.016	4.915	9.0092	30			
220	0.2022	0.2065	0.10211	4.945	4.843	9.0034	20			
230	0.2051	0.2095	0.10217	4.877	4.773	9.0075	10			
240	0.2079	0.2126	0.10223	4.810	4.705	9.0015	78			
250	0.2108	0.2156	0.10230	4.745	4.638	9.0054	50			
260	0.2136	0.2186	0.10236	4.682	4.574	9.0092	40			
270	0.2164	0.2217	0.10243	4.620	4.511	9.0030	30			
280	0.2193	0.2247	0.10249	4.560	4.449	9.0066	20			
290	0.2221	0.2278	0.10256	4.502	4.390	9.0002	10			
300	0.2250	0.2309	0.10263	4.445	4.331	9.0037	77			
310	0.2278	0.2339	0.10270	4.390	4.275	9.0071	50			
320	0.2306	0.2370	0.10277	4.336	4.219	9.0104	40			
330	0.2334	0.2399	0.10284	4.284	4.165	9.0137	30			
340	0.2363	0.2432	0.10291	4.232	4.113	9.0169	20			
350	0.2391	0.2462	0.10299	4.182	4.061	9.0100	10			
360	0.2419	0.2493	0.10306	4.133	4.011	9.0030	76			
370	0.2447	0.2524	0.10314	4.086	3.962	9.0059	50			
380	0.2476	0.2555	0.10321	4.039	3.914	9.0088	40			
390	0.2504	0.2586	0.10329	3.994	3.867	9.0015	30			
400	0.2532	0.2617	0.10337	3.949	3.821	9.0042	20			
410	0.2560	0.2648	0.10345	3.906	3.776	9.0069	10			
420	0.2588	0.2679	0.10353	3.864	3.732	9.0095	75			
430	0.2616	0.2711	0.10361	3.822	3.689	9.0121	50			
440	0.2644	0.2742	0.10369	3.782	3.647	9.0146	40			
450	0.2672	0.2773	0.10377	3.742	3.606	9.0171	30			
460	0.2700	0.2805	0.10386	3.703	3.566	9.0196	20			
470	0.2728	0.2836	0.10394	3.665	3.526	9.0221	10			

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Natural Trigonometrical Functions

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

°	0	1	2	3	4	5	6	7	8	9
16	0.2756	0.2867	0.10403	3.628	3.487	9.0126	74			
17	0.2784	0.2899	0.10412	3.592	3.450	9.0146	50			
18	0.2812	0.2931	0.10423	3.556	3.412	9.0166	40			
19	0.2840	0.2962	0.10429	3.521	3.376	9.0186	30			
20	0.2868	0.2994	0.10438	3.487	3.340	9.0199	20			
21	0.2896	0.3026	0.10448	3.453	3.305	9.0215	10			
22	0.2924	0.3057	0.10457	3.420	3.271	9.0230	73			
23	0.2952	0.3089	0.10466	3.388	3.237	9.0245	50			
24	0.2979	0.3121	0.10476	3.357	3.204	9.0259	40			
25	0.3007	0.3153	0.10485	3.326	3.172	9.0272	30			
26	0.3035	0.3185	0.10495	3.295	3.140	9.0284	20			
27	0.3062	0.3217	0.10505	3.265	3.108	9.0295	10			
28	0.3090	0.3249	0.10515	3.236	3.078	9.0306	72			
29	0.3118	0.3281	0.10525	3.207	3.048	9.0315	50			
30	0.3145	0.3314	0.10535	3.179	3.018	9.0324	40			
31	0.3173	0.3346	0.10545	3.152	2.989	9.0332	30			
32	0.3201	0.3378	0.10555	3.124	2.960	9.0340	20			
33	0.3228	0.3411	0.10566	3.098	2.932	9.0346	10			
34	0.3256	0.3443	0.10576	3.072	2.904	9.0352	71			
35	0.3283	0.3476	0.10587	3.046	2.877	9.0357	50			
36	0.3311	0.3508	0.10598	3.020	2.850	9.0361	40			
37	0.3338	0.3541	0.10608	2.996	2.824	9.0364	30			
38	0.3365	0.3574	0.10619	2.971	2.798	9.0367	20			
39	0.3393	0.3607	0.10631	2.947	2.773	9.0369	10			
40	0.3420	0.3640	0.10642	2.924	2.747	9.0369	70			
41	0.3448	0.3673	0.10653	2.900	2.723	9.0369	50			
42	0.3475	0.3706	0.10665	2.878	2.699	9.0369	40			
43	0.3502	0.3739	0.10676	2.856	2.675	9.0367	30			
44	0.3529	0.3772	0.10688	2.833	2.651	9.0365	20			
45	0.3557	0.3805	0.10700	2.811	2.628	9.0362	10			
46	0.3584	0.3839	0.10711	2.790	2.605	9.0358	89			
47	0.3611	0.3872	0.10723	2.769	2.583	9.0353	50			
48	0.3638	0.3906	0.10736	2.749	2.560	9.0348	40			
49	0.3665	0.3939	0.10748	2.729	2.539	9.0342	30			
50	0.3692	0.3973	0.10760	2.709	2.517	9.0335	20			
51	0.3719	0.4006	0.10773	2.689	2.496	9.0327	10			
52	0.3746	0.4040	0.10785	2.670	2.475	9.0318	88			
53	0.3773	0.4074	0.10798	2.650	2.455	9.0309	50			
54	0.3800	0.4108	0.10811	2.632	2.434	9.0299	40			
55	0.3827	0.4142	0.10824	2.613	2.414	9.0288	30			
56	0.3854	0.4176	0.10837	2.595	2.394	9.0276	20			
57	0.3881	0.4210	0.10850	2.577	2.375	9.0264	10			
58	0.3908	0.4245	0.10864	2.559	2.356	9.0250	67			
59	0.3934	0.4279	0.10877	2.542	2.337	9.0236	50			
60	0.3961	0.4314	0.10891	2.525	2.318	9.0222	40			
61	0.3987	0.4348	0.10904	2.508	2.300	9.0206	30			
62	0.4014	0.4383	0.10918	2.491	2.282	9.0190	20			
63	0.4041	0.4417	0.10932	2.475	2.264	9.0172	10			

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

°	0	1	2	3	4	5	6	7	8	9
24	4067	4452	1.0946	2.459	2.246	9.0155	66			
10	4094	4487	1.0961	2.443	2.229	9.0136	50			
20	4120	4522	1.0975	2.427	2.211	9.0116	40			
30	4147	4557	1.0989	2.411	2.194	9.0096	30			
40	4173	4592	1.1004	2.396	2.177	9.0075	20			
50	4200	4628	1.1019	2.381	2.161	9.0053	10			
25	4226	4663	1.1034	2.366	2.145	9.0031	85			
10	4253	4699	1.1049	2.351	2.128	9.0007	50			
20	4279	4734	1.1064	2.337	2.112	9.0083	40			
30	4305	4770	1.1079	2.323	2.097	9.0059	30			
40	4331	4806	1.1095	2.309	2.081	9.0033	20			
50	4358	4841	1.1110	2.295	2.066	9.0007	10			
26	4384	4877	1.1126	2.281	2.050	8.9979	64			
10	4410	4913	1.1142	2.268	2.035	8.9752	50			
20	4436	4950	1.1158	2.254	2.020	8.9623	40			
30	4462	4986	1.1174	2.241	2.006	8.9493	30			
40	4488	5022	1.1190	2.228	1.991	8.9363	20			
50	4514	5059	1.1207	2.215	1.977	8.9232	10			
27	4540	5095	1.1223	2.203	1.963	8.9101	83			
10	4566	5132	1.1240	2.190	1.949	8.8969	50			
20	4592	5169	1.1257	2.178	1.935	8.8835	40			
30	4617	5206	1.1274	2.166	1.921	8.8701	30			
40	4643	5243	1.1291	2.154	1.907	8.8566	20			
50	4669	5280	1.1308	2.142	1.894	8.8431	10			
28	4695	5317	1.1326	2.130	1.881	8.8295	62			
10	4720	5354	1.1343	2.119	1.868	8.8158	50			
20	4746	5392	1.1361	2.107	1.855	8.8020	40			
30	4772	5430	1.1379	2.096	1.842	8.7882	30			
40	4797	5467	1.1397	2.085	1.829	8.7743	20			
50	4823	5505	1.1415	2.073	1.816	8.7603	10			
29	4848	5543	1.1434	2.063	1.804	8.7462	61			
10	4874	5581	1.1452	2.052	1.792	8.7321	50			
20	4899	5619	1.1471	2.041	1.780	8.7178	40			
30	4924	5658	1.1490	2.031	1.767	8.7036	30			
40	4950	5696	1.1509	2.020	1.756	8.6892	20			
50	4975	5735	1.1528	2.010	1.744	8.6748	10			
30	5000	5774	1.1547	2.000	1.732	8.6603	60			
10	5025	5812	1.1566	1.990	1.720	8.6457	50			
20	5050	5851	1.1586	1.980	1.709	8.6310	40			
30	5075	5890	1.1606	1.970	1.698	8.6163	30			
40	5100	5930	1.1626	1.961	1.686	8.6015	20			
50	5125	5969	1.1646	1.951	1.675	8.5866	10			
31	5150	6009	1.1666	1.942	1.664	8.5717	59			
10	5175	6048	1.1687	1.932	1.653	8.5567	50			
20	5200	6088	1.1707	1.923	1.643	8.5416	40			
30	5225	6128	1.1728	1.914	1.632	8.5264	30			
40	5250	6168	1.1749	1.905	1.621	8.5112	20			
50	5275	6208	1.1770	1.896	1.611	8.4960	10			

Natural Trigonometrical Functions

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

°	'							°	'
32	.5299	.6249	1.1792	1.887	1.600	.84805			
10	.5324	.6289	1.1813	1.878	1.590	.84650			
20	.5348	.6330	1.1835	1.870	1.580	.84495			
30	.5373	.6371	1.1857	1.861	1.570	.84339			
40	.5398	.6412	1.1879	1.853	1.560	.84182			
50	.5422	.6453	1.1901	1.844	1.550	.84025			
33	.5446	.6494	1.1924	1.836	1.540	.83867			
10	.5471	.6536	1.1946	1.828	1.530	.83708			
20	.5495	.6577	1.1969	1.820	1.520	.83549			
30	.5519	.6619	1.1992	1.812	1.511	.83389			
40	.5544	.6661	1.2015	1.804	1.501	.83228			
50	.5568	.6703	1.2039	1.796	1.492	.83066			
34	.5592	.6745	1.2062	1.788	1.483	.82904			
10	.5616	.6787	1.2086	1.781	1.473	.82741			
20	.5640	.6830	1.2110	1.773	1.464	.82577			
30	.5664	.6873	1.2134	1.766	1.455	.82413			
40	.5688	.6916	1.2158	1.758	1.446	.82248			
50	.5712	.6959	1.2183	1.751	1.437	.82082			
35	.5736	.7002	1.2208	1.743	1.428	.81915			
10	.5760	.7046	1.2233	1.736	1.419	.81748			
20	.5783	.7089	1.2258	1.729	1.411	.81580			
30	.5807	.7133	1.2283	1.722	1.402	.81412			
40	.5831	.7177	1.2309	1.715	1.393	.81242			
50	.5854	.7221	1.2335	1.708	1.385	.81072			
36	.5878	.7265	1.2361	1.701	1.376	.80902			
10	.5901	.7310	1.2387	1.695	1.368	.80730			
20	.5925	.7355	1.2413	1.688	1.360	.80558			
30	.5948	.7400	1.2440	1.681	1.351	.80386			
40	.5972	.7445	1.2466	1.675	1.343	.80212			
50	.5995	.7490	1.2494	1.668	1.335	.80038			
37	.6018	.7536	1.2521	1.662	1.327	.79864			
10	.6041	.7581	1.2549	1.655	1.319	.79688			
20	.6065	.7627	1.2577	1.649	1.311	.79512			
30	.6088	.7673	1.2605	1.643	1.303	.79335			
40	.6111	.7720	1.2633	1.636	1.295	.79158			
50	.6134	.7766	1.2661	1.630	1.288	.78980			
38	.6157	.7813	1.2690	1.624	1.280	.78801			
10	.6180	.7860	1.2719	1.618	1.272	.78622			
20	.6202	.7907	1.2748	1.612	1.265	.78442			
30	.6225	.7954	1.2778	1.606	1.257	.78261			
40	.6248	.8002	1.2808	1.601	1.250	.78079			
50	.6271	.8050	1.2838	1.595	1.242	.77897			

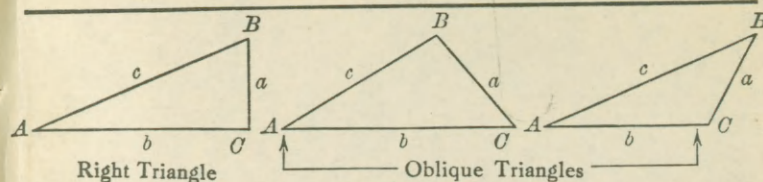
Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

°	'							°	'
39	.6293	.8098	1.2868	1.589	1.235	.77715		51	
10	.6316	.8146	1.2898	1.583	1.228	.77531		50	
20	.6338	.8195	1.2929	1.578	1.220	.77347		40	
30	.6361	.8243	1.2959	1.572	1.213	.77162		30	
40	.6383	.8292	1.2991	1.567	1.206	.76977		20	
50	.6406	.8342	1.3022	1.561	1.199	.76791		10	
40	.6428	.8391	1.3054	1.556	1.192	.76604		50	
10	.6450	.8441	1.3086	1.550	1.185	.76417		50	
20	.6472	.8491	1.3118	1.545	1.178	.76229		40	
30	.6494	.8541	1.3151	1.540	1.171	.76041		30	
40	.6517	.8591	1.3184	1.535	1.164	.75851		20	
50	.6539	.8642	1.3217	1.529	1.157	.75661		10	
41	.6561	.8693	1.3251	1.524	1.150	.75471		49	
10	.6583	.8744	1.3284	1.519	1.144	.75280		50	
20	.6604	.8796	1.3318	1.514	1.137	.75088		40	
30	.6626	.8847	1.3352	1.509	1.130	.74896		30	
40	.6648	.8899	1.3386	1.504	1.124	.74703		20	
50	.6670	.8952	1.3421	1.499	1.117	.74509		10	
42	.6691	.9004	1.3456	1.494	1.111	.74314		48	
10	.6713	.9057	1.3492	1.490	1.104	.74120		50	
20	.6734	.9110	1.3527	1.485	1.098	.73924		40	
30	.6756	.9163	1.3563	1.480	1.091	.73728		30	
40	.6777	.9217	1.3600	1.476	1.085	.73531		20	
50	.6799	.9271	1.3636	1.471	1.079	.73333		10	
43	.6820	.9325	1.3673	1.466	1.072	.73135		47	
10	.6841	.9380	1.3711	1.462	1.066	.72937		50	
20	.6862	.9435	1.3748	1.457	1.060	.72737		40	
30	.6884	.9490	1.3786	1.453	1.054	.72537		30	
40	.6905	.9545	1.3824	1.448	1.048	.72337		20	
50	.6926	.9601	1.3863	1.444	1.042	.72136		10	
44	.6947	.9657	1.3902	1.440	1.036	.71934		46	
10	.6967	.9713	1.3941	1.435	1.030	.71732		50	
20	.6988	.9770	1.3980	1.431	1.024	.71529		40	
30	.7009	.9827	1.4020	1.427	1.018	.71325		30	
40	.7030	.9884	1.4061	1.422	1.012	.71121		20	
50	.7050	.9942	1.4101	1.418	1.006	.70916		10	
	.7071	1.	1.414	1.414	1.	.70711		45	

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

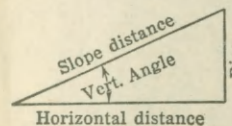
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given a, b	Required A, B, c	$\tan A = \frac{a}{b} = \cot B$, $c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$, $b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90^\circ - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90^\circ - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90^\circ - A$, $a = c \sin A$, $b = c \cos A$

Solution of Oblique Triangles

Given A, B, a	Required b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C$, $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a + b + c}{2}$, $\sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$, $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}$, $C = 180^\circ - (A + B)$
a, b, c	Area	$s = \frac{a + b + c}{2}$, $\text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = $5^\circ 10'$. From Table, Page IX. $\cos 5^\circ 10' = .9959$. Horizontal distance = $319.4 \times .9959 = 318.09$ ft. Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. $\cos 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.



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