AD-A048 583 AERONAUTICAL RESEARCH LABS MELBOURNE (AUSTRALIA) F/G 12/1
APPROXIMATION ERRORS IN CALCULATION OF TARGET BEARINGS,(U)
MAR 77 G J MURRAY
UNCLASSIFIED ARL/SYS NOTE-55 NL

1 OF 1
ADA048583

END
DATE FILMED
2-78
DDC

AD A048583

ARL/Sys. Note 55

AR No. 000-721

DEPARTMENT OF DEFENCE

DEFENCE SCIENCE AND TECHNOLOGY ORGANISATION

AERONAUTICAL RESEARCH LABORATORIES

MELBOURNE VICTORIA

SYSTEMS NOTE 55

APPROXIMATION ERRORS IN CALCULATION OF TARGET BEARINGS

G. J. MURRAY

AD No. ____
DDC FILE COPY

Approved for Public Release

DDC
RECEIVED
JAN 26 1978
D

© COMMONWEALTH OF AUSTRALIA 1977

COPY No 15

MARCH 1977

APPROVED

FOR PUBLIC RELEASE

THE UNITED STATES NATIONAL
TECHNICAL INFORMATION SERVICE
IS AUTHORISED TO
REPRODUCE AND SELL THIS REPORT

(14) ARL/Sys. Note-55

AR No. 000-721

AUSTRALIA

DEPARTMENT OF DEFENCE

DEFENCE SCIENCE AND TECHNOLOGY ORGANISATION

AERONAUTICAL RESEARCH LABORATORIES

MELBOURNE VICTORIA

SYSTEMS NOTE 55

(6) APPROXIMATION ERRORS IN CALCULATION OF TARGET BEARINGS

(10) G. J. MURRAY

(12) 47 p.

ACCESSION for
NTIS White Section X
DDC Buff Section
UNANNOUNCED
JUSTIFICATION
BY
DISTRIBUTION/AVAILABILITY CODES
Dist. AVAIL. and/or SPECIAL
A

Approved for Public Release

DDC
RECEIVED
JAN 26 1978
D

© COMMONWEALTH OF AUSTRALIA 1977

COPY No

(11) MAR 77

008 659

AR No. 000-721

DEPARTMENT OF DEFENCE

DEFENCE SCIENCE AND TECHNOLOGY ORGANISATION

AERONAUTICAL RESEARCH LABORATORIES

SYSTEMS NOTE 55

APPROXIMATION ERRORS IN CALCULATION OF TARGET BEARINGS

by

G. J. MURRAY

SUMMARY

A submariner is able to estimate the course of a ship from his record of successive bearings on the ship. The "bearings only" technique provides a mathematical approximation which uses this data to estimate the angle to bow of the ship. This study shows that the accuracy of the "bearings only" estimate of the angle to bow increases with increasing values of the ratio $\frac{\text{speed of ship}}{\text{speed of submarine}}$.

POSTAL ADDRESS: Chief Superintendent, Aeronautical Research Laboratories,
P.O. Box 4331, Melbourne, Victoria, 3001, Australia.

DOCUMENT CONTROL DATA SHEET

Security classification of this page Unclassified

1. Document Numbers
   (*a*) AR Number: 000–721
   (*b*) Document Series and Number: ARL/Sys. Note 55
   (*c*) Report Number: Systems Note 55

2. Security Classification
   (*a*) Complete document: Unclassified
   (*b*) Title in isolation: Unclassified
   (*c*) Summary in isolation: Unclassified

3. Title: APPROXIMATION ERRORS IN CALCULATION OF TARGET BEARINGS

4. Personal Author(s):
   G. J. MURRAY

5. Document Date:
   March 1977

6. Type of Report and Period Covered:

7. Corporate Author(s):
   Aeronautical Research Laboratories

8. Reference Numbers
   (*a*) Task:
   (*b*) Sponsoring Agency:

9. Cost Code:
   74 6480

10. Inprint (Publishing establishment):
    Aeronautical Research Laboratories

11. Computer Program(s)
    (Title(s) and language(s)):
    BOA 1 Basic for Wang 2200A

12. Release Limitations (of the document)
    Document Approved for Public Release

12-0. Overseas:	No.		P.R.	1	A		B		C		D		E	

13. Announcement Limitations (of the information on this page):
    No Limitations

14. Descriptors:
    Approximation
    Operations Research
    Detection

15. Cosati Codes:
    12 01
    12 02
    17 11

16.

SUMMARY

A submariner is able to estimate the course of a ship from his record of successive bearings on the ship. The "bearings only" technique provides a mathematical approximation which uses this data to estimate the angle to bow of the ship. This study shows that the accuracy of the "bearings only" estimate of the angle to bow increases with increasing values of the ratio $\frac{\textit{speed of ship}}{\textit{speed of submarine}}$

CONTENTS

INTRODUCTION	1
Time Bearing Plot	1
Estimation of Convoy Course	1
THE CALCULATIONS	7
CONCLUSION	7
APPENDIX I	8
DERIVATION OF APPROXIMATE ANGLE TO BOW	8
APPENDIX II	10
THE CALCULATOR PROGRAM	10
PROGRAM LISTING	11
TABULATION OF RESULTS OF CALCULATIONS	
DISTRIBUTION	

INTRODUCTION

Passive listening devices available to the submariner enable him to construct a record of the successive bearings of a ship or convoy, though they may provide little or no information on the range of the potential target. A mathematical approximation known as the "bearings only" approximation provides an estimate for the angle to bow (ATB) of the convoy. The mathematical formula used does not require any information about target range, nor does it provide any such information. However, a knowledge of the maximum capabilities or usual operating procedures on potential targets, or the intensity of sound received, may enable him to guess an approximate range.

An estimated ATB obtained from the "bearings only" formula will be subject to three sources of error:

(1) Non-uniform motion of the target
(2) Errors in the measurement of bearings
(3) Error introduced by the approximation involved in the calculations.

This report records the results of an investigation of the third type of error above. A large number of representative situations involving a submarine and a convoy have been examined, and the estimated ATB compared with the known ATB in each case. The data generated here provide an indication as to when (in the absence of the first two types of error listed above) the estimated ATB from the "bearings only" approach is most likely to be reliable.

Time Bearing Plot

The submariner plots the received bearings of a target as a function of time on a "time bearing plot". A smooth curve is drawn through these plotted points. All of the submariner's calculations involve bearings read off this smooth curve rather than the original raw data plotted. This is done in an attempt to minimize the effect of bearing measurement errors.

In addition, if sufficient time is available, the submariner may develop time bearing plots for two submarine courses; one directed along, and the other approximately at right angles to, the radius vector to the target.

Estimation of Convoy Course

In making his estimate of target motion, the submariner assumes that the convoy maintains constant speed and direction while he is taking bearings on it. From the time bearing curve the submariner interpolates a series of bearings corresponding to equal time intervals between adjacent bearings. These bearings are plotted, and a line is drawn across them to give equal intercepts travelled by the convoy in equal time intervals. The direction of this line then gives the approximate course of the convoy.

Suppose that three such bearing lines are drawn; bearing B at the end of the series, bearing C in the middle and bearing E at the beginning. Allowing for the motion of the submarine, there are three different regions in which the convoy's course might lie for any given B, C and E. Three possible courses, one in each region, are shown in figure 1. Normally the submarine's detection equipment will be able to distinguish between course 1 (figure 1) and the other two. Additional information would be required to distinguish between courses 2 and 3.

The geometrical situation corresponding to convoy course 1 is illustrated in figure 2. Similarly, course 2 is illustrated in figure 4. In figures 2 and 4 the ATB at the time corresponding to bearing B is A_0. During the time interval between bearings E and B the convoy moves from (x_2, y_2) through (x_1, y_1) to (O, P) while the submarine moves from (x_4, y_4) through (x_3, y_3) to $(0, 0)$. This geometrical layout corresponds to the location of cartesian axes with the origin at the final submarine position, and the y-axis passing through the final position of the convoy. Any other cartesian co-ordinate system may be made consistent with this scheme by suitable translation and/or rotation of co-ordinate axes.

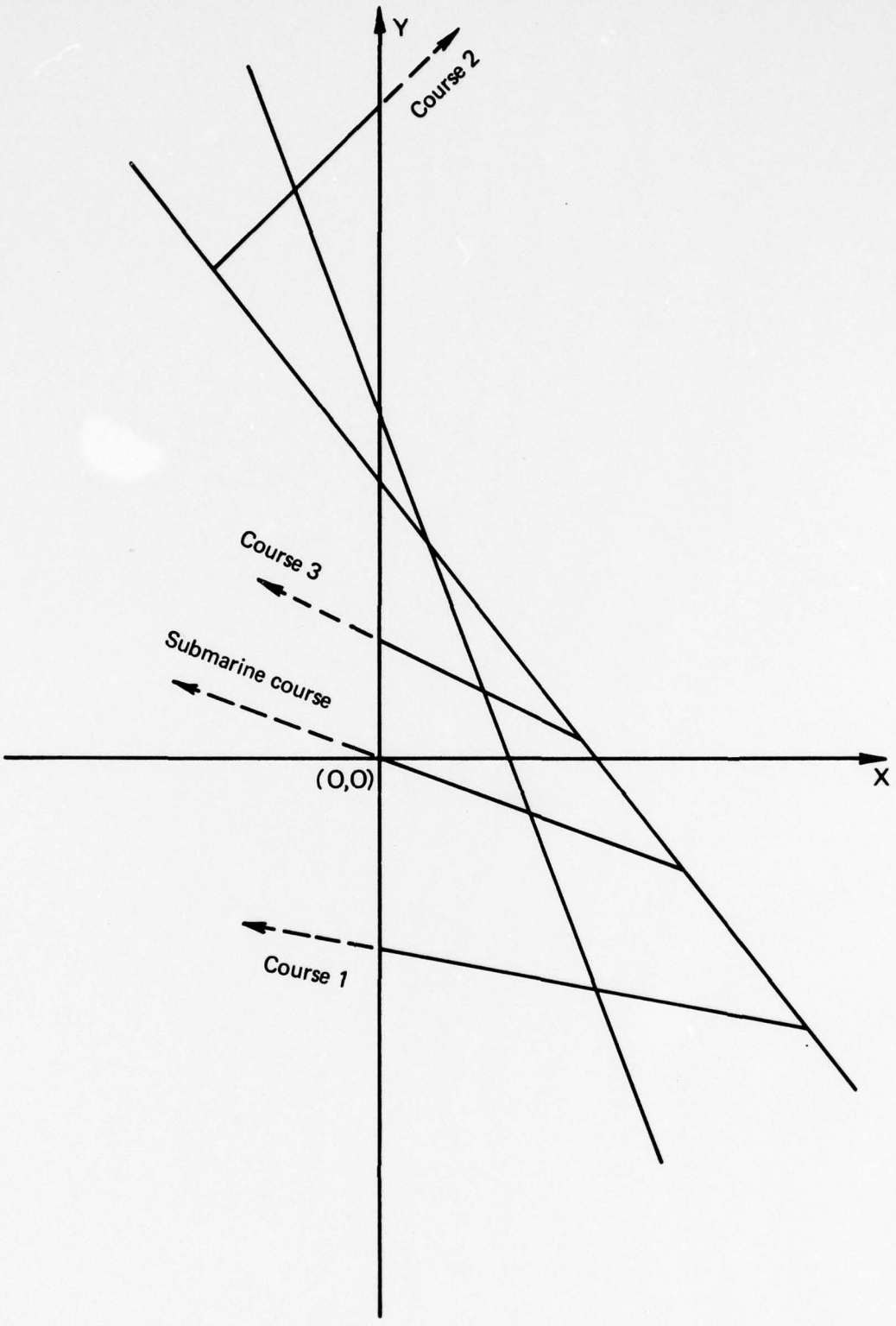

FIGURE 1

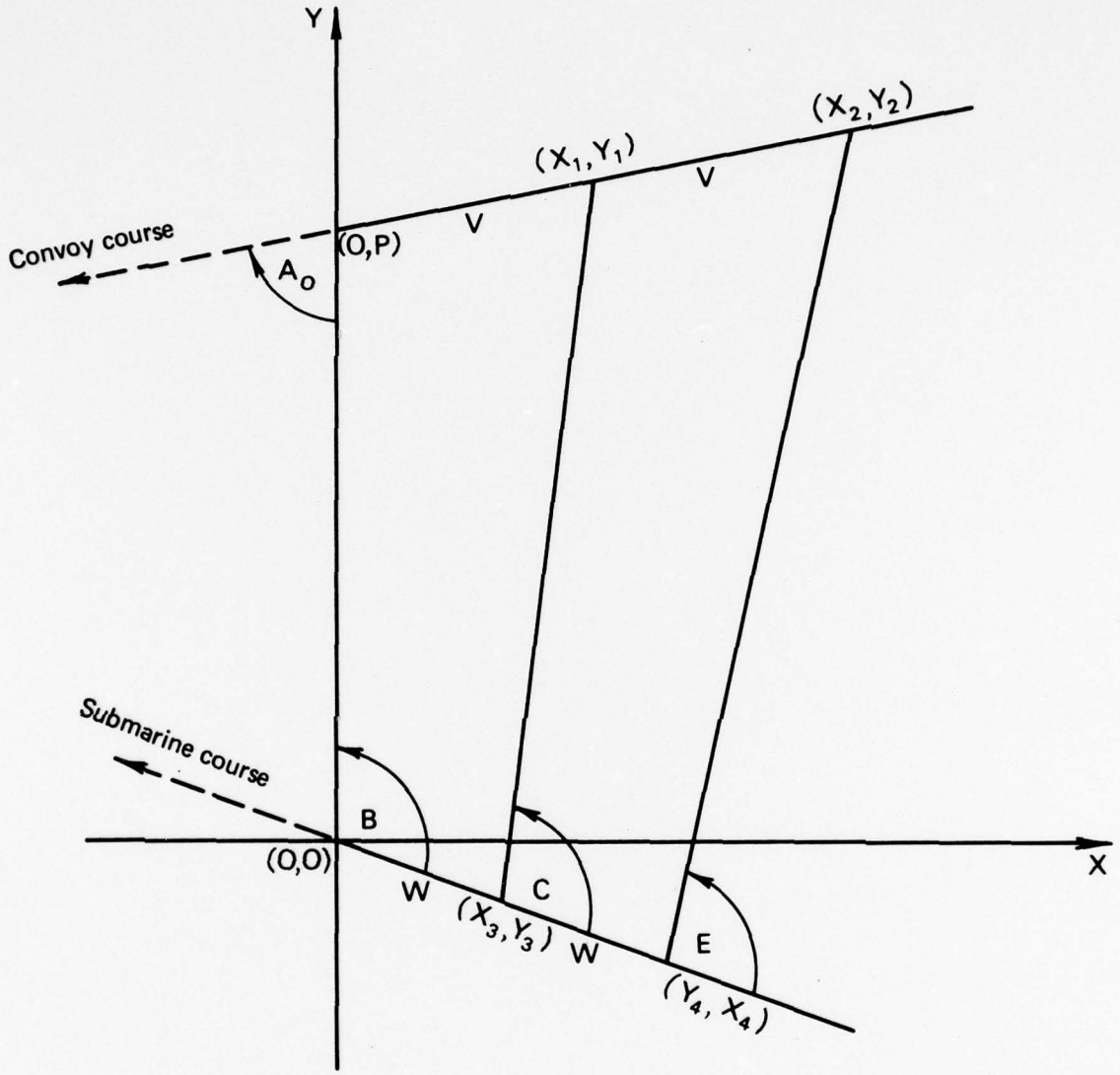
Y
(X_2, Y_2)
(X_1, Y_1)
V
V
Convoy course
(O,P)
A_o
Submarine course
B
(O,O)
X
W
C
(X_3, Y_3)
W
E
(Y_4, X_4)

FIGURE 2

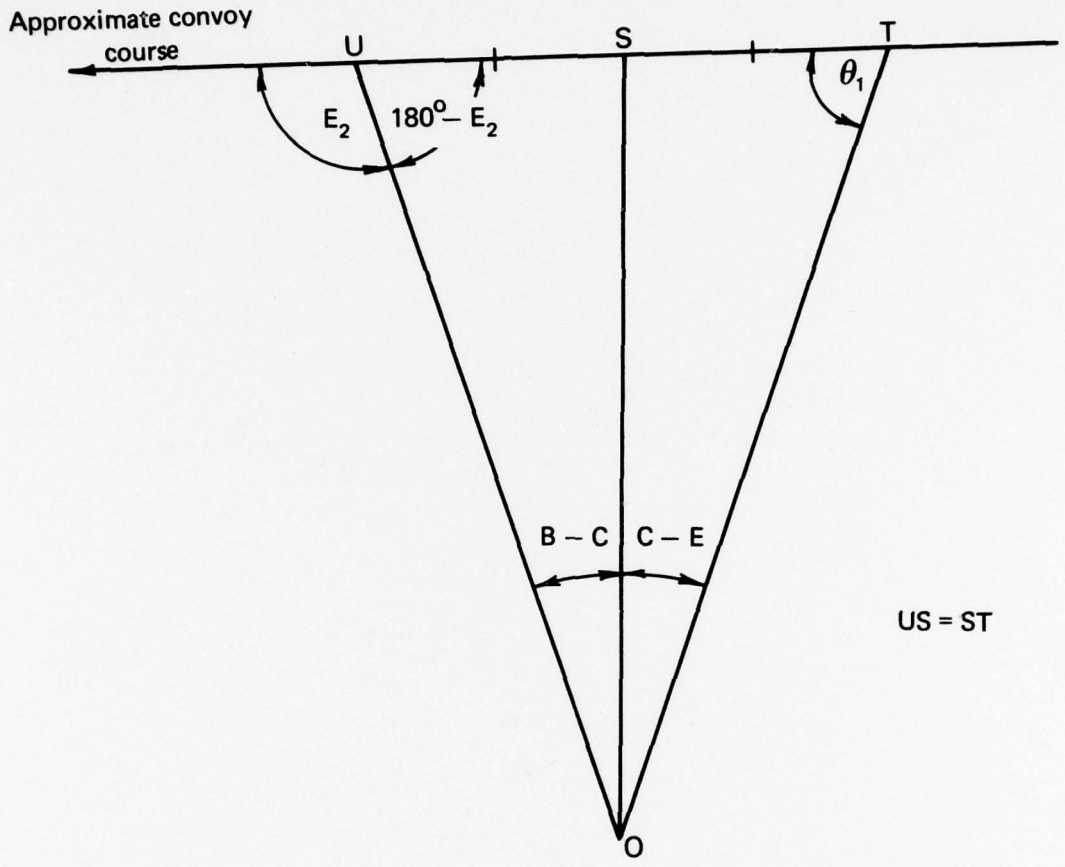

FIGURE 3

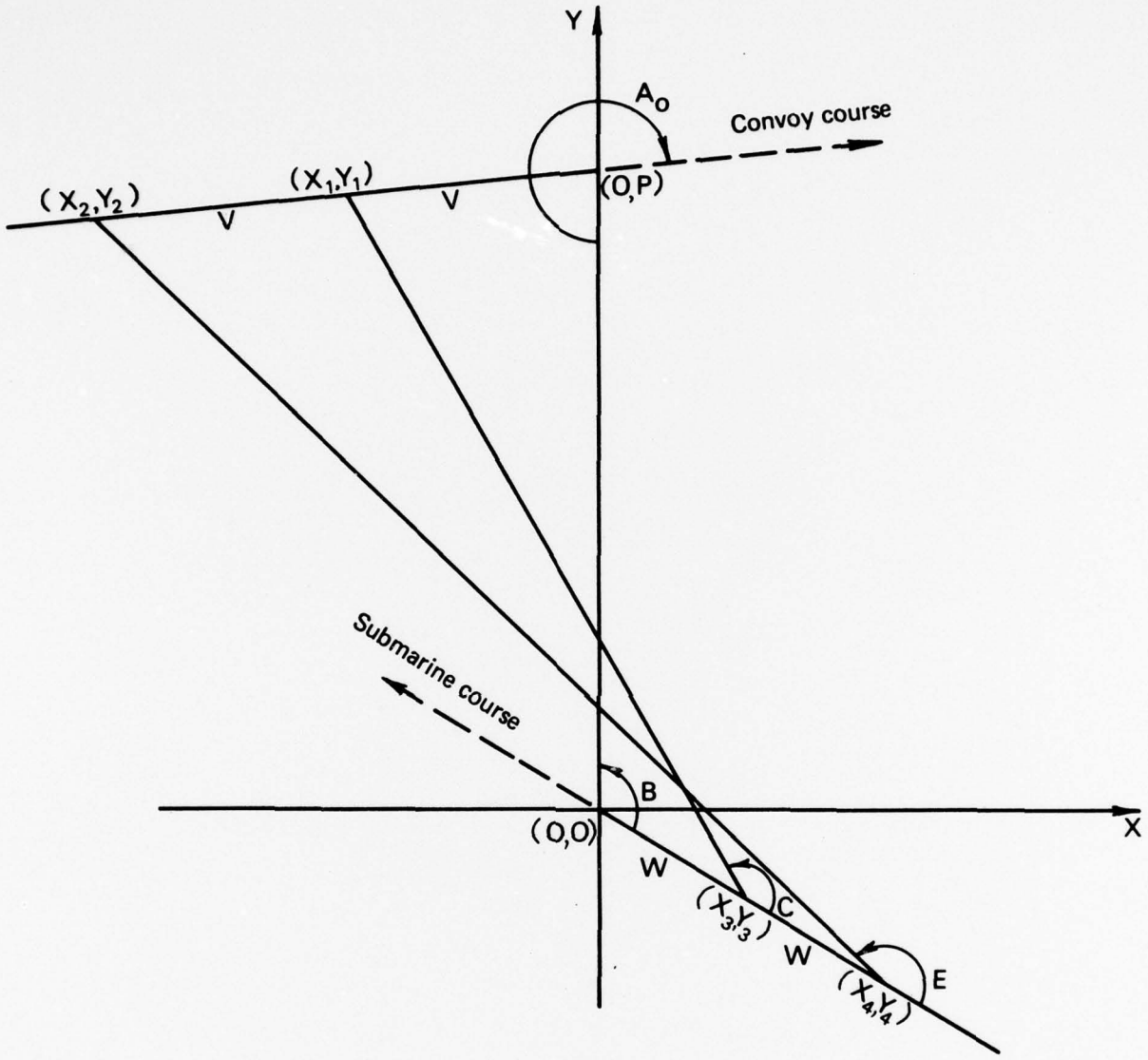
Y
A_o
Convoy course
(X_2,Y_2)
(X_1,Y_1)
V
V
(0,P)
Submarine course
B
(0,0)
X
W
(X_3,Y_3)
C
W
(X_4,Y_4)
E

FIGURE 4

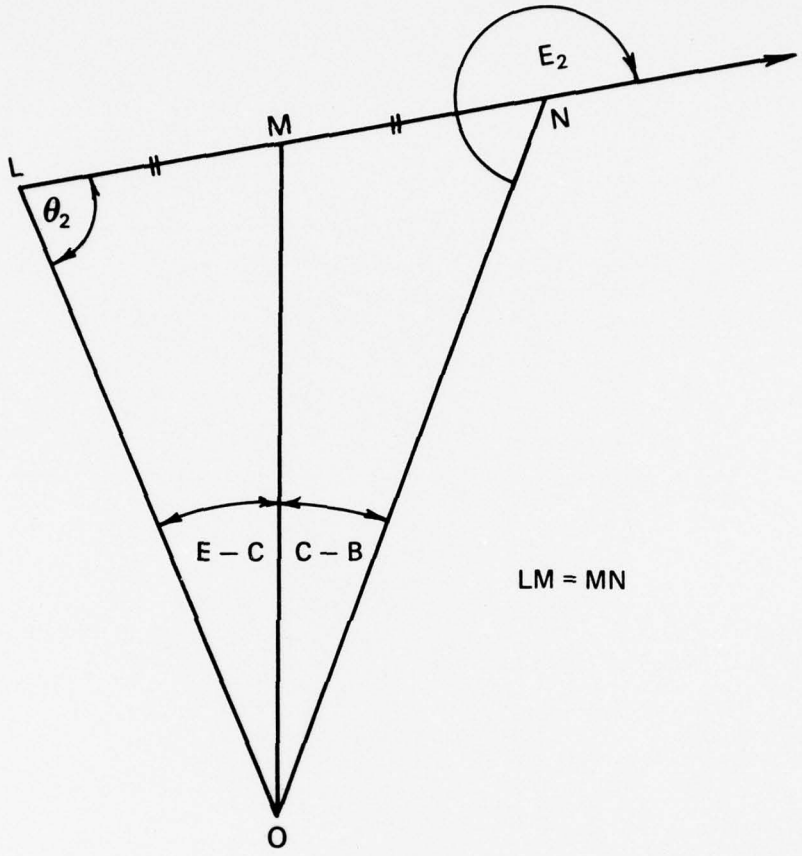

FIGURE 5

The "bearings only" approximation for *ATB* rests on two main assumptions:

(1) The convoy maintains a straight course and moves equal distances in equal time intervals.

(2) The motion of the submarine may be neglected.

All of the possible relative orientations of submarine and convoy are represented by figures 2 and 4. Application of the above assumptions to figures 2 and 4 allows their simplification to figures 3 and 5 respectively. Each case then yields a unique solution, E_2, for the approximate *ATB*. This solution is derived in Appendix I.

THE CALCULATIONS

In figures 2 and 4 the submarine moves a distance of W units in one unit of time. In the same time the convoy moves V units. The submarine and convoy are P units apart when the final bearing is recorded. Substituting $W = 1$ in the calculation allows P and V to be used as ratios, thus obtaining maximum generality in the results.

The ratios chosen for the calculations were based on the following data:

Submarine speed = 5 to 15 knots

Convoy speed = 10 to 25 knots

Hence V/W varies between 0·67 and 5. Ratio values of 1, 3 and 9 were selected for the calculations.

Let T minutes be the period during which bearings are recorded and let X nautical miles be the distance travelled by the submarine in $T/2$ minutes. The values of P/X are recorded below.

(i) Submarine speed = 5 knots

T	15	30	60
X	5/8	5/4	5/2
P	5–10	10–25	20–100
P/X	8–16	8–20	8 –40

(ii) Submarine speed = 15 knots

T	15	30	60
X	15/8	15/4	15/2
P	5–10	10–25	20–100
P/X	2·67–5·33	2·67–6·67	2·67–13·33

Ratio values of 1, 7 and 49 were selected for P/X.

Using selected values of P and V, the approximate *ATB* from the "bearings only" formula is compared to the known value of the *ATB* for a large number of values of A_0 and B. E_2 is the "bearings only" estimate of the *ATB*. The results of this calculation are tabulated in Appendix II.

In the tabulation of results, Z represents the absolute error which would be found if the bearing lines corresponding to A_0 and E_2 were drawn. All such errors $\geqslant 20°$ are indicated by an asterisk in the print out of results. An examination of the results indicates that the "bearings only" estimate for *ATB* improves as the ratio V/W increases. This finding is also reflected in the decreasing incidence of asterisks in the print out as V/W increases. The error, Z, appears to be independent of the ratio P/W.

CONCLUSION

The calculations indicate that the "bearings only" approximation for angle to bow (*ATB*) on the convoy is critically dependent on the assumption that the motion of the submarine may be neglected. The greater the value of the ratio $\frac{\text{speed of convoy}}{\text{speed of submarine}}$, the smaller the error in the estimated *ATB* obtained from the "bearings only" approximation. The error in the estimated *ATB* appears to be independent of the separation between the submarine and the convoy.

APPENDIX I

DERIVATION OF APPROXIMATE ANGLE TO BOW

Case (i)

Application of the Sine Rule to triangles OUS, OST (See figure 3) yields the equations

$$\frac{OS}{\sin(180^\circ - E_2)} = \frac{US}{\sin(B - C)} \tag{1}$$

$$\frac{OS}{\sin \theta_1} = \frac{ST}{\sin(C - E)} \tag{2}$$

Since $US = ST$ equation (1) may be simplified as

$$\frac{OS}{\sin E_2} = \frac{ST}{\sin(B - C)} \tag{3}$$

E_2 is an exterior angle to the triangle UOT. Hence

$$\begin{aligned} E_2 &= \theta_1 + (B - C) + (C - E) \\ &= \theta_1 + B - E \end{aligned}$$

Therefore $\theta_1 = E_2 - B + E$

Substituting for θ_1 in equation (2) yields

$$\frac{OS}{\sin(E_2 - B + E)} = \frac{ST}{\sin(C - E)} \tag{4}$$

Elimination of OS and ST from equations (3) and (4) leads to

$$\frac{\sin(E_2 - B + E)}{\sin E_2} = \frac{\sin(C - E)}{\sin(B - C)}$$

$$\therefore \frac{\sin E_2 \cos(B - E) - \cos E_2 \sin(B - E)}{\sin E_2} = \frac{\sin(C - E)}{\sin(B - C)} \tag{5}$$

$$\therefore \cos(B - E) - \frac{\sin(B - E)}{\tan E_2} = \frac{\sin(C - E)}{\sin(B - C)}$$

$$\therefore \cos(B - E) - \frac{\sin(C - E)}{\sin(B - C)} = \frac{\sin(B - E)}{\tan E_2}$$

$$\therefore \tan E_2 = \frac{\sin(B - C)\sin(B - E)}{\sin(B - C)\cos(B - E) - \sin(C - E)}$$

$$\therefore E_2 = \operatorname{artan}\left(\frac{\sin(B - C)\sin(B - E)}{\sin(B - C)\cos(B - E) - \sin(C - E)}\right) \tag{6}$$

Case (ii)

Application of the Sine Rule to triangles OLM, OMN (see figure 5) yields the equations

$$\frac{OM}{\sin \theta_2} = \frac{LM}{\sin(E - C)} \tag{7}$$

$$\frac{OM}{\sin(E_2 - 180^\circ)} = \frac{MN}{\sin(C - B)} \tag{8}$$

Since $LM = MN$ equation (8) can be simplified as

$$\frac{OM}{-\sin E_2} = \frac{LM}{\sin(C - B)} \tag{9}$$

Since $360° - E_2$ is an exterior angle to triangle OLN,

$$\begin{aligned} 360° - E_2 &= \theta_2 + (E - C) + (C - B) \\ &= \theta_2 + E - B \end{aligned}$$

Therefore $$\theta_2 = 360° - E_2 + B - E$$

Hence $$\begin{aligned} \sin \theta_2 &= \sin (360° - (E_2 - B + E)) \\ &= - \sin (E_2 - B + E) \end{aligned}$$

Equation (7) then simplifies to

$$\frac{OM}{- \sin (E_2 - B + E)} = \frac{LM}{\sin (E - C)} \tag{10}$$

Elimination of OM and LM from equations (9) and (10) leads to

$$\frac{\sin (E_2 - B + E)}{\sin E_2} = \frac{\sin (E - C)}{\sin (C - B)}$$

$$\therefore \frac{\sin E_2 \cos (B - E) - \cos E_2 \sin (B - E)}{\sin E_2} = \frac{\sin (C - E)}{\sin (B - C)}$$

This equation is identical with equation (5) and therefore leads to the formula given by equation (6).

APPENDIX II

THE CALCULATOR PROGRAM

The calculator program is written in BASIC for the Wang 2200A Programmable Calculator. A program listing is provided in the appendix. Statements 180, 200 and 210 are designed to avoid unnecessary calculations in situations where the bearings only approximation is not appropriate. Statement 360 terminates calculations for a given value of B when a collision course is indicated by the artan subroutine. Statements 380, 390 and 400 terminate calculations for a given value of B when the differences between B, C and E become too small to be significant. Statements 420 to 550 terminate calculations for a given value of B when calculations indicate that a collision course has been followed by ship and submarine. Statements 560 to 610 check that $B \geqslant C \geqslant E$ or $B < C < E$. If neither condition is met the calculation is terminated for the particular value of B.

The artan subroutine is contained in statements 790 to 990. Limited printout is produced when "collision" conditions are indicated. A more complete data printout is provided for each case in which computations are completed. The subroutine in lines 1000 to 1040 controls the number of lines of printing per page of output and arranges page numbering.

In the printout of results all errors $\geqslant 20°$ are indicated by*.

```
10 REM "BOA 1" F7 TAPE GJM4 18.8.1976
20 SELECT PRINT 215(80)
30 SELECT D
40 L5=1
50 PRINT :PRINT :PRINTUSING 1050,L5:PRINT :PRINT
60 PRINTUSING 1060:PRINT
70 L1=50
80 L2=0.000001
90 L3=0.000001
100 L=0:A$="*"
110 W=1
120 FOR I=1TO 3
130 V=3^(I-1)*W
140 FOR J=1TO 3
150 P=7^(J-1)*W
160 FOR A0=0 TO 340 STEP 20
170 FOR B=0 TO 180 STEP 20
180 IF (A0+B)<10 THEN 730
190 IF V>2 THEN 220
200 IF ABS(B-A0)<L2 THEN 730
210 IF ABS(B+A0-180)<L2 THEN 730
220 X1=V*SIN(A0)
230 Y1=P+V*COS(A0)
240 X2=2*X1
250 Y2=P+2*V*COS(A0)
260 X3=W*SIN(B)
270 Y3=W*COS(B)
280 X4=2*X3
290 Y4=2*Y3
300 X9=X1-X3: Y9=Y1-Y3
310 I9=1
320 GOSUB 790
330 C=E1+B-90
340 X9=X2-X4: Y9=Y2-Y4
350 GOSUB 790
360 IF I9<0 THEN 730
370 E=E1+B-90
380 IF ABS(B-E)<L3 THEN 730
390 IF ABS(B)+ABS(C)+ABS(E)<L3 THEN 410
400 IF ABS(B-180)+ABS(C-180)+ABS(E-180)>L3 THEN 420
410 PRINTUSING 1070,V,P,A0,B,C,E,B-C,C-E: GOSUB 1000: GOTO 730
420 IF ABS(B)<L3 THEN 510
430 IF ABS(B-180)<L3 THEN 540
440 IF ABS(C)<L3 THEN 480
450 IF ABS(C-180)>L3 THEN 560
460 IF ABS(E)<L3 THEN 490
470 GOTO 560
480 IF ABS(E-180)>L3 THEN 560
490 PRINTUSING 1070,V,P,A0,B,C,E,B-C,C-E: GOSUB 1000
500 PRINT TAB(7);"COLLISION": GOSUB 1000: GOTO 730
510 IF ABS(C-180)<L3 THEN 490
520 IF ABS(E-180)<L3 THEN 490
530 GOTO 560
540 IF ABS(C)<L3 THEN 490
```

```
550 IF ABS(E)<L3 THEN 490
560 I0=0
570 IF B-C<0 THEN 580: I0=I0+1: GOTO 590
580 I0=I0-1
590 IF C-E<0 THEN 600: I0=I0+1: GOTO 610
600 I0=I0-1
610 IF ABS(I0)<1 THEN 730
620 E0=SIN(B-C)*COS(B-E)-SIN(C-E)
630 IF ABS(E0)>=L3 THEN 640:E2=90:GOTO 670
640 E9=SIN(B-C)*SIN(B-E)/E0
650 E2=ARCTAN(E9)
660 IF E2>0 THEN 670:E2=E2+180
670 IF I0>1  THEN 680: E2=E2+180
680 Z=ABS(E2-A0): IF Z<180 THEN 690: Z=Z-360
690 IF ABS(Z)<20 THEN 710: PRINTUSING 1070, V, P, A0, B, C, E, B-C, C-E, E2, Z, A$
700 GOTO 720
710 PRINTUSING 1070, V, P, A0, B, C, E, B-C, C-E, E2, Z
720 GOSUB 1000
730 NEXT B
740 NEXT A0
750 NEXT J
760 NEXT I
770 PRINT HEX(07)
780 END
790 IF ABS(X9)<L3 THEN 930
800 IF ABS(Y9)<L3 THEN 900
810 R=SQR(X9^2+Y9^2)
820 S0=SGN(Y9/R)
830 T1=Y9/X9
840 E1=ARCTAN(T1)
850 IF T1>0 THEN 880
860 IF S0<0 THEN 980
870 E1=E1+180:GOTO 980
880 IF S0>0 THEN 980
890 E1=E1-180:GOTO 980
900 IF X9>0 THEN 920
910 E1=180:GOTO 980
920 E1=0:GOTO 980
930 IF ABS(Y9)>=L3 THEN 950
940 PRINT "COLLISION": I9=-1: GOSUB 1000: RETURN
950 IF Y9>0 THEN 970
960 E1=-90:GOTO 980
970 E1=90
980 IF E1>0 THEN 990: E1=E1+360
990 RETURN
1000 L=L+1
1010 IF L<L1 THEN 1040: PRINT HEX(0C): PRINT : PRINT
1020 L5=L5+1: PRINTUSING 1050,L5: PRINT : PRINT
1030 PRINTUSING 1060: PRINT : L=0
1040 RETURN
1050%                                          ###
1060%       V  P    A0  B      C         E         B-C      C-E      E2       Z
1070%       # ### ### ### -###.## -###.## -###.## -###.## -###.## -###.## #
```

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	1	0	20	37.87	51.40	-17.87	-13.52	279.99	80.00	*
1	1	0	40	67.51	81.21	-27.51	-13.69	290.00	70.00	*
1	1	0	60	90.00	100.89	-30.00	-10.89	300.00	59.99	*
1	1	0	80	108.33	116.59	-28.33	-8.25	310.00	50.00	*
1	1	0	100	124.37	130.47	-24.37	-6.09	320.00	40.00	*
1	1	0	120	139.10	143.41	-19.10	-4.30	330.00	30.00	*
1	1	0	140	153.08	155.83	-13.08	-2.75	340.00	19.99	
1	1	0	160	166.63	167.98	-6.63	-1.34	350.00	9.99	
1	1	20	0	-20.00	-37.87	20.00	17.87	99.99	79.99	*
1	1	20	40	54.37	64.05	-14.37	-9.68	299.99	80.00	*
1	1	20	60	80.00	89.14	-20.00	-9.14	310.00	69.99	*
1	1	20	80	100.00	106.91	-20.00	-6.91	319.99	60.00	*
1	1	20	100	116.91	121.72	-16.91	-4.80	330.00	49.99	*
1	1	20	120	132.12	135.11	-12.12	-2.99	340.00	39.99	*
1	1	20	140	146.34	147.76	-6.34	-1.42	350.00	29.99	*
1	1	20	180	173.36	172.01	6.63	1.34	9.99	10.00	
1	1	40	0	-40.00	-67.51	40.00	27.51	109.99	69.99	*
1	1	40	20	0.00	-22.66	20.00	22.66	120.00	80.00	*
1	1	40	60	70.00	76.24	-10.00	-6.24	319.99	80.00	*
1	1	40	80	92.12	97.38	-12.12	-5.26	330.00	69.99	*
1	1	40	100	110.00	113.36	-10.00	-3.36	340.00	59.99	*
1	1	40	120	125.62	127.20	-5.62	-1.57	349.99	50.00	*
1	1	40	160	153.65	152.23	6.34	1.42	9.99	30.00	*
1	1	40	180	166.91	164.16	13.08	2.75	19.99	20.00	*
1	1	60	20	-23.08	-63.43	43.08	40.35	130.00	70.00	*
1	1	60	40	23.08	-3.65	16.91	26.73	140.00	80.00	*
1	1	60	80	85.11	88.17	-5.11	-3.06	339.99	80.00	*
1	1	60	100	104.05	105.77	-4.05	-1.71	350.00	69.99	*
1	1	60	140	134.37	132.79	5.62	1.57	10.00	49.99	*
1	1	60	160	147.87	144.88	12.12	2.99	19.99	40.00	*
1	1	60	180	160.89	156.58	19.10	4.30	30.00	30.00	*
1	1	80	60	49.99	25.62	10.00	24.37	159.99	79.99	*
1	1	80	120	115.94	114.22	4.05	1.71	9.99	70.00	*
1	1	80	140	129.99	126.63	10.00	3.36	19.99	60.00	*
1	1	80	160	143.08	138.27	16.91	4.80	29.99	50.00	*
1	1	80	180	155.62	149.52	24.37	6.09	40.00	40.00	*
1	1	100	120	114.88	111.82	5.11	3.06	20.00	79.99	*
1	1	100	140	127.87	122.61	12.12	5.26	29.99	70.00	*
1	1	100	160	140.00	133.08	20.00	6.91	40.00	59.99	*
1	1	100	180	151.66	143.40	28.33	8.25	50.00	50.00	*
1	1	120	80	100.00	225.62	-20.00	-125.62	190.00	70.00	*
1	1	120	100	110.00	134.37	-10.00	-24.37	200.00	80.00	*
1	1	120	140	130.00	123.75	10.00	6.24	40.00	79.99	*
1	1	120	160	140.00	130.85	20.00	9.14	49.99	70.00	*
1	1	120	180	150.00	139.10	30.00	10.89	59.99	60.00	*
1	1	140	60	199.99	223.75	-139.99	-23.75	190.00	50.00	*
1	1	140	80	159.99	222.12	-79.99	-62.12	200.00	60.00	*
1	1	140	100	140.00	205.11	-40.00	-65.11	210.00	70.00	*
1	1	140	120	136.91	163.65	-16.91	-26.73	219.99	79.99	*
1	1	140	160	145.62	135.94	14.37	9.68	60.00	79.99	*

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	1	140	180	152.48	138.78	27.51	13.69	70.00	70.00	*
1	1	160	40	196.91	205.99	-156.91	-9.07	189.99	29.99	*
1	1	160	60	190.00	210.85	-130.00	-20.85	199.99	39.99	*
1	1	160	80	179.99	213.65	-99.99	-33.65	210.00	50.00	*
1	1	160	100	170.00	212.48	-70.00	-42.48	220.00	60.00	*
1	1	160	120	163.08	203.43	-43.08	-40.35	229.99	69.99	*
1	1	160	140	160.00	182.66	-20.00	-22.66	239.99	79.99	*
1	1	160	180	162.12	148.59	17.87	13.52	80.00	79.99	*
1	1	180	20	180.00	186.63	-160.00	-6.63	189.99	9.99	
1	1	180	40	180.00	193.08	-140.00	-13.08	200.00	20.00	*
1	1	180	60	180.00	199.10	-120.00	-19.10	209.99	29.99	*
1	1	180	80	179.99	204.37	-99.99	-24.37	220.00	40.00	*
1	1	180	100	180.00	208.33	-80.00	-28.33	230.00	50.00	*
1	1	180	120	180.00	210.00	-60.00	-30.00	240.00	60.00	*
1	1	180	140	180.00	207.51	-40.00	-27.51	250.00	70.00	*
1	1	180	160	180.00	197.87	-20.00	-17.87	260.00	80.00	*
1	1	200	0	160.00	166.63	-160.00	-6.63	189.99	10.00	
1	1	200	20	162.12	173.62	-142.12	-11.50	199.99	0.00	
1	1	200	40	165.62	180.75	-125.62	-15.13	209.99	9.99	
1	1	200	60	170.00	187.87	-110.00	-17.87	220.00	20.00	*
1	1	200	80	174.88	194.80	-94.88	-19.92	230.00	30.00	*
1	1	200	100	180.00	201.33	-80.00	-21.33	240.00	40.00	*
1	1	200	120	185.11	207.14	-65.11	-22.02	250.00	50.00	*
1	1	200	140	190.00	211.66	-50.00	-21.66	259.99	59.99	*
1	1	200	160	194.37	213.83	-34.37	-19.46	270.00	70.00	*
1	1	200	180	197.87	211.40	-17.87	-13.52	279.99	79.99	*
1	1	220	0	139.99	153.08	-139.99	-13.08	200.00	20.00	*
1	1	220	20	145.62	160.75	-125.62	-15.13	209.99	10.00	
1	1	220	40	152.48	168.75	-112.48	-16.27	220.00	0.00	
1	1	220	60	159.99	176.91	-99.99	-16.91	230.00	10.00	
1	1	220	80	167.87	185.11	-87.87	-17.23	240.00	20.00	*
1	1	220	100	175.94	193.24	-75.94	-17.30	250.00	30.00	*
1	1	220	120	184.05	201.18	-64.05	-17.12	259.99	39.99	*
1	1	220	140	192.12	208.74	-52.12	-16.62	270.00	50.00	*
1	1	220	160	200.00	215.62	-40.00	-15.62	279.99	59.99	*
1	1	220	180	207.51	221.21	-27.51	-13.69	290.00	70.00	*
1	1	240	0	120.00	139.10	-120.00	-19.10	209.99	30.00	*
1	1	240	20	130.00	147.87	-110.00	-17.87	220.00	20.00	*
1	1	240	40	139.99	156.91	-99.99	-16.91	230.00	9.99	
1	1	240	60	150.00	166.10	-90.00	-16.10	240.00	0.00	
1	1	240	80	160.00	175.35	-80.00	-15.35	250.00	10.00	
1	1	240	100	170.00	184.64	-70.00	-14.64	260.00	20.00	*
1	1	240	120	180.00	193.89	-60.00	-13.89	270.00	30.00	*
1	1	240	140	190.00	203.08	-50.00	-13.08	280.00	40.00	*
1	1	240	160	200.00	212.12	-40.00	-12.12	289.99	49.99	*
1	1	240	180	210.00	220.89	-30.00	-10.89	300.00	60.00	*
1	1	260	0	99.99	124.37	-99.99	-24.37	220.00	39.99	*
1	1	260	20	114.88	134.80	-94.88	-19.92	230.00	29.99	*
1	1	260	40	127.87	145.11	-87.87	-17.23	240.00	20.00	*
1	1	260	60	140.00	155.35	-80.00	-15.35	250.00	9.99	

V	P	A0	B	C	E	B-C	C-E	E2		
1	1	260	80	151.66	165.56	-71.66	-13.90	259.99	0.00	
1	1	260	100	163.08	175.75	-63.08	-12.67	270.00	10.00	
1	1	260	120	174.37	185.94	-54.37	-11.56	280.00	20.00	*
1	1	260	140	185.62	196.13	-45.62	-10.50	290.00	30.00	*
1	1	260	160	196.91	206.34	-36.91	-9.42	299.99	39.99	*
1	1	260	180	208.33	216.59	-28.33	-8.25	310.00	50.00	*
1	1	280	0	80.00	108.33	-80.00	-28.33	230.00	49.99	*
1	1	280	20	100.00	121.33	-80.00	-21.33	240.00	39.99	*
1	1	280	40	115.94	133.24	-75.94	-17.30	250.00	29.99	*
1	1	280	60	130.00	144.64	-70.00	-14.64	259.99	20.00	*
1	1	280	80	143.08	155.75	-63.08	-12.67	270.00	10.00	
1	1	280	100	155.62	166.72	-55.62	-11.09	280.00	0.00	
1	1	280	120	167.87	177.62	-47.87	-9.74	289.99	9.99	
1	1	280	140	180.00	188.50	-40.00	-8.50	300.00	20.00	*
1	1	280	160	192.12	199.43	-32.12	-7.31	309.99	29.99	*
1	1	280	180	204.37	210.47	-24.37	-6.09	320.00	40.00	*
1	1	300	0	60.00	90.00	-60.00	-30.00	240.00	60.00	*
1	1	300	20	85.11	107.14	-65.11	-22.02	250.00	50.00	*
1	1	300	40	104.05	121.18	-64.05	-17.12	259.99	40.00	*
1	1	300	60	120.00	133.89	-60.00	-13.89	270.00	30.00	*
1	1	300	80	134.37	145.94	-54.37	-11.56	280.00	20.00	*
1	1	300	100	147.87	157.62	-47.87	-9.74	289.99	10.00	
1	1	300	120	160.89	169.10	-40.89	-8.21	299.99	0.00	
1	1	300	140	173.65	180.50	-33.65	-6.85	309.99	9.99	
1	1	300	160	186.34	191.91	-26.34	-5.57	319.99	19.99	
1	1	300	180	199.10	203.41	-19.10	-4.30	330.00	30.00	*
1	1	320	0	40.00	67.51	-40.00	-27.51	250.00	69.99	*
1	1	320	20	70.00	91.66	-50.00	-21.66	260.00	60.00	*
1	1	320	40	92.12	108.74	-52.12	-16.62	270.00	50.00	*
1	1	320	60	110.00	123.08	-50.00	-13.08	280.00	40.00	*
1	1	320	80	125.62	136.13	-45.62	-10.50	290.00	30.00	*
1	1	320	100	140.00	148.50	-40.00	-8.50	300.00	19.99	
1	1	320	120	153.65	160.50	-33.65	-6.85	309.99	10.00	
1	1	320	140	166.91	172.31	-26.91	-5.40	319.99	0.00	
1	1	320	160	180.00	184.05	-20.00	-4.05	330.00	10.00	
1	1	320	180	193.08	195.83	-13.08	-2.75	340.00	20.00	*
1	1	340	0	20.00	37.87	-20.00	-17.87	260.00	79.99	*
1	1	340	20	54.37	73.83	-34.37	-19.46	270.00	70.00	*
1	1	340	40	80.00	95.62	-40.00	-15.62	279.99	60.00	*
1	1	340	60	100.00	112.12	-40.00	-12.12	289.99	50.00	*
1	1	340	80	116.91	126.34	-36.91	-9.42	299.99	40.00	*
1	1	340	100	132.12	139.43	-32.12	-7.31	309.99	30.00	*
1	1	340	120	146.34	151.91	-26.34	-5.57	319.99	20.00	*
1	1	340	140	160.00	164.05	-20.00	-4.05	330.00	9.99	
1	1	340	160	173.36	176.03	-13.36	-2.67	340.00	0.00	
1	1	340	180	186.63	187.98	-6.63	-1.34	350.00	10.00	
1	7	0	20	22.77	25.48	-2.77	-2.71	279.99	80.00	*
1	7	0	40	45.07	49.76	-5.07	-4.68	290.00	69.99	*
1	7	0	60	66.58	72.21	-6.58	-5.62	299.99	60.00	*
1	7	0	80	87.17	92.82	-7.17	-5.65	309.99	50.00	*

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	7	0	100	106.87	111.89	-6.87	-5.02	319.99	40.00	*
1	7	0	120	125.81	129.82	-5.81	-4.00	329.99	30.00	*
1	7	0	140	144.19	146.95	-4.19	-2.76	340.00	19.99	
1	7	0	160	162.19	163.59	-2.19	-1.40	350.00	9.99	
1	7	20	0	-2.82	-5.67	2.82	2.85	99.99	79.99	*
1	7	20	40	42.40	44.68	-2.40	-2.27	300.00	79.99	*
1	7	20	60	64.02	67.57	-4.02	-3.54	309.99	70.00	*
1	7	20	80	84.73	88.56	-4.73	-3.83	319.99	60.00	*
1	7	20	100	104.52	107.93	-4.52	-3.40	329.99	50.00	*
1	7	20	120	123.55	126.05	-3.55	-2.50	340.00	39.99	*
1	7	20	140	141.97	143.30	-1.97	-1.32	349.99	30.00	*
1	7	20	180	177.80	176.40	2.19	1.40	9.99	10.00	
1	7	40	0	-5.42	-11.13	5.42	5.70	109.99	69.99	*
1	7	40	20	17.47	14.83	2.52	2.64	119.99	79.99	*
1	7	40	60	61.75	63.39	-1.75	-1.63	320.00	79.99	*
1	7	40	80	82.57	84.77	-2.57	-2.19	329.99	70.00	*
1	7	40	100	102.46	104.40	-2.46	-1.93	339.99	60.00	*
1	7	40	120	121.54	122.68	-1.54	-1.13	350.00	49.99	*
1	7	40	160	158.02	156.69	1.97	1.32	10.00	29.99	*
1	7	40	180	175.80	173.04	4.19	2.76	19.99	20.00	*
1	7	60	0	-7.58	-16.10	7.58	8.51	119.99	59.99	*
1	7	60	20	15.43	10.28	4.56	5.14	130.00	70.00	*
1	7	60	40	38.10	36.05	1.89	2.05	140.00	80.00	*
1	7	60	80	80.92	81.77	-0.92	-0.84	339.99	80.00	*
1	7	60	100	100.88	101.63	-0.88	-0.74	349.99	70.00	*
1	7	60	140	138.45	137.31	1.54	1.13	9.99	50.00	*
1	7	60	160	156.44	153.94	3.55	2.50	19.99	40.00	*
1	7	60	180	174.18	170.17	5.81	4.00	30.00	29.99	*
1	7	80	0	-9.06	-20.22	9.06	11.15	130.00	50.00	*
1	7	80	20	14.11	6.76	5.88	7.34	140.00	60.00	*
1	7	80	40	36.94	33.29	3.05	3.65	150.00	70.00	*
1	7	80	60	58.98	57.85	1.01	1.12	159.99	79.99	*
1	7	80	120	119.11	118.36	0.88	0.74	10.00	69.99	*
1	7	80	140	137.53	135.59	2.46	1.93	20.00	59.99	*
1	7	80	160	155.47	152.06	4.52	3.40	30.00	49.99	*
1	7	80	180	173.12	168.10	6.87	5.02	40.00	39.99	*
1	7	100	0	-9.59	-22.94	9.59	13.35	140.00	40.00	*
1	7	100	20	13.76	4.92	6.23	8.84	149.99	49.99	*
1	7	100	40	36.76	32.39	3.23	4.37	160.00	60.00	*
1	7	100	60	58.92	57.59	1.07	1.33	169.99	69.99	*
1	7	100	120	119.07	118.22	0.92	0.84	20.00	79.99	*
1	7	100	140	137.42	135.22	2.57	2.19	30.00	69.99	*
1	7	100	160	155.26	151.43	4.73	3.83	40.00	59.99	*
1	7	100	180	172.82	167.17	7.17	5.65	50.00	49.99	*
1	7	120	0	-8.94	-23.41	8.94	14.46	150.00	30.00	*
1	7	120	20	14.61	5.73	5.38	8.88	159.99	39.99	*
1	7	120	40	37.77	34.29	2.22	3.47	170.00	50.00	*
1	7	120	80	81.07	82.40	-1.07	-1.33	190.00	70.00	*
1	7	120	100	101.01	102.14	-1.01	-1.12	200.00	80.00	*
1	7	120	140	138.24	136.60	1.75	1.63	39.99	80.00	*

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	7	120	160	155.97	152.42	4.02	3.54	50.00	69.99	*
1	7	120	180	173.41	167.78	6.58	5.62	60.00	59.99	*
1	7	140	0	-7.00	-20.34	7.00	13.33	159.99	19.99	
1	7	140	20	16.74	10.48	3.25	6.26	170.00	30.00	*
1	7	140	60	62.22	65.70	-2.22	-3.47	189.99	49.99	*
1	7	140	80	83.23	87.60	-3.23	-4.37	199.99	59.99	*
1	7	140	100	103.05	106.70	-3.05	-3.65	209.99	69.99	*
1	7	140	120	121.89	123.94	-1.89	-2.05	219.99	79.99	*
1	7	140	160	157.59	155.31	2.40	2.27	59.99	80.00	*
1	7	140	180	174.92	170.23	5.07	4.68	69.99	70.00	*
1	7	160	0	-3.86	-12.36	3.86	8.49	170.00	10.00	
1	7	160	40	43.25	49.51	-3.25	-6.26	190.00	30.00	*
1	7	160	60	65.38	74.26	-5.38	-8.88	200.00	40.00	*
1	7	160	80	86.23	95.07	-6.23	-8.84	210.00	50.00	*
1	7	160	100	105.88	113.23	-5.88	-7.34	219.99	59.99	*
1	7	160	120	124.56	129.71	-4.56	-5.14	229.99	69.99	*
1	7	160	140	142.52	145.16	-2.52	-2.64	240.00	80.00	*
1	7	160	180	177.22	174.51	2.77	2.71	80.00	79.99	*
1	7	180	20	23.86	32.36	-3.86	-8.49	189.99	9.99	
1	7	180	40	47.00	60.34	-7.00	-13.33	200.00	20.00	*
1	7	180	60	68.94	83.41	-8.94	-14.46	209.99	29.99	*
1	7	180	80	89.59	102.94	-9.59	-13.35	219.99	39.99	*
1	7	180	100	109.06	120.22	-9.06	-11.15	229.99	49.99	*
1	7	180	120	127.58	136.10	-7.58	-8.51	240.00	60.00	*
1	7	180	140	145.42	151.13	-5.42	-5.70	250.00	70.00	*
1	7	180	160	162.82	165.67	-2.82	-2.85	260.00	80.00	*
1	7	200	0	3.86	12.36	-3.86	-8.49	189.99	10.00	
1	7	200	20	27.60	42.88	-7.60	-15.27	199.99	0.00	
1	7	200	40	50.53	68.76	-10.53	-18.22	210.00	10.00	
1	7	200	60	72.25	90.38	-12.25	-18.12	220.00	20.00	*
1	7	200	80	92.70	109.07	-12.70	-16.36	230.00	30.00	*
1	7	200	100	112.01	125.88	-12.01	-13.87	239.99	39.99	*
1	7	200	120	130.43	141.54	-10.43	-11.10	250.00	50.00	*
1	7	200	140	148.20	156.49	-8.20	-8.28	259.99	59.99	*
1	7	200	160	165.58	171.05	-5.58	-5.47	270.00	70.00	*
1	7	200	180	182.77	185.48	-2.77	-2.71	279.99	79.99	*
1	7	220	0	7.00	20.34	-7.00	-13.33	200.00	19.99	
1	7	220	20	30.53	48.76	-10.53	-18.22	210.00	10.00	
1	7	220	40	53.23	73.15	-13.23	-19.92	219.99	0.00	
1	7	220	60	74.74	94.03	-14.74	-19.29	229.99	9.99	
1	7	220	80	95.03	112.44	-15.03	-17.41	240.00	20.00	*
1	7	220	100	114.25	129.23	-14.25	-14.98	249.99	29.99	*
1	7	220	120	132.62	145.01	-12.62	-12.38	260.00	40.00	*
1	7	220	140	150.40	160.16	-10.40	-9.76	270.00	50.00	*
1	7	220	160	167.81	175.00	-7.81	-7.18	280.00	60.00	*
1	7	220	180	185.07	189.76	-5.07	-4.68	290.00	70.00	*
1	7	240	0	8.94	23.41	-8.94	-14.46	209.99	30.00	*
1	7	240	20	32.25	50.38	-12.25	-18.12	220.00	19.99	
1	7	240	40	54.74	74.03	-14.74	-19.29	229.99	10.00	
1	7	240	60	76.10	94.71	-16.10	-18.61	239.99	0.00	

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	7	240	80	96.30	113.21	-16.30	-16.91	250.00	10.00	
1	7	240	100	115.50	130.25	-15.50	-14.74	259.99	19.99	
1	7	240	120	133.89	146.32	-13.89	-12.43	270.00	30.00	*
1	7	240	140	151.73	161.83	-11.73	-10.10	279.99	39.99	*
1	7	240	160	169.22	177.04	-9.22	-7.82	290.00	50.00	*
1	7	240	180	186.58	192.21	-6.58	-5.62	299.99	59.99	*
1	7	260	0	9.59	22.94	-9.59	-13.35	219.99	40.00	*
1	7	260	20	32.70	49.07	-12.70	-16.36	230.00	29.99	*
1	7	260	40	55.03	72.44	-15.03	-17.41	240.00	19.99	
1	7	260	60	76.30	93.21	-16.30	-16.91	250.00	9.99	
1	7	260	80	96.49	111.99	-16.49	-15.50	260.00	0.00	
1	7	260	100	115.71	129.36	-15.71	-13.65	270.00	10.00	
1	7	260	120	134.17	145.81	-14.17	-11.63	280.00	20.00	*
1	7	260	140	152.09	161.68	-12.09	-9.58	289.99	29.99	*
1	7	260	160	169.69	177.27	-9.69	-7.58	300.00	40.00	*
1	7	260	180	187.17	192.82	-7.17	-5.65	309.99	49.99	*
1	7	280	0	9.06	20.22	-9.06	-11.15	229.99	50.00	*
1	7	280	20	32.01	45.88	-12.01	-13.87	239.99	40.00	*
1	7	280	40	54.25	69.23	-14.25	-14.98	249.99	30.00	*
1	7	280	60	75.50	90.25	-15.50	-14.74	259.99	20.00	*
1	7	280	80	95.71	109.36	-15.71	-13.65	270.00	10.00	
1	7	280	100	115.00	127.11	-15.00	-12.10	280.00	0.00	
1	7	280	120	133.56	143.91	-13.56	-10.35	290.00	10.00	
1	7	280	140	151.58	160.13	-11.58	-8.54	300.00	20.00	*
1	7	280	160	169.28	176.04	-9.28	-6.75	309.99	29.99	*
1	7	280	180	186.87	191.89	-6.87	-5.02	319.99	39.99	*
1	7	300	0	7.58	16.10	-7.58	-8.51	240.00	59.99	*
1	7	300	20	30.43	41.54	-10.43	-11.10	250.00	49.99	*
1	7	300	40	52.62	65.01	-12.62	-12.38	260.00	40.00	*
1	7	300	60	73.89	86.32	-13.89	-12.43	270.00	30.00	*
1	7	300	80	94.17	105.81	-14.17	-11.63	280.00	19.99	
1	7	300	100	113.56	123.91	-13.56	-10.35	290.00	9.99	
1	7	300	120	132.21	141.05	-12.21	-8.83	299.99	0.00	
1	7	300	140	150.34	157.56	-10.34	-7.22	309.99	9.99	
1	7	300	160	168.14	173.74	-8.14	-5.59	319.99	19.99	
1	7	300	180	185.81	189.82	-5.81	-4.00	329.99	29.99	*
1	7	320	0	5.42	11.13	-5.42	-5.70	250.00	69.99	*
1	7	320	20	28.20	36.49	-8.20	-8.28	259.99	60.00	*
1	7	320	40	50.40	60.16	-10.40	-9.76	270.00	50.00	*
1	7	320	60	71.73	81.83	-11.73	-10.10	279.99	40.00	*
1	7	320	80	92.09	101.68	-12.09	-9.58	289.99	30.00	*
1	7	320	100	111.58	120.13	-11.58	-8.54	300.00	19.99	
1	7	320	120	130.34	137.56	-10.34	-7.22	309.99	10.00	
1	7	320	140	148.56	154.33	-8.56	-5.76	320.00	0.00	
1	7	320	160	166.45	170.71	-6.45	-4.25	330.00	10.00	
1	7	320	180	184.19	186.95	-4.19	-2.76	340.00	20.00	*
1	7	340	0	2.82	5.67	-2.82	-2.85	260.00	79.99	*
1	7	340	20	25.58	31.05	-5.58	-5.47	270.00	70.00	*
1	7	340	40	47.81	55.00	-7.81	-7.18	280.00	59.99	*
1	7	340	60	69.22	77.04	-9.22	-7.82	290.00	49.99	*

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	7	340	80	89.69	97.27	-9.69	-7.58	300.00	39.99	*
1	7	340	100	109.28	116.04	-9.28	-6.75	309.99	30.00	*
1	7	340	120	128.14	133.74	-8.14	-5.59	319.99	20.00	*
1	7	340	140	146.45	150.71	-6.45	-4.25	330.00	9.99	
1	7	340	160	164.40	167.24	-4.40	-2.84	340.00	0.00	
1	7	340	180	182.19	183.59	-2.19	-1.40	350.00	10.00	
1	49	0	20	20.39	20.79	-0.39	-0.39	280.00	79.99	*
1	49	0	40	40.74	41.48	-0.74	-0.74	289.99	70.00	*
1	49	0	60	61.00	61.98	-1.00	-0.98	300.00	59.99	*
1	49	0	80	81.13	82.22	-1.13	-1.09	309.99	50.00	*
1	49	0	100	101.12	102.19	-1.12	-1.07	319.99	40.00	*
1	49	0	120	120.98	121.90	-0.98	-0.92	330.00	29.99	*
1	49	0	140	140.72	141.40	-0.72	-0.67	340.00	19.99	
1	49	0	160	160.38	160.74	-0.38	-0.35	349.99	10.00	
1	49	20	0	-0.40	-0.80	0.40	0.40	100.00	80.00	*
1	49	20	40	40.35	40.69	-0.35	-0.34	300.00	79.99	*
1	49	20	60	60.60	61.20	-0.60	-0.59	309.99	70.00	*
1	49	20	80	80.74	81.45	-0.74	-0.71	320.00	59.99	*
1	49	20	100	100.73	101.43	-0.73	-0.70	329.99	50.00	*
1	49	20	120	120.59	121.15	-0.59	-0.56	339.99	40.00	*
1	49	20	140	140.33	140.65	-0.33	-0.31	350.00	29.99	*
1	49	20	180	179.61	179.25	0.38	0.35	10.00	9.99	
1	49	40	0	-0.75	-1.51	0.75	0.76	109.99	69.99	*
1	49	40	20	19.64	19.29	0.35	0.35	120.00	80.00	*
1	49	40	60	60.25	60.51	-0.25	-0.25	320.00	79.99	*
1	49	40	80	80.39	80.78	-0.39	-0.38	330.00	69.99	*
1	49	40	100	100.39	100.77	-0.39	-0.37	340.00	59.99	*
1	49	40	120	120.25	120.49	-0.25	-0.24	350.00	49.99	*
1	49	40	160	159.66	159.34	0.33	0.31	9.99	30.00	*
1	49	40	180	179.27	178.59	0.72	0.67	19.99	20.00	*
1	49	60	0	-1.02	-2.06	1.02	1.04	120.00	60.00	*
1	49	60	20	19.38	18.75	0.61	0.62	129.99	69.99	*
1	49	60	40	39.73	39.47	0.26	0.26	140.00	80.00	*
1	49	60	80	80.13	80.27	-0.13	-0.13	340.00	79.99	*
1	49	60	100	100.13	100.27	-0.13	-0.13	349.99	70.00	*
1	49	60	140	139.74	139.50	0.25	0.24	9.99	50.00	*
1	49	60	160	159.40	158.84	0.59	0.56	20.00	39.99	*
1	49	60	180	179.01	178.09	0.98	0.92	29.99	30.00	*
1	49	80	0	-1.17	-2.38	1.17	1.21	130.00	50.00	*
1	49	80	20	19.23	18.44	0.76	0.78	140.00	60.00	*
1	49	80	40	39.59	39.18	0.40	0.41	149.99	69.99	*
1	49	80	60	59.86	59.71	0.13	0.14	159.99	79.99	*
1	49	80	120	119.86	119.72	0.13	0.13	10.00	69.99	*
1	49	80	140	139.60	139.22	0.39	0.37	19.99	60.00	*
1	49	80	160	159.26	158.56	0.73	0.70	30.00	49.99	*
1	49	80	180	178.87	177.80	1.12	1.07	40.00	39.99	*
1	49	100	0	-1.17	-2.41	1.17	1.23	140.00	40.00	*
1	49	100	20	19.23	18.42	0.76	0.80	149.99	49.99	*
1	49	100	40	39.59	39.16	0.40	0.42	160.00	60.00	*
1	49	100	60	59.85	59.71	0.14	0.14	170.00	70.00	*

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	49	100	120	119.86	119.72	0.13	0.13	19.99	80.00	*
1	49	100	140	139.60	139.21	0.39	0.38	29.99	70.00	*
1	49	100	160	159.25	158.54	0.74	0.71	39.99	60.00	*
1	49	100	180	178.86	177.77	1.13	1.09	50.00	49.99	*
1	49	120	0	-1.04	-2.15	1.04	1.11	150.00	30.00	*
1	49	120	20	19.36	18.69	0.63	0.67	159.99	39.99	*
1	49	120	40	39.73	39.44	0.26	0.28	169.99	49.99	*
1	49	120	80	80.14	80.28	-0.14	-0.14	189.99	69.99	*
1	49	120	100	100.13	100.28	-0.13	-0.14	200.00	80.00	*
1	49	120	140	139.74	139.48	0.25	0.25	39.99	80.00	*
1	49	120	160	159.39	158.79	0.60	0.59	50.00	69.99	*
1	49	120	180	178.99	178.01	1.00	0.98	59.99	60.00	*
1	49	140	0	-0.77	-1.61	0.77	0.83	159.99	19.99	
1	49	140	20	19.63	19.24	0.36	0.39	170.00	30.00	*
1	49	140	60	60.26	60.55	-0.26	-0.28	190.00	50.00	*
1	49	140	80	80.40	80.83	-0.40	-0.42	199.99	59.99	*
1	49	140	100	100.40	100.81	-0.40	-0.41	210.00	70.00	*
1	49	140	120	120.26	120.52	-0.26	-0.26	219.99	79.99	*
1	49	140	160	159.64	159.30	0.35	0.34	59.99	80.00	*
1	49	140	180	179.25	178.51	0.74	0.74	70.00	69.99	*
1	49	160	0	-0.41	-0.86	0.41	0.45	169.99	9.99	
1	49	160	40	40.36	40.75	-0.36	-0.39	189.99	29.99	*
1	49	160	60	60.63	61.30	-0.63	-0.67	200.00	40.00	*
1	49	160	80	80.76	81.57	-0.76	-0.80	210.00	50.00	*
1	49	160	100	100.76	101.55	-0.76	-0.78	219.99	59.99	*
1	49	160	120	120.61	121.24	-0.61	-0.62	230.00	70.00	*
1	49	160	140	140.35	140.70	-0.35	-0.35	239.99	79.99	*
1	49	160	180	179.60	179.20	0.39	0.39	79.99	80.00	*
1	49	180	20	20.41	20.86	-0.41	-0.45	190.00	10.00	
1	49	180	40	40.77	41.61	-0.77	-0.83	200.00	20.00	*
1	49	180	60	61.04	62.15	-1.04	-1.11	209.99	29.99	*
1	49	180	80	81.17	82.41	-1.17	-1.23	219.99	39.99	*
1	49	180	100	101.17	102.38	-1.17	-1.21	229.99	49.99	*
1	49	180	120	121.02	122.06	-1.02	-1.04	239.99	59.99	*
1	49	180	140	140.75	141.51	-0.75	-0.76	250.00	70.00	*
1	49	180	160	160.40	160.80	-0.40	-0.40	259.99	79.99	*
1	49	200	0	0.41	0.86	-0.41	-0.45	190.00	9.99	
1	49	200	20	20.83	21.73	-0.83	-0.90	200.00	0.00	
1	49	200	40	41.19	42.47	-1.19	-1.28	209.99	9.99	
1	49	200	60	61.45	62.99	-1.45	-1.54	220.00	20.00	*
1	49	200	80	81.58	83.24	-1.58	-1.66	230.00	30.00	*
1	49	200	100	101.57	103.19	-1.57	-1.62	240.00	40.00	*
1	49	200	120	121.42	122.87	-1.42	-1.44	249.99	49.99	*
1	49	200	140	141.15	142.31	-1.15	-1.16	259.99	59.99	*
1	49	200	160	160.79	161.59	-0.79	-0.79	270.00	70.00	*
1	49	200	180	180.39	180.79	-0.39	-0.39	280.00	80.00	*
1	49	220	0	0.77	1.61	-0.77	-0.83	200.00	19.99	
1	49	220	20	21.19	22.47	-1.19	-1.28	209.99	10.00	
1	49	220	40	41.55	43.20	-1.55	-1.65	220.00	0.00	
1	49	220	60	61.81	63.71	-1.81	-1.90	229.99	9.99	

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	49	220	80	81.93	83.95	-1.93	-2.01	240.00	20.00	*
1	49	220	100	101.92	103.89	-1.92	-1.96	250.00	30.00	*
1	49	220	120	121.77	123.56	-1.77	-1.78	260.00	40.00	*
1	49	220	140	141.50	143.00	-1.50	-1.50	270.00	50.00	*
1	49	220	160	161.14	162.28	-1.14	-1.13	280.00	60.00	*
1	49	220	180	180.74	181.48	-0.74	-0.74	289.99	69.99	*
1	49	240	0	1.04	2.15	-1.04	-1.11	209.99	30.00	*
1	49	240	20	21.45	22.99	-1.45	-1.54	220.00	19.99	
1	49	240	40	41.81	43.71	-1.81	-1.90	229.99	10.00	
1	49	240	60	62.06	64.21	-2.06	-2.14	239.99	0.00	
1	49	240	80	82.19	84.44	-2.19	-2.24	250.00	10.00	
1	49	240	100	102.17	104.37	-2.17	-2.20	260.00	20.00	*
1	49	240	120	122.02	124.04	-2.02	-2.01	270.00	30.00	*
1	49	240	140	141.75	143.48	-1.75	-1.73	279.99	39.99	*
1	49	240	160	161.39	162.77	-1.39	-1.37	290.00	50.00	*
1	49	240	180	181.00	181.98	-1.00	-0.98	300.00	60.00	*
1	49	260	0	1.17	2.41	-1.17	-1.23	219.99	40.00	*
1	49	260	20	21.58	23.24	-1.58	-1.66	230.00	29.99	*
1	49	260	40	41.93	43.95	-1.93	-2.01	240.00	19.99	
1	49	260	60	62.19	64.44	-2.19	-2.24	250.00	9.99	
1	49	260	80	82.31	84.66	-2.31	-2.34	259.99	0.00	
1	49	260	100	102.30	104.59	-2.30	-2.29	270.00	10.00	
1	49	260	120	122.14	124.26	-2.14	-2.11	280.00	20.00	*
1	49	260	140	141.87	143.71	-1.87	-1.83	289.99	29.99	*
1	49	260	160	161.52	163.00	-1.52	-1.47	299.99	39.99	*
1	49	260	180	181.13	182.22	-1.13	-1.09	309.99	49.99	*
1	49	280	0	1.17	2.38	-1.17	-1.21	229.99	50.00	*
1	49	280	20	21.57	23.19	-1.57	-1.62	240.00	39.99	*
1	49	280	40	41.92	43.89	-1.92	-1.96	250.00	29.99	*
1	49	280	60	62.17	64.37	-2.17	-2.20	260.00	19.99	
1	49	280	80	82.30	84.59	-2.30	-2.29	270.00	10.00	
1	49	280	100	102.28	104.53	-2.28	-2.24	280.00	0.00	
1	49	280	120	122.13	124.20	-2.13	-2.07	289.99	9.99	
1	49	280	140	141.86	143.66	-1.86	-1.79	299.99	19.99	
1	49	280	160	161.51	162.96	-1.51	-1.44	310.00	30.00	*
1	49	280	180	181.12	182.19	-1.12	-1.07	319.99	39.99	*
1	49	300	0	1.02	2.06	-1.02	-1.04	239.99	60.00	*
1	49	300	20	21.42	22.87	-1.42	-1.44	249.99	50.00	*
1	49	300	40	41.77	43.56	-1.77	-1.78	260.00	39.99	*
1	49	300	60	62.02	64.04	-2.02	-2.01	270.00	30.00	*
1	49	300	80	82.14	84.26	-2.14	-2.11	280.00	19.99	
1	49	300	100	102.13	104.20	-2.13	-2.07	289.99	10.00	
1	49	300	120	121.98	123.88	-1.98	-1.90	299.99	0.00	
1	49	300	140	141.71	143.35	-1.71	-1.63	310.00	10.00	
1	49	300	160	161.37	162.66	-1.37	-1.29	320.00	20.00	*
1	49	300	180	180.98	181.90	-0.98	-0.92	330.00	30.00	*
1	49	320	0	0.75	1.51	-0.75	-0.76	250.00	69.99	*
1	49	320	20	21.15	22.31	-1.15	-1.16	259.99	60.00	*
1	49	320	40	41.50	43.00	-1.50	-1.50	270.00	50.00	*
1	49	320	60	61.75	63.48	-1.75	-1.73	279.99	40.00	*

V	P	A0	B	C	E	B-C	C-E	E2	Z	
1	49	320	80	81.87	83.71	-1.87	-1.83	289.99	30.00	*
1	49	320	100	101.86	103.66	-1.86	-1.79	299.99	20.00	*
1	49	320	120	121.71	123.35	-1.71	-1.63	310.00	9.99	
1	49	320	140	141.45	142.82	-1.45	-1.36	320.00	0.00	
1	49	320	160	161.11	162.15	-1.11	-1.03	329.99	9.99	
1	49	320	180	180.72	181.40	-0.72	-0.67	340.00	20.00	*
1	49	340	0	0.40	0.80	-0.40	-0.40	259.99	80.00	*
1	49	340	20	20.79	21.59	-0.79	-0.79	270.00	70.00	*
1	49	340	40	41.14	42.28	-1.14	-1.13	280.00	59.99	*
1	49	340	60	61.39	62.77	-1.39	-1.37	290.00	49.99	*
1	49	340	80	81.52	83.00	-1.52	-1.47	299.99	40.00	*
1	49	340	100	101.51	102.96	-1.51	-1.44	310.00	29.99	*
1	49	340	120	121.37	122.66	-1.37	-1.29	320.00	19.99	
1	49	340	140	141.11	142.15	-1.11	-1.03	329.99	10.00	
1	49	340	160	160.77	161.48	-0.77	-0.71	339.99	0.00	
1	49	340	180	180.38	180.74	-0.38	-0.35	349.99	9.99	
3	1	0	20	26.37	27.60	-6.37	-1.23	350.57	9.42	
3	1	0	40	51.24	53.23	-11.24	-1.98	343.94	16.05	
3	1	0	60	73.89	76.10	-13.89	-2.20	340.89	19.10	
3	1	0	80	94.43	96.49	-14.43	-2.05	340.78	19.21	
3	1	0	100	113.27	115.00	-13.27	-1.73	342.76	17.23	
3	1	0	120	130.89	132.21	-10.89	-1.32	346.10	13.89	
3	1	0	140	147.68	148.56	-7.68	-0.88	350.31	9.68	
3	1	0	160	163.96	164.40	-3.96	-0.44	355.03	4.96	
3	1	20	0	-20.00	-23.86	20.00	3.86	29.42	9.42	
3	1	20	20	6.63	3.96	13.36	2.67	20.00	0.00	
3	1	20	40	32.84	31.46	7.15	1.38	10.57	9.42	
3	1	20	60	57.23	56.75	2.76	0.48	3.94	16.05	
3	1	20	80	79.35	79.24	0.64	0.10	0.89	19.10	
3	1	20	100	99.40	99.32	0.59	0.08	0.78	19.21	
3	1	20	120	117.87	117.60	2.12	0.27	2.76	17.23	
3	1	20	140	135.22	134.64	4.77	0.58	6.10	13.89	
3	1	20	160	151.82	150.87	8.17	0.94	10.31	9.68	
3	1	20	180	167.98	166.63	12.01	1.34	15.03	4.96	
3	1	40	0	-40.00	-47.00	40.00	7.00	56.05	16.05	
3	1	40	20	-13.92	-20.48	33.92	6.55	49.42	9.42	
3	1	40	40	13.08	7.68	26.91	5.40	40.00	0.00	
3	1	40	60	39.21	35.19	20.78	4.01	30.57	9.42	
3	1	40	80	63.19	60.22	16.80	2.97	23.94	16.05	
3	1	40	100	84.79	82.38	15.20	2.41	20.89	19.10	
3	1	40	120	104.37	102.14	15.62	2.22	20.78	19.21	
3	1	40	140	122.44	120.16	17.55	2.28	22.76	17.23	
3	1	40	160	139.47	137.00	20.52	2.47	26.10	13.89	
3	1	40	180	155.83	153.08	24.16	2.75	30.31	9.68	
3	1	60	0	-60.00	-68.94	60.00	8.94	79.10	19.10	
3	1	60	20	-35.33	-44.82	55.33	9.49	76.05	16.05	
3	1	60	40	-8.43	-17.74	48.43	9.31	69.42	9.42	
3	1	60	60	19.10	10.89	40.89	8.21	60.00	0.00	
3	1	60	80	45.25	38.54	34.74	6.71	50.57	9.42	
3	1	60	100	68.89	63.41	31.10	5.47	43.94	16.05	

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	1	60	120	90.00	85.28	30.00	4.71	40.89	19.10
3	1	60	140	109.09	104.74	30.90	4.34	40.78	19.21
3	1	60	160	126.73	122.49	33.26	4.24	42.76	17.23
3	1	60	180	143.41	139.10	36.58	4.30	46.10	13.89
3	1	80	0	-80.00	-89.59	80.00	9.59	99.21	19.21
3	1	80	20	-57.45	-68.21	77.45	10.76	99.10	19.10
3	1	80	40	-31.91	-43.70	71.91	11.79	96.05	16.05
3	1	80	60	-3.94	-15.99	63.94	12.04	89.42	9.42
3	1	80	80	24.37	13.27	55.62	11.09	80.00	0.00
3	1	80	100	50.70	41.23	49.29	9.47	70.57	9.42
3	1	80	120	74.05	66.06	45.94	7.99	63.94	16.05
3	1	80	140	94.69	87.70	45.30	6.98	60.89	19.10
3	1	80	160	113.28	106.88	46.71	6.39	60.78	19.21
3	1	80	180	130.47	124.37	49.52	6.09	62.76	17.23
3	1	100	100	28.33	14.43	71.66	13.90	100.00	0.00
3	1	100	120	55.11	42.91	64.88	12.19	90.57	9.42
3	1	100	140	78.30	67.86	61.69	10.44	83.94	16.05
3	1	100	160	98.50	89.37	61.49	9.12	80.89	19.10
3	1	100	180	116.59	108.33	63.40	8.25	80.78	19.21
3	1	180	0	180.00	180.00	-180.00	0.00		
COLLISION									
3	1	180	20	193.36	194.32	-173.36	-0.95	184.96	4.96
3	1	180	40	206.91	208.86	-166.91	-1.94	189.68	9.68
3	1	180	60	220.89	223.89	-160.89	-3.00	193.89	13.89
3	1	180	80	235.62	239.77	-155.62	-4.15	197.23	17.23
3	1	180	100	251.66	257.05	-151.66	-5.39	199.21	19.21
3	1	180	120	270.00	276.58	-150.00	-6.58	199.10	19.10
3	1	180	140	292.48	299.65	-152.48	-7.17	196.05	16.05
3	1	180	160	322.12	327.63	-162.12	-5.51	189.42	9.42
3	1	200	0	160.00	162.82	-160.00	-2.82	195.03	4.96
3	1	200	20	173.62	177.22	-153.62	-3.60	200.00	0.00
3	1	200	40	187.15	191.58	-147.15	-4.43	204.96	4.96
3	1	200	60	200.78	206.13	-140.78	-5.34	209.68	9.68
3	1	200	80	214.74	221.10	-134.74	-6.36	213.89	13.89
3	1	200	100	229.29	236.85	-129.29	-7.56	217.23	17.23
3	1	200	120	244.88	253.87	-124.88	-8.99	219.21	19.21
3	1	200	140	262.25	272.94	-122.25	-10.68	219.10	19.10
3	1	200	160	282.73	295.23	-122.73	-12.50	216.05	16.05
3	1	200	180	308.59	322.12	-128.59	-13.52	209.42	9.42
3	1	220	0	139.99	145.42	-139.99	-5.42	210.31	9.68
3	1	220	20	154.58	160.33	-134.58	-5.74	215.03	4.96
3	1	220	40	168.75	174.92	-128.75	-6.16	220.00	0.00
3	1	220	60	182.76	189.43	-122.76	-6.67	224.96	4.96
3	1	220	80	196.80	204.09	-116.80	-7.28	229.68	9.68
3	1	220	100	211.10	219.14	-111.10	-8.03	233.89	13.89
3	1	220	120	225.94	234.91	-105.94	-8.97	237.23	17.23
3	1	220	140	241.69	251.87	-101.69	-10.17	239.21	19.21
3	1	220	160	258.97	270.71	-98.97	-11.74	239.10	19.10
3	1	220	180	278.78	292.48	-98.78	-13.69	236.05	16.05
3	1	240	0	120.00	127.58	-120.00	-7.58	226.10	13.89

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	1	240	20	136.08	143.41	-116.08	-7.32	230.31	9.68
3	1	240	40	151.33	158.58	-111.33	-7.24	235.03	4.96
3	1	240	60	166.10	173.41	-106.10	-7.31	240.00	0.00
3	1	240	80	180.64	188.13	-100.64	-7.48	244.96	4.96
3	1	240	100	195.20	202.98	-95.20	-7.78	249.68	9.68
3	1	240	120	210.00	218.21	-90.00	-8.21	253.89	13.89
3	1	240	140	225.30	234.12	-85.30	-8.82	257.23	17.23
3	1	240	160	241.49	251.17	-81.49	-9.68	259.21	19.21
3	1	240	180	259.10	270.00	-79.10	-10.89	259.10	19.10
3	1	260	0	99.99	109.06	-99.99	-9.06	242.76	17.23
3	1	260	20	117.95	126.24	-97.95	-8.29	246.10	13.89
3	1	260	40	134.56	142.34	-94.56	-7.77	250.31	9.68
3	1	260	60	150.31	157.76	-90.31	-7.45	255.03	4.96
3	1	260	80	165.56	172.82	-85.56	-7.26	260.00	0.00
3	1	260	100	180.59	187.78	-80.59	-7.18	264.96	4.96
3	1	260	120	195.62	202.85	-75.62	-7.22	269.68	9.68
3	1	260	140	210.90	218.29	-70.90	-7.38	273.89	13.89
3	1	260	160	226.71	234.42	-66.71	-7.71	277.23	17.23
3	1	260	180	243.40	251.66	-63.40	-8.25	279.21	19.21
3	1	280	0	80.00	89.59	-80.00	-9.59	260.78	19.21
3	1	280	20	100.00	108.58	-80.00	-8.58	262.76	17.23
3	1	280	40	118.14	125.94	-78.14	-7.79	266.10	13.89
3	1	280	60	135.03	142.23	-75.03	-7.19	270.31	9.68
3	1	280	80	151.11	157.86	-71.11	-6.74	275.03	4.96
3	1	280	100	166.72	173.12	-66.72	-6.40	280.00	0.00
3	1	280	120	182.12	188.29	-62.12	-6.17	284.96	4.96
3	1	280	140	197.55	203.58	-57.55	-6.03	289.68	9.68
3	1	280	160	213.26	219.25	-53.26	-5.99	293.89	13.89
3	1	280	180	229.52	235.62	-49.52	-6.09	297.23	17.23
3	1	300	0	60.00	68.94	-60.00	-8.94	280.89	19.10
3	1	300	20	82.04	90.16	-62.04	-8.12	280.78	19.21
3	1	300	40	101.85	109.15	-61.85	-7.30	282.76	17.23
3	1	300	60	120.00	126.58	-60.00	-6.58	286.10	13.89
3	1	300	80	137.00	142.99	-57.00	-5.98	290.31	9.68
3	1	300	100	153.26	158.75	-53.26	-5.48	295.03	4.96
3	1	300	120	169.10	174.18	-49.10	-5.07	300.00	0.00
3	1	300	140	184.77	189.51	-44.77	-4.74	304.96	4.96
3	1	300	160	200.52	205.00	-40.52	-4.48	309.68	9.68
3	1	300	180	216.58	220.89	-36.58	-4.30	313.89	13.89
3	1	320	0	40.00	47.00	-40.00	-7.00	303.94	16.05
3	1	320	20	63.91	70.69	-43.91	-6.78	300.89	19.10
3	1	320	40	85.43	91.67	-45.43	-6.24	300.78	19.21
3	1	320	60	104.96	110.56	-44.96	-5.60	302.76	17.23
3	1	320	80	122.99	127.98	-42.99	-4.98	306.10	13.89
3	1	320	100	140.00	144.42	-40.00	-4.42	310.31	9.68
3	1	320	120	156.34	160.27	-36.34	-3.93	315.03	4.96
3	1	320	140	172.31	175.80	-32.31	-3.48	320.00	0.00
3	1	320	160	188.17	191.27	-28.17	-3.09	324.96	4.96
3	1	320	180	204.16	206.91	-24.16	-2.75	329.68	9.68
3	1	340	0	20.00	23.86	-20.00	-3.86	330.57	9.42

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	1	340	20	45.41	49.89	-25.41	-4.48	323.94	16.05
3	1	340	40	68.66	73.17	-28.66	-4.50	320.89	19.10
3	1	340	60	89.68	93.86	-29.68	-4.18	320.78	19.21
3	1	340	80	108.88	112.59	-28.88	-3.70	322.76	17.23
3	1	340	100	126.73	129.93	-26.73	-3.19	326.10	13.89
3	1	340	120	143.65	146.35	-23.65	-2.69	330.31	9.68
3	1	340	140	160.00	162.22	-20.00	-2.22	335.03	4.96
3	1	340	160	176.03	177.80	-16.03	-1.76	340.00	0.00
3	1	340	180	192.01	193.36	-12.01	-1.34	344.96	4.96
3	7	0	20	22.16	23.51	-2.16	-1.35	350.57	9.42
3	7	0	40	43.98	46.39	-3.98	-2.41	343.94	16.05
3	7	0	60	65.20	68.21	-5.20	-3.00	340.89	19.10
3	7	0	80	85.72	88.84	-5.72	-3.12	340.78	19.21
3	7	0	100	105.52	108.39	-5.52	-2.86	342.76	17.23
3	7	0	120	124.71	127.05	-4.71	-2.33	346.10	13.89
3	7	0	140	143.41	145.05	-3.41	-1.63	350.31	9.68
3	7	0	160	161.79	162.63	-1.79	-0.84	355.03	4.96
3	7	20	0	-6.63	-10.91	6.63	4.28	29.42	9.42
3	7	20	20	15.59	12.75	4.40	2.84	19.99	0.00
3	7	20	40	37.57	36.05	2.42	1.52	10.57	9.42
3	7	20	60	59.01	58.42	0.98	0.59	3.94	16.05
3	7	20	80	79.75	79.61	0.24	0.13	0.89	19.10
3	7	20	100	99.76	99.63	0.23	0.12	0.78	19.21
3	7	20	120	119.11	118.65	0.88	0.45	2.76	17.23
3	7	20	140	137.92	136.90	2.07	1.02	6.10	13.89
3	7	20	160	156.36	154.61	3.63	1.74	10.31	9.68
3	7	20	180	174.58	172.01	5.41	2.56	15.03	4.96
3	7	40	0	-13.08	-21.89	13.08	8.81	56.05	16.05
3	7	40	20	9.25	1.91	10.74	7.33	49.42	9.42
3	7	40	40	31.43	25.66	8.56	5.76	39.99	0.00
3	7	40	60	53.11	48.66	6.88	4.45	30.57	9.42
3	7	40	80	74.09	70.47	5.90	3.61	23.94	16.05
3	7	40	100	94.31	91.02	5.68	3.28	20.89	19.10
3	7	40	120	113.81	110.42	6.18	3.38	20.78	19.21
3	7	40	140	132.72	128.91	7.27	3.80	22.76	17.23
3	7	40	160	151.19	146.75	8.80	4.44	26.10	13.89
3	7	40	180	169.39	164.16	10.60	5.23	30.31	9.68
3	7	60	0	-19.10	-33.00	19.10	13.89	79.10	19.10
3	7	60	20	3.38	-9.05	16.61	12.44	76.05	16.05
3	7	60	40	25.81	15.21	14.18	10.59	69.42	9.42
3	7	60	60	47.78	38.94	12.21	8.83	60.00	0.00
3	7	60	80	69.03	61.51	10.96	7.51	50.57	9.42
3	7	60	100	89.46	82.68	10.53	6.78	43.94	16.05
3	7	60	120	109.10	102.51	10.89	6.58	40.89	19.10
3	7	60	140	128.08	121.26	11.91	6.81	40.78	19.21
3	7	60	160	146.55	139.20	13.44	7.35	42.76	17.23
3	7	60	180	164.70	156.58	15.29	8.11	46.10	13.89
3	7	80	0	-24.37	-44.36	24.37	19.98	99.21	19.21
3	7	80	20	-1.65	-20.29	21.65	18.64	99.10	19.10
3	7	80	40	21.10	4.61	18.89	16.49	96.05	16.05

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	7	80	60	43.43	29.32	16.56	14.10	89.42	9.42
3	7	80	80	64.99	52.88	15.00	12.10	80.00	0.00
3	7	80	100	85.64	74.84	14.35	10.79	70.57	9.42
3	7	80	120	105.40	95.20	14.59	10.20	63.94	16.05
3	7	80	140	124.41	114.22	15.58	10.18	60.89	19.10
3	7	80	160	142.84	132.22	17.15	10.61	60.78	19.21
3	7	80	180	160.87	149.52	19.12	11.35	62.76	17.23
3	7	100	0	-28.33	-56.18	28.33	27.84	117.23	17.23
3	7	100	20	-5.24	-32.02	25.24	26.77	119.21	19.21
3	7	100	40	17.97	-6.24	22.02	24.21	119.10	19.10
3	7	100	60	40.74	19.88	19.25	20.85	116.05	16.05
3	7	100	80	62.65	44.92	17.34	17.72	109.42	9.42
3	7	100	100	83.50	68.00	16.49	15.50	99.99	0.00
3	7	100	120	103.34	89.02	16.65	14.31	90.57	9.42
3	7	100	140	122.30	108.31	17.69	13.98	83.94	16.05
3	7	100	160	140.60	126.31	19.39	14.29	80.89	19.10
3	7	100	180	158.44	143.40	21.55	15.03	80.78	19.21
3	7	120	0	-30.00	-68.94	30.00	38.94	133.89	13.89
3	7	120	20	-6.32	-44.82	26.32	38.50	137.23	17.23
3	7	120	40	17.55	-17.74	22.44	35.30	139.21	19.21
3	7	120	60	40.89	10.89	19.10	30.00	139.10	19.10
3	7	120	80	63.14	38.54	16.85	24.60	136.05	16.05
3	7	120	100	84.12	63.41	15.87	20.70	129.42	9.42
3	7	120	120	103.89	85.28	16.10	18.61	120.00	0.00
3	7	120	140	122.66	104.74	17.33	17.92	110.57	9.42
3	7	120	160	140.69	122.49	19.30	18.19	103.94	16.05
3	7	120	180	158.21	139.10	21.78	19.10	100.89	19.10
3	7	140	0	-27.51	-84.02	27.51	56.50	149.68	9.68
3	7	140	20	-2.86	-60.61	22.86	57.75	153.89	13.89
3	7	140	40	21.91	-31.27	18.08	53.18	157.23	17.23
3	7	140	60	45.81	3.45	14.18	42.35	159.21	19.21
3	7	140	80	68.22	37.45	11.77	30.77	159.10	19.10
3	7	140	100	89.04	65.55	10.95	23.49	156.05	16.05
3	7	140	120	108.45	88.02	11.54	20.43	149.42	9.42
3	7	140	140	126.76	106.84	13.23	19.92	139.99	0.00
3	7	140	160	144.29	123.47	15.70	20.82	130.57	9.42
3	7	140	180	161.31	138.78	18.68	22.52	123.94	16.05
3	7	160	60	57.51	18.50	2.48	39.00	177.23	17.23
3	7	160	80	79.41	75.35	0.58	4.05	179.21	19.21
3	7	160	100	99.45	97.23	0.54	2.22	179.10	19.10
3	7	160	120	118.04	112.28	1.95	5.75	176.05	16.05
3	7	160	140	135.56	125.16	4.43	10.40	169.42	9.42
3	7	160	160	152.39	137.11	7.60	15.27	160.00	0.00
3	7	160	180	168.79	148.59	11.20	20.19	150.57	9.42
3	7	180	0	0.00	180.00	0.00	-180.00		
COLLISION									
3	7	180	20	26.37	162.12	-6.37	-135.74	184.96	4.96
3	7	180	40	51.24	152.48	-11.24	-101.24	189.68	9.68
3	7	180	60	73.89	150.00	-13.89	-76.10	193.89	13.89
3	7	180	80	94.43	151.66	-14.43	-57.23	197.23	17.23

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	7	180	100	113.27	155.62	-13.27	-42.34	199.21	19.21
3	7	180	120	130.89	160.89	-10.89	-30.00	199.10	19.10
3	7	180	140	147.68	166.91	-7.68	-19.23	196.05	16.05
3	7	180	160	163.96	173.36	-3.96	-9.40	189.42	9.42
3	7	200	0	17.87	107.27	-17.87	-89.39	195.03	4.96
3	7	200	20	42.88	120.71	-22.88	-77.82	199.99	0.00
3	7	200	40	66.04	132.91	-26.04	-66.87	204.96	4.96
3	7	200	60	87.20	144.53	-27.20	-57.33	209.68	9.68
3	7	200	80	106.64	155.84	-26.64	-49.19	213.89	13.89
3	7	200	100	124.78	166.97	-24.78	-42.18	217.23	17.23
3	7	200	120	142.00	178.03	-22.00	-36.02	219.21	19.21
3	7	200	140	158.64	189.07	-18.64	-30.43	219.10	19.10
3	7	200	160	174.95	200.17	-14.95	-25.21	216.05	16.05
3	7	200	180	191.20	211.40	-11.20	-20.19	209.42	9.42
3	7	220	0	27.51	84.02	-27.51	-56.50	210.31	9.68
3	7	220	20	51.10	103.41	-31.10	-52.30	215.03	4.96
3	7	220	40	73.15	120.37	-33.15	-47.22	219.99	0.00
3	7	220	60	93.62	135.90	-33.62	-42.27	224.96	4.96
3	7	220	80	112.75	150.55	-32.75	-37.80	229.68	9.68
3	7	220	100	130.85	164.72	-30.85	-33.86	233.89	13.89
3	7	220	120	148.24	178.65	-28.24	-30.41	237.23	17.23
3	7	220	140	165.18	192.57	-25.18	-27.38	239.21	19.21
3	7	220	160	181.92	206.67	-21.92	-24.75	239.10	19.10
3	7	220	180	198.68	221.21	-18.68	-22.52	236.05	16.05
3	7	240	0	30.00	68.94	-30.00	-38.94	226.10	13.89
3	7	240	20	52.81	90.16	-32.81	-37.35	230.31	9.68
3	7	240	40	74.39	109.15	-34.39	-34.76	235.03	4.96
3	7	240	60	94.71	126.58	-34.71	-31.87	240.00	0.00
3	7	240	80	113.92	142.99	-33.92	-29.06	244.96	4.96
3	7	240	100	132.27	158.75	-32.27	-26.48	249.68	9.68
3	7	240	120	150.00	174.18	-30.00	-24.18	253.89	13.89
3	7	240	140	167.34	189.51	-27.34	-22.17	257.23	17.23
3	7	240	160	184.53	205.00	-24.53	-20.46	259.21	19.21
3	7	240	180	201.78	220.89	-21.78	-19.10	259.10	19.10
3	7	260	0	28.33	56.18	-28.33	-27.84	242.76	17.23
3	7	260	20	50.75	78.25	-30.75	-27.50	246.10	13.89
3	7	260	40	72.19	98.40	-32.19	-26.20	250.31	9.68
3	7	260	60	92.57	117.02	-32.57	-24.44	255.03	4.96
3	7	260	80	111.99	134.54	-31.99	-22.54	259.99	0.00
3	7	260	100	130.63	151.32	-30.63	-20.69	264.96	4.96
3	7	260	120	148.69	167.67	-28.69	-18.98	269.68	9.68
3	7	260	140	166.40	183.84	-26.40	-17.44	273.89	13.89
3	7	260	160	183.95	200.07	-23.95	-16.11	277.23	17.23
3	7	260	180	201.55	216.59	-21.55	-15.03	279.21	19.21
3	7	280	0	24.37	44.36	-24.37	-19.98	260.78	19.21
3	7	280	20	46.60	66.93	-26.60	-20.32	262.76	17.23
3	7	280	40	68.03	87.85	-28.03	-19.82	266.10	13.89
3	7	280	60	88.55	107.33	-28.55	-18.78	270.31	9.68
3	7	280	80	108.19	125.67	-28.19	-17.47	275.03	4.96
3	7	280	100	127.11	143.20	-27.11	-16.09	280.00	0.00

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	7	280	120	145.46	160.19	-25.46	-14.73	284.96	4.96
3	7	280	140	163.46	176.92	-23.46	-13.45	289.68	9.68
3	7	280	160	181.28	193.60	-21.28	-12.31	293.89	13.89
3	7	280	180	199.12	210.47	-19.12	-11.35	297.23	17.23
3	7	300	0	19.10	33.00	-19.10	-13.89	280.89	19.10
3	7	300	20	41.25	55.90	-21.25	-14.65	280.78	19.21
3	7	300	40	62.73	77.43	-22.73	-14.69	282.76	17.23
3	7	300	60	83.41	97.58	-23.41	-14.17	286.10	13.89
3	7	300	80	103.28	116.58	-23.28	-13.30	290.31	9.68
3	7	300	100	122.44	134.70	-22.44	-12.25	295.03	4.96
3	7	300	120	141.05	152.20	-21.05	-11.15	300.00	0.00
3	7	300	140	159.27	169.33	-19.27	-10.06	304.96	4.96
3	7	300	160	177.29	186.33	-17.29	-9.03	309.68	9.68
3	7	300	180	195.29	203.41	-15.29	-8.11	313.89	13.89
3	7	320	0	13.08	21.89	-13.08	-8.81	303.94	16.05
3	7	320	20	35.19	45.04	-15.19	-9.85	300.89	19.10
3	7	320	40	56.77	67.06	-16.77	-10.29	300.78	19.21
3	7	320	60	77.62	87.80	-17.62	-10.18	302.76	17.23
3	7	320	80	97.70	107.38	-17.70	-9.67	306.10	13.89
3	7	320	100	117.09	126.00	-17.09	-8.90	310.31	9.68
3	7	320	120	135.91	143.92	-15.91	-8.00	315.03	4.96
3	7	320	140	154.33	161.38	-14.33	-7.05	320.00	0.00
3	7	320	160	172.50	178.62	-12.50	-6.11	324.96	4.96
3	7	320	180	190.60	195.83	-10.60	-5.23	329.68	9.68
3	7	340	0	6.63	10.91	-6.63	-4.28	330.57	9.42
3	7	340	20	28.75	34.26	-8.75	-5.51	323.94	16.05
3	7	340	40	50.44	56.72	-10.44	-6.28	320.89	19.10
3	7	340	60	71.47	78.01	-11.47	-6.53	320.78	19.21
3	7	340	80	91.77	98.11	-11.77	-6.34	322.76	17.23
3	7	340	100	111.37	117.20	-11.37	-5.83	326.10	13.89
3	7	340	120	130.39	135.50	-10.39	-5.11	330.31	9.68
3	7	340	140	148.95	153.25	-8.95	-4.29	335.03	4.96
3	7	340	160	167.24	170.67	-7.24	-3.42	340.00	0.00
3	7	340	180	185.41	187.98	-5.41	-2.56	344.96	4.96
3	49	0	20	20.38	20.73	-0.38	-0.35	350.57	9.42
3	49	0	40	40.71	41.37	-0.71	-0.65	343.94	16.05
3	49	0	60	60.96	61.83	-0.96	-0.87	340.89	19.10
3	49	0	80	81.08	82.06	-1.08	-0.97	340.78	19.21
3	49	0	100	101.08	102.03	-1.08	-0.95	342.76	17.23
3	49	0	120	120.94	121.77	-0.94	-0.82	346.10	13.89
3	49	0	140	140.69	141.30	-0.69	-0.60	350.31	9.68
3	49	0	160	160.37	160.68	-0.37	-0.31	355.03	4.96
3	49	20	0	-1.15	-2.23	1.15	1.07	29.42	9.42
3	49	20	20	19.22	18.51	0.77	0.71	20.00	0.00
3	49	20	40	39.56	39.17	0.43	0.39	10.57	9.42
3	49	20	60	59.82	59.65	0.17	0.16	3.94	16.05
3	49	20	80	79.95	79.91	0.04	0.04	0.89	19.10
3	49	20	100	99.95	99.91	0.04	0.04	0.78	19.21
3	49	20	120	119.82	119.67	0.17	0.15	2.76	17.23
3	49	20	140	139.58	139.21	0.41	0.36	6.10	13.89

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	49	20	160	159.25	158.61	0.74	0.64	10.31	9.68
3	49	20	180	178.88	177.92	1.11	0.96	15.03	4.96
3	49	40	0	-2.19	-4.27	2.19	2.07	56.05	16.05
3	49	40	20	18.19	16.48	1.80	1.70	49.42	9.42
3	49	40	40	38.54	37.17	1.45	1.36	39.99	0.00
3	49	40	60	58.80	57.68	1.19	1.11	30.57	9.42
3	49	40	80	78.94	77.97	1.05	0.97	23.94	16.05
3	49	40	100	98.94	97.99	1.05	0.95	20.89	19.10
3	49	40	120	118.82	117.77	1.17	1.05	20.78	19.21
3	49	40	140	138.58	137.32	1.41	1.25	22.76	17.23
3	49	40	160	158.26	156.72	1.73	1.53	26.10	13.89
3	49	40	180	177.88	176.03	2.11	1.85	30.31	9.68
3	49	60	0	-3.00	-5.93	3.00	2.92	79.10	19.10
3	49	60	20	17.39	14.85	2.60	2.53	76.05	16.05
3	49	60	40	37.74	35.56	2.25	2.17	69.42	9.42
3	49	60	60	58.01	56.11	1.98	1.90	60.00	0.00
3	49	60	80	78.16	76.42	1.83	1.73	50.57	9.42
3	49	60	100	98.17	96.47	1.82	1.70	43.94	16.05
3	49	60	120	118.05	116.26	1.94	1.79	40.89	19.10
3	49	60	140	137.81	135.82	2.18	1.99	40.78	19.21
3	49	60	160	157.48	155.21	2.51	2.27	42.76	17.23
3	49	60	180	177.11	174.50	2.88	2.60	46.10	13.89
3	49	80	0	-3.48	-7.01	3.48	3.52	99.21	19.21
3	49	80	20	16.92	13.80	3.07	3.11	99.10	19.10
3	49	80	40	37.28	34.55	2.71	2.72	96.05	16.05
3	49	80	60	57.56	55.13	2.43	2.42	89.42	9.42
3	49	80	80	77.71	75.46	2.28	2.24	79.99	0.00
3	49	80	100	97.73	95.52	2.26	2.20	70.57	9.42
3	49	80	120	117.60	115.32	2.39	2.28	63.94	16.05
3	49	80	140	137.36	134.87	2.63	2.49	60.89	19.10
3	49	80	160	157.03	154.25	2.96	2.78	60.78	19.21
3	49	80	180	176.65	173.52	3.34	3.13	62.76	17.23
3	49	100	0	-3.56	-7.32	3.56	3.76	117.23	17.23
3	49	100	20	16.85	13.53	3.14	3.32	119.21	19.21
3	49	100	40	37.22	34.31	2.77	2.91	119.10	19.10
3	49	100	60	57.50	54.91	2.49	2.59	116.05	16.05
3	49	100	80	77.66	75.27	2.33	2.39	109.42	9.42
3	49	100	100	97.68	95.33	2.31	2.34	100.00	0.00
3	49	100	120	117.55	115.12	2.44	2.43	90.57	9.42
3	49	100	140	137.31	134.66	2.68	2.64	83.94	16.05
3	49	100	160	156.97	154.01	3.02	2.95	80.89	19.10
3	49	100	180	176.58	173.25	3.41	3.32	80.78	19.21
3	49	120	0	-3.19	-6.73	3.19	3.53	133.89	13.89
3	49	120	20	17.22	14.16	2.77	3.06	137.23	17.23
3	49	120	40	37.60	34.97	2.39	2.62	139.21	19.21
3	49	120	60	57.88	55.59	2.11	2.29	139.10	19.10
3	49	120	80	78.04	75.95	1.95	2.09	136.05	16.05
3	49	120	100	98.06	96.01	1.93	2.04	129.42	9.42
3	49	120	120	117.93	115.78	2.06	2.14	120.00	0.00
3	49	120	140	137.68	135.29	2.31	2.38	110.57	9.42

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	49	120	160	157.33	154.61	2.66	2.71	103.94	16.05
3	49	120	180	176.93	173.82	3.06	3.11	100.89	19.10
3	49	140	0	-2.41	-5.19	2.41	2.78	149.68	9.68
3	49	140	20	18.01	15.73	1.98	2.28	153.89	13.89
3	49	140	40	38.39	36.56	1.60	1.82	157.23	17.23
3	49	140	60	58.68	57.19	1.31	1.48	159.21	19.21
3	49	140	80	78.83	77.54	1.16	1.29	159.10	19.10
3	49	140	100	98.84	97.58	1.15	1.26	156.05	16.05
3	49	140	120	118.71	117.32	1.28	1.38	149.42	9.42
3	49	140	140	138.44	136.79	1.55	1.65	139.99	0.00
3	49	140	160	158.09	156.07	1.90	2.01	130.57	9.42
3	49	140	180	177.68	175.24	2.31	2.43	123.94	16.05
3	49	160	0	-1.30	-2.84	1.30	1.53	164.96	4.96
3	49	160	20	19.13	18.11	0.86	1.02	169.68	9.68
3	49	160	40	39.51	38.95	0.48	0.56	173.89	13.89
3	49	160	60	59.79	59.56	0.20	0.23	177.23	17.23
3	49	160	80	79.94	79.89	0.05	0.05	179.21	19.21
3	49	160	100	99.94	99.89	0.05	0.05	179.10	19.10
3	49	160	120	119.80	119.58	0.19	0.21	176.05	16.05
3	49	160	140	139.53	139.02	0.46	0.51	169.42	9.42
3	49	160	160	159.16	158.26	0.83	0.90	159.99	0.00
3	49	160	180	178.75	177.40	1.24	1.34	150.57	9.42
3	49	180	20	20.43	20.95	-0.43	-0.51	184.96	4.96
3	49	180	40	40.81	41.77	-0.81	-0.96	189.68	9.68
3	49	180	60	61.09	62.36	-1.09	-1.27	193.89	13.89
3	49	180	80	81.23	82.64	-1.23	-1.41	197.23	17.23
3	49	180	100	101.22	102.60	-1.22	-1.37	199.21	19.21
3	49	180	120	121.06	122.25	-1.06	-1.18	199.10	19.10
3	49	180	140	140.78	141.65	-0.78	-0.86	196.05	16.05
3	49	180	160	160.41	160.87	-0.41	-0.45	189.42	9.42
3	49	200	0	1.30	2.84	-1.30	-1.53	195.03	4.96
3	49	200	20	21.73	23.77	-1.73	-2.04	200.00	0.00
3	49	200	40	42.10	44.56	-2.10	-2.45	204.96	4.96
3	49	200	60	62.37	65.10	-2.37	-2.73	209.68	9.68
3	49	200	80	82.50	85.34	-2.50	-2.83	213.89	13.89
3	49	200	100	102.48	105.25	-2.48	-2.77	217.23	17.23
3	49	200	120	122.32	124.87	-2.32	-2.55	219.21	19.21
3	49	200	140	142.03	144.25	-2.03	-2.21	219.10	19.10
3	49	200	160	161.66	163.46	-1.66	-1.79	216.05	16.05
3	49	200	180	181.24	182.59	-1.24	-1.34	209.42	9.42
3	49	220	0	2.41	5.19	-2.41	-2.78	210.31	9.68
3	49	220	20	22.84	26.09	-2.84	-3.25	215.03	4.96
3	49	220	40	43.20	46.83	-3.20	-3.63	220.00	0.00
3	49	220	60	63.46	67.33	-3.46	-3.87	224.96	4.96
3	49	220	80	83.58	87.53	-3.58	-3.95	229.68	9.68
3	49	220	100	103.55	107.41	-3.55	-3.86	233.89	13.89
3	49	220	120	123.38	127.01	-3.38	-3.62	237.23	17.23
3	49	220	140	143.10	146.38	-3.10	-3.28	239.21	19.21
3	49	220	160	162.72	165.60	-2.72	-2.87	239.10	19.10
3	49	220	180	182.31	184.75	-2.31	-2.43	236.05	16.05

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	49	240	0	3.19	6.73	-3.19	-3.53	226.10	13.89
3	49	240	20	23.61	27.59	-3.61	-3.97	230.31	9.68
3	49	240	40	43.96	48.29	-3.96	-4.32	235.03	4.96
3	49	240	60	64.21	68.75	-4.21	-4.53	240.00	0.00
3	49	240	80	84.32	88.92	-4.32	-4.59	244.96	4.96
3	49	240	100	104.29	108.78	-4.29	-4.49	249.68	9.68
3	49	240	120	124.12	128.38	-4.12	-4.25	253.89	13.89
3	49	240	140	143.84	147.76	-3.84	-3.92	257.23	17.23
3	49	240	160	163.47	167.00	-3.47	-3.52	259.21	19.21
3	49	240	180	183.06	186.17	-3.06	-3.11	259.10	19.10
3	49	260	0	3.56	7.32	-3.56	-3.76	242.76	17.23
3	49	260	20	23.96	28.14	-3.96	-4.17	246.10	13.89
3	49	260	40	44.31	48.80	-4.31	-4.49	250.31	9.68
3	49	260	60	64.55	69.24	-4.55	-4.68	255.03	4.96
3	49	260	80	84.66	89.39	-4.66	-4.73	260.00	0.00
3	49	260	100	104.62	109.26	-4.62	-4.63	264.96	4.96
3	49	260	120	124.46	128.87	-4.46	-4.41	269.68	9.68
3	49	260	140	144.17	148.27	-4.17	-4.09	273.89	13.89
3	49	260	160	163.81	167.53	-3.81	-3.71	277.23	17.23
3	49	260	180	183.41	186.74	-3.41	-3.32	279.21	19.21
3	49	280	0	3.48	7.01	-3.48	-3.52	260.78	19.21
3	49	280	20	23.88	27.79	-3.88	-3.91	262.76	17.23
3	49	280	40	44.21	48.43	-4.21	-4.21	266.10	13.89
3	49	280	60	64.45	68.85	-4.45	-4.39	270.31	9.68
3	49	280	80	84.56	89.00	-4.56	-4.44	275.03	4.96
3	49	280	100	104.53	108.88	-4.53	-4.35	280.00	0.00
3	49	280	120	124.36	128.51	-4.36	-4.14	284.96	4.96
3	49	280	140	144.09	147.94	-4.09	-3.84	289.68	9.68
3	49	280	160	163.73	167.23	-3.73	-3.49	293.89	13.89
3	49	280	180	183.34	186.47	-3.34	-3.13	297.23	17.23
3	49	300	0	3.00	5.93	-3.00	-2.92	280.89	19.10
3	49	300	20	23.39	26.69	-3.39	-3.29	280.78	19.21
3	49	300	40	43.72	47.31	-3.72	-3.59	282.76	17.23
3	49	300	60	63.96	67.73	-3.96	-3.77	286.10	13.89
3	49	300	80	84.07	87.89	-4.07	-3.82	290.31	9.68
3	49	300	100	104.04	107.79	-4.04	-3.75	295.03	4.96
3	49	300	120	123.88	127.44	-3.88	-3.56	300.00	0.00
3	49	300	140	143.61	146.90	-3.61	-3.28	304.96	4.96
3	49	300	160	163.27	166.22	-3.27	-2.95	309.68	9.68
3	49	300	180	182.88	185.49	-2.88	-2.60	313.89	13.89
3	49	320	0	2.19	4.27	-2.19	-2.07	303.94	16.05
3	49	320	20	22.58	25.01	-2.58	-2.43	300.89	19.10
3	49	320	40	42.91	45.64	-2.91	-2.72	300.78	19.21
3	49	320	60	63.14	66.06	-3.14	-2.91	302.76	17.23
3	49	320	80	83.26	86.24	-3.26	-2.98	306.10	13.89
3	49	320	100	103.23	106.16	-3.23	-2.92	310.31	9.68
3	49	320	120	123.08	125.84	-3.08	-2.75	315.03	4.96
3	49	320	140	142.82	145.32	-2.82	-2.50	319.99	0.00
3	49	320	160	162.48	164.67	-2.48	-2.19	324.96	4.96
3	49	320	180	182.11	183.96	-2.11	-1.85	329.68	9.68

V	P	A0	B	C	E	B-C	C-E	E2	Z
3	49	340	0	1.15	2.23	-1.15	-1.07	330.57	9.42
3	49	340	20	21.54	22.96	-1.54	-1.42	323.94	16.05
3	49	340	40	41.87	43.59	-1.87	-1.72	320.89	19.10
3	49	340	60	62.11	64.03	-2.11	-1.92	320.78	19.21
3	49	340	80	82.22	84.23	-2.22	-2.00	322.76	17.23
3	49	340	100	102.21	104.18	-2.21	-1.96	326.10	13.89
3	49	340	120	122.07	123.89	-2.07	-1.81	330.31	9.68
3	49	340	140	141.81	143.40	-1.81	-1.58	335.03	4.96
3	49	340	160	161.48	162.77	-1.48	-1.28	340.00	0.00
3	49	340	180	181.11	182.07	-1.11	-0.96	344.96	4.96
9	1	0	20	22.16	22.28	-2.16	-0.12	357.57	2.42
9	1	0	40	43.98	44.20	-3.98	-0.22	355.53	4.46
9	1	0	60	65.20	65.49	-5.20	-0.28	354.18	5.81
9	1	0	80	85.72	86.02	-5.72	-0.30	353.63	6.36
9	1	0	100	105.52	105.81	-5.52	-0.28	353.87	6.12
9	1	0	120	124.71	124.94	-4.71	-0.23	354.79	5.20
9	1	0	140	143.41	143.58	-3.41	-0.16	356.23	3.76
9	1	0	160	161.79	161.87	-1.79	-0.08	358.02	1.97
9	1	20	0	-20.00	-21.14	20.00	1.14	22.42	2.42
9	1	20	20	2.19	1.15	17.80	1.03	20.00	0.00
9	1	20	40	24.34	23.44	15.65	0.90	17.57	2.42
9	1	20	60	46.12	45.34	13.87	0.78	15.53	4.46
9	1	20	80	67.29	66.59	12.70	0.69	14.18	5.81
9	1	20	100	87.73	87.08	12.26	0.64	13.63	6.36
9	1	20	120	107.47	106.83	12.52	0.63	13.87	6.12
9	1	20	140	126.60	125.93	13.39	0.66	14.79	5.20
9	1	20	160	145.25	144.54	14.74	0.71	16.23	3.76
9	1	20	180	163.59	162.82	16.40	0.77	18.02	1.97
9	1	40	0	-40.00	-42.13	40.00	2.13	44.46	4.46
9	1	40	20	-18.04	-20.13	38.04	2.09	42.42	2.42
9	1	40	40	4.19	2.19	35.80	1.99	39.99	0.00
9	1	40	60	26.36	24.49	33.63	1.87	37.57	2.42
9	1	40	80	48.12	46.38	31.87	1.74	35.53	4.46
9	1	40	100	69.24	67.61	30.75	1.63	34.18	5.81
9	1	40	120	89.62	88.07	30.37	1.55	33.63	6.36
9	1	40	140	109.29	107.78	30.70	1.51	33.87	6.12
9	1	40	160	128.36	126.85	31.63	1.50	34.79	5.20
9	1	40	180	146.95	145.42	33.04	1.53	36.23	3.76
9	1	60	0	-60.00	-62.83	60.00	2.83	65.81	5.81
9	1	60	20	-38.53	-41.41	58.53	2.88	64.46	4.46
9	1	60	40	-16.49	-19.37	56.49	2.87	62.42	2.42
9	1	60	60	5.81	3.00	54.18	2.81	60.00	0.00
9	1	60	80	28.03	25.32	51.96	2.70	57.57	2.42
9	1	60	100	49.80	47.22	50.19	2.57	55.53	4.46
9	1	60	120	70.89	68.44	49.10	2.44	54.18	5.81
9	1	60	140	91.22	88.87	48.77	2.34	53.63	6.36
9	1	60	160	110.83	108.55	49.16	2.27	53.87	6.12
9	1	60	180	129.82	127.58	50.17	2.23	54.79	5.20
9	1	80	0	-80.00	-83.16	80.00	3.16	86.36	6.36
9	1	80	20	-59.21	-62.49	79.21	3.27	85.81	5.81

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	1	80	40	-37.67	-41.03	77.67	3.36	84.46	4.46
9	1	80	60	-15.53	-18.94	75.53	3.40	82.42	2.42
9	1	80	80	6.87	3.48	73.12	3.38	80.00	0.00
9	1	80	100	29.15	25.84	70.84	3.30	77.57	2.42
9	1	80	120	50.95	47.76	69.04	3.18	75.53	4.46
9	1	80	140	72.04	68.98	67.95	3.05	74.18	5.81
9	1	80	160	92.34	89.41	67.65	2.93	73.63	6.36
9	1	80	180	111.89	109.06	68.10	2.83	73.87	6.12
9	1	180	0	180.00	180.00	-180.00	0.00		
COLLISION									
9	1	180	20	197.80	197.92	-177.80	-0.11	181.97	1.97
9	1	180	40	215.80	216.03	-175.80	-0.22	183.76	3.76
9	1	180	60	234.18	234.50	-174.18	-0.32	185.20	5.20
9	1	180	80	253.12	253.52	-173.12	-0.39	186.12	6.12
9	1	180	100	272.82	273.25	-172.82	-0.42	186.36	6.36
9	1	180	120	293.41	293.82	-173.41	-0.40	185.81	5.81
9	1	180	140	314.92	315.24	-174.92	-0.32	184.46	4.46
9	1	180	160	337.22	337.40	-177.22	-0.18	182.42	2.42
9	1	200	0	160.00	161.03	-160.00	-1.03	198.02	1.97
9	1	200	20	177.83	178.97	-157.83	-1.13	200.00	0.00
9	1	200	40	195.65	196.89	-155.65	-1.24	201.97	1.97
9	1	200	60	213.63	214.99	-153.63	-1.36	203.76	3.76
9	1	200	80	231.96	233.44	-151.96	-1.48	205.20	5.20
9	1	200	100	250.84	252.43	-150.84	-1.58	206.12	6.12
9	1	200	120	270.45	272.12	-150.45	-1.67	206.36	6.36
9	1	200	140	290.92	292.64	-150.92	-1.71	205.81	5.81
9	1	200	160	312.31	314.01	-152.31	-1.70	204.46	4.46
9	1	200	180	334.51	336.13	-154.51	-1.62	202.42	2.42
9	1	220	0	140.00	141.96	-140.00	-1.96	216.23	3.76
9	1	220	20	158.12	160.12	-138.12	-2.00	218.02	1.97
9	1	220	40	176.01	178.08	-136.01	-2.06	219.99	0.00
9	1	220	60	193.87	196.02	-133.87	-2.15	221.97	1.97
9	1	220	80	211.87	214.13	-131.87	-2.26	223.76	3.76
9	1	220	100	230.19	232.57	-130.19	-2.38	225.20	5.20
9	1	220	120	249.04	251.54	-129.04	-2.50	226.12	6.12
9	1	220	140	268.58	271.20	-128.58	-2.62	226.36	6.36
9	1	220	160	288.96	291.67	-128.96	-2.71	225.81	5.81
9	1	220	180	310.23	312.99	-130.23	-2.76	224.46	4.46
9	1	240	0	120.00	122.68	-120.00	-2.68	234.79	5.20
9	1	240	20	138.61	141.26	-118.61	-2.64	236.23	3.76
9	1	240	40	156.82	159.46	-116.82	-2.63	238.02	1.97
9	1	240	60	174.79	177.45	-114.79	-2.66	240.00	0.00
9	1	240	80	192.70	195.42	-112.70	-2.71	241.97	1.97
9	1	240	100	210.75	213.55	-110.75	-2.79	243.76	3.76
9	1	240	120	229.10	232.00	-109.10	-2.89	245.20	5.20
9	1	240	140	247.95	250.97	-107.95	-3.01	246.12	6.12
9	1	240	160	267.46	270.61	-107.46	-3.14	246.36	6.36
9	1	240	180	287.78	291.05	-107.78	-3.26	245.81	5.81
9	1	260	0	99.99	103.10	-99.99	-3.10	253.87	6.12
9	1	260	20	119.27	122.27	-99.27	-3.00	254.79	5.20

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	1	260	40	137.95	140.89	-97.95	-2.93	256.23	3.76
9	1	260	60	156.23	159.12	-96.23	-2.89	258.02	1.97
9	1	260	80	174.27	177.15	-94.27	-2.87	260.00	0.00
9	1	260	100	192.26	195.15	-92.26	-2.89	261.97	1.97
9	1	260	120	210.37	213.31	-90.37	-2.94	263.76	3.76
9	1	260	140	228.77	231.78	-88.77	-3.01	265.20	5.20
9	1	260	160	247.65	250.76	-87.65	-3.11	266.12	6.12
9	1	260	180	267.17	270.40	-87.17	-3.22	266.36	6.36
9	1	280	0	80.00	83.16	-80.00	-3.16	273.63	6.36
9	1	280	20	100.00	103.04	-80.00	-3.04	273.87	6.12
9	1	280	40	119.29	122.23	-79.29	-2.93	274.79	5.20
9	1	280	60	138.02	140.87	-78.02	-2.84	276.23	3.76
9	1	280	80	156.36	159.14	-76.36	-2.77	278.02	1.97
9	1	280	100	174.47	177.20	-74.47	-2.73	280.00	0.00
9	1	280	120	192.52	195.24	-72.52	-2.71	281.97	1.97
9	1	280	140	210.70	213.42	-70.70	-2.72	283.76	3.76
9	1	280	160	229.16	231.93	-69.16	-2.76	285.20	5.20
9	1	280	180	248.10	250.93	-68.10	-2.83	286.12	6.12
9	1	300	0	60.00	62.83	-60.00	-2.83	294.18	5.81
9	1	300	20	80.72	83.47	-60.72	-2.74	293.63	6.36
9	1	300	40	100.70	103.35	-60.70	-2.64	293.87	6.12
9	1	300	60	120.00	122.54	-60.00	-2.54	294.79	5.20
9	1	300	80	138.75	141.19	-58.75	-2.44	296.23	3.76
9	1	300	100	157.12	159.48	-57.12	-2.36	298.02	1.97
9	1	300	120	175.28	177.58	-55.28	-2.29	299.99	0.00
9	1	300	140	193.39	195.65	-53.39	-2.25	301.97	1.97
9	1	300	160	211.63	213.86	-51.63	-2.23	303.76	3.76
9	1	300	180	230.17	232.41	-50.17	-2.23	305.20	5.20
9	1	320	0	40.00	42.13	-40.00	-2.13	315.53	4.46
9	1	320	20	61.38	63.50	-41.38	-2.12	314.18	5.81
9	1	320	40	82.04	84.12	-42.04	-2.07	313.63	6.36
9	1	320	60	101.97	103.97	-41.97	-2.00	313.87	6.12
9	1	320	80	121.24	123.15	-41.24	-1.90	314.79	5.20
9	1	320	100	140.00	141.81	-40.00	-1.81	316.23	3.76
9	1	320	120	158.39	160.11	-38.39	-1.72	318.02	1.97
9	1	320	140	176.58	178.22	-36.58	-1.64	320.00	0.00
9	1	320	160	194.74	196.32	-34.74	-1.57	321.97	1.97
9	1	320	180	213.04	214.57	-33.04	-1.53	323.76	3.76
9	1	340	0	20.00	21.14	-20.00	-1.14	337.57	2.42
9	1	340	20	41.87	43.10	-21.87	-1.22	335.53	4.46
9	1	340	40	63.17	64.43	-23.17	-1.25	334.18	5.81
9	1	340	60	83.76	85.00	-23.76	-1.23	333.63	6.36
9	1	340	80	103.63	104.82	-23.63	-1.18	333.87	6.12
9	1	340	100	122.87	123.98	-22.87	-1.11	334.79	5.20
9	1	340	120	141.60	142.63	-21.60	-1.02	336.23	3.76
9	1	340	140	160.00	160.94	-20.00	-0.94	338.02	1.97
9	1	340	160	178.20	179.06	-18.20	-0.85	340.00	0.00
9	1	340	180	196.40	197.17	-16.40	-0.77	341.97	1.97
9	7	0	20	21.30	21.69	-1.30	-0.39	357.57	2.42
9	7	0	40	42.41	43.13	-2.41	-0.71	355.53	4.46

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	7	0	60	63.19	64.12	-3.19	-0.92	354.18	5.81
9	7	0	80	83.56	84.56	-3.56	-1.00	353.63	6.36
9	7	0	100	103.48	104.44	-3.48	-0.95	353.87	6.12
9	7	0	120	123.00	123.81	-3.00	-0.80	354.79	5.20
9	7	0	140	142.19	142.77	-2.19	-0.57	356.23	3.76
9	7	0	160	161.15	161.45	-1.15	-0.30	358.02	1.97
9	7	20	0	-12.01	-15.69	12.01	3.67	22.42	2.42
9	7	20	20	9.32	6.05	10.67	3.27	20.00	0.00
9	7	20	40	30.58	27.72	9.41	2.86	17.57	2.42
9	7	20	60	51.58	49.07	8.41	2.51	15.53	4.46
9	7	20	80	72.20	69.92	7.79	2.27	14.18	5.81
9	7	20	100	92.37	90.20	7.62	2.16	13.63	6.36
9	7	20	120	112.10	109.93	7.89	2.17	13.87	6.12
9	7	20	140	131.46	129.16	8.53	2.29	14.79	5.20
9	7	20	160	150.52	148.02	9.47	2.50	16.23	3.76
9	7	20	180	169.40	166.63	10.59	2.76	18.02	1.97
9	7	40	0	-24.16	-31.62	24.16	7.46	44.46	4.46
9	7	40	20	-2.79	-9.92	22.79	7.13	42.42	2.42
9	7	40	40	18.61	11.89	21.38	6.71	40.00	0.00
9	7	40	60	39.83	33.56	20.16	6.26	37.57	2.42
9	7	40	80	60.71	54.84	19.28	5.87	35.53	4.46
9	7	40	100	81.15	75.57	18.84	5.58	34.18	5.81
9	7	40	120	101.13	95.69	18.86	5.43	33.63	6.36
9	7	40	140	120.67	115.26	19.32	5.40	33.87	6.12
9	7	40	160	139.85	134.34	20.14	5.50	34.79	5.20
9	7	40	180	158.77	153.08	21.22	5.69	36.23	3.76
9	7	60	0	-36.58	-48.07	36.58	11.48	65.81	5.81
9	7	60	20	-15.20	-26.54	35.20	11.33	64.46	4.46
9	7	60	40	6.32	-4.67	33.67	10.99	62.42	2.42
9	7	60	60	27.79	17.26	32.20	10.52	59.99	0.00
9	7	60	80	48.98	38.97	31.01	10.01	57.57	2.42
9	7	60	100	69.74	60.20	30.25	9.54	55.53	4.46
9	7	60	120	90.00	80.81	30.00	9.18	54.18	5.81
9	7	60	140	109.75	100.79	30.24	8.96	53.63	6.36
9	7	60	160	129.07	120.18	30.92	8.89	53.87	6.12
9	7	60	180	148.05	139.10	31.94	8.94	54.79	5.20
9	7	80	0	-49.52	-65.37	49.52	15.84	86.36	6.36
9	7	80	20	-28.18	-44.17	48.18	15.99	85.81	5.81
9	7	80	40	-6.51	-22.40	46.51	15.88	84.46	4.46
9	7	80	60	15.23	-0.29	44.76	15.52	82.42	2.42
9	7	80	80	36.79	21.82	43.20	14.97	80.00	0.00
9	7	80	100	57.95	43.61	42.04	14.34	77.57	2.42
9	7	80	120	78.57	64.82	41.42	13.75	75.53	4.46
9	7	80	140	98.61	85.33	41.38	13.27	74.18	5.81
9	7	80	160	118.11	105.16	41.88	12.95	73.63	6.36
9	7	80	180	137.17	124.37	42.82	12.80	73.87	6.12
9	7	100	0	-63.40	-83.96	63.40	20.55	106.12	6.12
9	7	100	20	-42.17	-63.32	62.17	21.14	106.36	6.36
9	7	100	40	-20.39	-41.89	60.39	21.49	105.81	5.81
9	7	100	60	1.68	-19.81	58.31	21.50	104.46	4.46

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	7	100	80	23.74	2.61	56.25	21.12	102.42	2.42
9	7	100	100	45.45	24.99	54.54	20.45	100.00	0.00
9	7	100	120	66.59	46.94	53.40	19.64	97.57	2.42
9	7	100	140	87.03	68.20	52.96	18.83	95.53	4.46
9	7	100	160	106.80	88.65	53.19	18.15	94.18	5.81
9	7	100	180	125.98	108.33	54.01	17.65	93.63	6.36
9	7	180	0	180.00	180.00	-180.00	0.00		
COLLISION									
9	7	180	20	193.36	196.95	-173.36	-3.59	181.97	1.97
9	7	180	40	206.91	214.14	-166.91	-7.22	183.76	3.76
9	7	180	60	220.89	231.78	-160.89	-10.89	185.20	5.20
9	7	180	80	235.62	250.15	-155.62	-14.52	186.12	6.12
9	7	180	100	251.66	269.52	-151.66	-17.85	186.36	6.36
9	7	180	120	270.00	290.17	-150.00	-20.17	185.81	5.81
9	7	180	140	292.48	312.26	-152.48	-19.78	184.46	4.46
9	7	180	160	322.12	335.71	-162.12	-13.58	182.42	2.42
9	7	200	0	128.59	152.67	-128.59	-24.07	198.02	1.97
9	7	200	20	145.02	169.88	-125.02	-24.86	200.00	0.00
9	7	200	40	160.85	186.97	-120.85	-26.11	201.97	1.97
9	7	200	60	176.39	204.14	-116.39	-27.75	203.76	3.76
9	7	200	80	191.87	221.62	-111.87	-29.75	205.20	5.20
9	7	200	100	207.53	239.65	-107.53	-32.12	206.12	6.12
9	7	200	120	223.64	258.49	-103.64	-34.85	206.36	6.36
9	7	200	140	240.52	278.40	-100.52	-37.87	205.81	5.81
9	7	200	160	258.60	299.59	-98.60	-40.98	204.46	4.46
9	7	200	180	278.44	322.12	-98.44	-43.67	202.42	2.42
9	7	220	0	98.78	127.22	-98.78	-28.43	216.23	3.76
9	7	220	20	117.75	145.27	-97.75	-27.52	218.02	1.97
9	7	220	40	135.86	162.91	-95.86	-27.04	220.00	0.00
9	7	220	60	153.39	180.35	-93.39	-26.95	221.97	1.97
9	7	220	80	170.57	197.79	-90.57	-27.21	223.76	3.76
9	7	220	100	187.63	215.44	-87.63	-27.80	225.20	5.20
9	7	220	120	204.79	233.51	-84.79	-28.72	226.12	6.12
9	7	220	140	222.27	252.23	-82.27	-29.96	226.36	6.36
9	7	220	160	240.31	271.83	-80.31	-31.51	225.81	5.81
9	7	220	180	259.18	292.48	-79.18	-33.30	224.46	4.46
9	7	240	0	79.10	104.39	-79.10	-25.28	234.79	5.20
9	7	240	20	99.14	123.40	-79.14	-24.26	236.23	3.76
9	7	240	40	118.38	141.82	-78.38	-23.43	238.02	1.97
9	7	240	60	136.99	159.82	-76.99	-22.83	240.00	0.00
9	7	240	80	155.15	177.61	-75.15	-22.45	241.97	1.97
9	7	240	100	173.06	195.37	-73.06	-22.31	243.76	3.76
9	7	240	120	190.89	213.30	-70.89	-22.41	245.20	5.20
9	7	240	140	208.83	231.58	-68.83	-22.75	246.12	6.12
9	7	240	160	227.08	250.42	-67.08	-23.34	246.36	6.36
9	7	240	180	245.81	270.00	-65.81	-24.18	245.81	5.81
9	7	260	0	63.40	83.96	-63.40	-20.55	253.87	6.12
9	7	260	20	83.96	103.81	-63.96	-19.85	254.79	5.20
9	7	260	40	103.83	122.97	-63.83	-19.14	256.23	3.76
9	7	260	60	123.09	141.59	-63.09	-18.50	258.02	1.97

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	7	260	80	141.87	159.84	-61.87	-17.97	260.00	0.00
9	7	260	100	160.32	177.90	-60.32	-17.57	261.97	1.97
9	7	260	120	178.60	195.93	-58.60	-17.32	263.76	3.76
9	7	260	140	196.87	214.12	-56.87	-17.25	265.20	5.20
9	7	260	160	215.28	232.64	-55.28	-17.35	266.12	6.12
9	7	260	180	234.01	251.66	-54.01	-17.65	266.36	6.36
9	7	280	0	49.52	65.37	-49.52	-15.84	273.63	6.36
9	7	280	20	70.37	85.87	-50.37	-15.50	273.87	6.12
9	7	280	40	90.64	105.67	-50.64	-15.03	274.79	5.20
9	7	280	60	110.35	124.87	-50.35	-14.52	276.23	3.76
9	7	280	80	129.57	143.59	-49.57	-14.02	278.02	1.97
9	7	280	100	148.42	161.99	-48.42	-13.57	280.00	0.00
9	7	280	120	167.03	180.24	-47.03	-13.20	281.97	1.97
9	7	280	140	185.53	198.48	-45.53	-12.94	283.76	3.76
9	7	280	160	204.08	216.89	-44.08	-12.80	285.20	5.20
9	7	280	180	222.82	235.62	-42.82	-12.80	286.12	6.12
9	7	300	0	36.58	48.07	-36.58	-11.48	294.18	5.81
9	7	300	20	57.61	69.04	-37.61	-11.43	293.63	6.36
9	7	300	40	78.16	89.38	-38.16	-11.22	293.87	6.12
9	7	300	60	98.21	109.10	-38.21	-10.89	294.79	5.20
9	7	300	80	117.77	128.28	-37.77	-10.50	296.23	3.76
9	7	300	100	136.94	147.04	-36.94	-10.10	298.02	1.97
9	7	300	120	155.81	165.53	-35.81	-9.71	300.00	0.00
9	7	300	140	174.52	183.90	-34.52	-9.38	301.97	1.97
9	7	300	160	193.18	202.30	-33.18	-9.11	303.76	3.76
9	7	300	180	211.94	220.89	-31.94	-8.94	305.20	5.20
9	7	320	0	24.16	31.62	-24.16	-7.46	315.53	4.46
9	7	320	20	45.31	52.94	-25.31	-7.63	314.18	5.81
9	7	320	40	66.08	73.72	-26.08	-7.63	313.63	6.36
9	7	320	60	86.40	93.90	-26.40	-7.50	313.87	6.12
9	7	320	80	106.26	113.51	-26.26	-7.25	314.79	5.20
9	7	320	100	125.69	132.64	-25.69	-6.94	316.23	3.76
9	7	320	120	144.79	151.40	-24.79	-6.60	318.02	1.97
9	7	320	140	163.67	169.93	-23.67	-6.26	320.00	0.00
9	7	320	160	182.44	188.39	-22.44	-5.95	321.97	1.97
9	7	320	180	201.22	206.91	-21.22	-5.69	323.76	3.76
9	7	340	0	12.01	15.69	-12.01	-3.67	337.57	2.42
9	7	340	20	33.25	37.24	-13.25	-3.98	335.53	4.46
9	7	340	40	54.21	58.39	-14.21	-4.17	334.18	5.81
9	7	340	60	74.77	78.99	-14.77	-4.22	333.63	6.36
9	7	340	80	94.88	99.02	-14.88	-4.13	333.87	6.12
9	7	340	100	114.57	118.51	-14.57	-3.94	334.79	5.20
9	7	340	120	133.88	137.56	-13.88	-3.68	336.23	3.76
9	7	340	140	152.91	156.30	-12.91	-3.38	338.02	1.97
9	7	340	160	171.78	174.85	-11.78	-3.07	340.00	0.00
9	7	340	180	190.59	193.36	-10.59	-2.76	341.97	1.97
9	49	0	20	20.34	20.60	-0.34	-0.25	357.57	2.42
9	49	0	40	40.64	41.12	-0.64	-0.48	355.53	4.46
9	49	0	60	60.86	61.50	-0.86	-0.64	354.18	5.81
9	49	0	80	80.97	81.69	-0.97	-0.71	353.63	6.36

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	49	0	100	100.96	101.67	-0.96	-0.70	353.87	6.12
9	49	0	120	120.84	121.45	-0.84	-0.61	354.79	5.20
9	49	0	140	140.62	141.07	-0.62	-0.44	356.23	3.76
9	49	0	160	160.33	160.56	-0.33	-0.23	358.02	1.97
9	49	20	0	-3.12	-5.50	3.12	2.38	22.42	2.42
9	49	20	20	17.22	15.11	2.77	2.11	20.00	0.00
9	49	20	40	37.54	35.67	2.45	1.86	17.57	2.42
9	49	20	60	57.77	56.10	2.22	1.67	15.53	4.46
9	49	20	80	77.90	76.34	2.09	1.56	14.18	5.81
9	49	20	100	97.91	96.38	2.08	1.53	13.63	6.36
9	49	20	120	117.81	116.21	2.18	1.59	13.87	6.12
9	49	20	140	137.60	135.86	2.39	1.73	14.79	5.20
9	49	20	160	157.31	155.38	2.68	1.93	16.23	3.76
9	49	20	180	176.98	174.82	3.01	2.16	18.02	1.97
9	49	40	0	-6.01	-10.77	6.01	4.76	44.46	4.46
9	49	40	20	14.34	9.86	5.65	4.47	42.42	2.42
9	49	40	40	34.67	30.46	5.32	4.20	39.99	0.00
9	49	40	60	54.92	50.95	5.07	3.97	37.57	2.42
9	49	40	80	75.07	71.25	4.92	3.81	35.53	4.46
9	49	40	100	95.10	91.35	4.89	3.75	34.18	5.81
9	49	40	120	115.01	111.23	4.98	3.78	33.63	6.36
9	49	40	140	134.81	130.91	5.18	3.89	33.87	6.12
9	49	40	160	154.52	150.44	5.47	4.08	34.79	5.20
9	49	40	180	174.19	169.87	5.80	4.31	36.23	3.76
9	49	60	0	-8.44	-15.55	8.44	7.11	65.81	5.81
9	49	60	20	11.93	5.12	8.06	6.80	64.46	4.46
9	49	60	40	32.27	25.78	7.72	6.49	62.42	2.42
9	49	60	60	52.55	46.33	7.44	6.21	60.00	0.00
9	49	60	80	72.72	66.70	7.27	6.01	57.57	2.42
9	49	60	100	92.76	86.86	7.23	5.90	55.53	4.46
9	49	60	120	112.68	106.78	7.31	5.90	54.18	5.81
9	49	60	140	132.49	126.49	7.50	6.00	53.63	6.36
9	49	60	160	152.20	146.02	7.79	6.18	53.87	6.12
9	49	60	180	171.86	165.43	8.13	6.42	54.79	5.20
9	49	80	0	-10.13	-19.47	10.13	9.33	86.36	6.36
9	49	80	20	10.25	1.26	9.74	8.99	85.81	5.81
9	49	80	40	30.62	21.99	9.37	8.62	84.46	4.46
9	49	80	60	50.92	42.62	9.07	8.29	82.42	2.42
9	49	80	80	71.11	63.07	8.88	8.03	79.99	0.00
9	49	80	100	91.17	83.28	8.82	7.88	77.57	2.42
9	49	80	120	111.09	103.24	8.90	7.85	75.53	4.46
9	49	80	140	130.90	122.96	9.09	7.93	74.18	5.81
9	49	80	160	150.60	142.48	9.39	8.11	73.63	6.36
9	49	80	180	170.24	161.86	9.75	8.38	73.87	6.12
9	49	100	0	-10.80	-22.00	10.80	11.19	106.12	6.12
9	49	100	20	9.61	-1.17	10.38	10.79	106.36	6.36
9	49	100	40	30.01	19.65	9.98	10.35	105.81	5.81
9	49	100	60	50.33	40.38	9.66	9.94	104.46	4.46
9	49	100	80	70.53	60.90	9.46	9.62	102.42	2.42
9	49	100	100	90.60	81.17	9.39	9.42	99.99	0.00

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	49	100	120	110.52	101.15	9.47	9.36	97.57	2.42
9	49	100	140	130.32	120.87	9.67	9.44	95.53	4.46
9	49	100	160	150.01	140.35	9.98	9.65	94.18	5.81
9	49	100	180	169.63	159.68	10.36	9.94	93.63	6.36
9	49	120	0	-10.15	-22.30	10.15	12.14	125.20	5.20
9	49	120	20	10.29	-1.35	9.70	11.64	126.12	6.12
9	49	120	40	30.71	19.60	9.28	11.10	126.36	6.36
9	49	120	60	51.05	40.44	8.94	10.61	125.81	5.81
9	49	120	80	71.26	61.04	8.73	10.22	124.46	4.46
9	49	120	100	91.33	81.34	8.66	9.98	122.42	2.42
9	49	120	120	111.24	101.32	8.75	9.92	120.00	0.00
9	49	120	140	131.02	120.99	8.97	10.02	117.57	2.42
9	49	120	160	150.68	140.40	9.31	10.27	115.53	4.46
9	49	120	180	170.27	159.63	9.72	10.64	114.18	5.81
9	49	140	0	-8.01	-19.20	8.01	11.19	143.76	3.76
9	49	140	20	12.46	1.91	7.53	10.55	145.20	5.20
9	49	140	40	32.90	23.01	7.09	9.89	146.12	6.12
9	49	140	60	53.25	43.95	6.74	9.30	146.36	6.36
9	49	140	80	73.46	64.60	6.53	8.86	145.81	5.81
9	49	140	100	93.52	84.89	6.47	8.63	144.46	4.46
9	49	140	120	113.41	104.80	6.58	8.61	142.42	2.42
9	49	140	140	133.16	124.36	6.83	8.79	140.00	0.00
9	49	140	160	152.79	143.64	7.20	9.15	137.57	2.42
9	49	140	180	172.35	162.72	7.64	9.62	135.53	4.46
9	49	160	0	-4.45	-11.56	4.45	7.11	161.97	1.97
9	49	160	20	16.04	9.73	3.95	6.31	163.76	3.76
9	49	160	40	36.49	30.94	3.50	5.55	165.20	5.20
9	49	160	60	56.83	51.89	3.16	4.93	166.12	6.12
9	49	160	80	77.03	72.48	2.96	4.54	166.36	6.36
9	49	160	100	97.05	92.64	2.94	4.41	165.81	5.81
9	49	160	120	116.91	112.38	3.08	4.53	164.46	4.46
9	49	160	140	136.62	131.75	3.37	4.87	162.42	2.42
9	49	160	160	156.22	150.84	3.77	5.37	160.00	0.00
9	49	160	180	175.76	169.76	4.23	6.00	157.57	2.42
9	49	180	20	20.50	21.34	-0.50	-0.84	181.97	1.97
9	49	180	40	40.93	42.49	-0.93	-1.55	183.76	3.76
9	49	180	60	61.25	63.30	-1.25	-2.04	185.20	5.20
9	49	180	80	81.41	83.67	-1.41	-2.26	186.12	6.12
9	49	180	100	101.40	103.59	-1.40	-2.19	186.36	6.36
9	49	180	120	121.22	123.09	-1.22	-1.87	185.81	5.81
9	49	180	140	140.90	142.26	-0.90	-1.35	184.46	4.46
9	49	180	160	160.47	161.19	-0.47	-0.71	182.42	2.42
9	49	200	0	4.45	11.56	-4.45	-7.11	198.02	1.97
9	49	200	20	24.93	32.75	-4.93	-7.82	200.00	0.00
9	49	200	40	45.34	53.68	-5.34	-8.34	201.97	1.97
9	49	200	60	65.62	74.23	-5.62	-8.61	203.76	3.76
9	49	200	80	85.74	94.36	-5.74	-8.61	205.20	5.20
9	49	200	100	105.69	114.06	-5.69	-8.36	206.12	6.12
9	49	200	120	125.48	133.41	-5.48	-7.92	206.36	6.36
9	49	200	140	145.14	152.48	-5.14	-7.33	205.81	5.81

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	49	200	160	164.71	171.38	-4.71	-6.67	204.46	4.46
9	49	200	180	184.23	190.23	-4.23	-6.00	202.42	2.42
9	49	220	0	8.01	19.20	-8.01	-11.19	216.23	3.76
9	49	220	20	28.46	40.18	-8.46	-11.71	218.02	1.97
9	49	220	40	48.83	60.89	-8.83	-12.05	220.00	0.00
9	49	220	60	69.08	81.24	-9.08	-12.16	221.97	1.97
9	49	220	80	89.17	101.22	-9.17	-12.05	223.76	3.76
9	49	220	100	109.09	120.84	-9.09	-11.74	225.20	5.20
9	49	220	120	128.87	140.17	-8.87	-11.29	226.12	6.12
9	49	220	140	148.52	159.28	-8.52	-10.75	226.36	6.36
9	49	220	160	168.10	178.28	-8.10	-10.18	225.81	5.81
9	49	220	180	187.64	197.27	-7.64	-9.62	224.46	4.46
9	49	240	0	10.15	22.30	-10.15	-12.14	234.79	5.20
9	49	240	20	30.57	43.11	-10.57	-12.53	236.23	3.76
9	49	240	40	50.91	63.68	-10.91	-12.76	238.02	1.97
9	49	240	60	71.13	83.94	-11.13	-12.81	240.00	0.00
9	49	240	80	91.20	103.88	-11.20	-12.68	241.97	1.97
9	49	240	100	111.11	123.51	-11.11	-12.39	243.76	3.76
9	49	240	120	130.89	142.90	-10.89	-12.00	245.20	5.20
9	49	240	140	150.55	162.11	-10.55	-11.55	246.12	6.12
9	49	240	160	170.15	181.23	-10.15	-11.08	246.36	6.36
9	49	240	180	189.72	200.36	-9.72	-10.64	245.81	5.81
9	49	260	0	10.80	22.00	-10.80	-11.19	253.87	6.12
9	49	260	20	31.19	42.70	-11.19	-11.50	254.79	5.20
9	49	260	40	51.51	63.20	-11.51	-11.69	256.23	3.76
9	49	260	60	71.71	83.44	-11.71	-11.73	258.02	1.97
9	49	260	80	91.77	103.39	-11.77	-11.62	260.00	0.00
9	49	260	100	111.68	123.08	-11.68	-11.39	261.97	1.97
9	49	260	120	131.47	142.54	-11.47	-11.07	263.76	3.76
9	49	260	140	151.15	161.85	-11.15	-10.69	265.20	5.20
9	49	260	160	170.77	181.08	-10.77	-10.30	266.12	6.12
9	49	260	180	190.36	200.31	-10.36	-9.94	266.36	6.36
9	49	280	0	10.13	19.47	-10.13	-9.33	273.63	6.36
9	49	280	20	30.50	40.12	-10.50	-9.61	273.87	6.12
9	49	280	40	50.80	60.59	-10.80	-9.78	274.79	5.20
9	49	280	60	70.99	80.83	-10.99	-9.83	276.23	3.76
9	49	280	80	91.05	100.82	-11.05	-9.76	278.02	1.97
9	49	280	100	110.98	120.57	-10.98	-9.58	280.00	0.00
9	49	280	120	130.78	140.11	-10.78	-9.32	281.97	1.97
9	49	280	140	150.49	159.51	-10.49	-9.01	283.76	3.76
9	49	280	160	170.13	178.82	-10.13	-8.69	285.20	5.20
9	49	280	180	189.75	198.13	-9.75	-8.38	286.12	6.12
9	49	300	0	8.44	15.55	-8.44	-7.11	294.18	5.81
9	49	300	20	28.79	36.16	-8.79	-7.37	293.63	6.36
9	49	300	40	49.08	56.63	-9.08	-7.54	293.87	6.12
9	49	300	60	69.28	76.90	-9.28	-7.62	294.79	5.20
9	49	300	80	89.34	96.93	-9.34	-7.58	296.23	3.76
9	49	300	100	109.28	116.74	-9.28	-7.45	298.02	1.97
9	49	300	120	129.11	136.36	-9.11	-7.24	300.00	0.00
9	49	300	140	148.83	155.82	-8.83	-6.98	301.97	1.97

V	P	A0	B	C	E	B-C	C-E	E2	Z
9	49	300	160	168.50	175.20	-8.50	-6.70	303.76	3.76
9	49	300	180	188.13	194.56	-8.13	-6.42	305.20	5.20
9	49	320	0	6.01	10.77	-6.01	-4.76	315.53	4.46
9	49	320	20	26.36	31.37	-6.36	-5.01	314.18	5.81
9	49	320	40	46.65	51.85	-6.65	-5.20	313.63	6.36
9	49	320	60	66.84	72.14	-6.84	-5.30	313.87	6.12
9	49	320	80	86.92	92.23	-6.92	-5.30	314.79	5.20
9	49	320	100	106.88	112.10	-6.88	-5.21	316.23	3.76
9	49	320	120	126.72	131.77	-6.72	-5.05	318.02	1.97
9	49	320	140	146.47	151.30	-6.47	-4.83	319.99	0.00
9	49	320	160	166.15	170.72	-6.15	-4.57	321.97	1.97
9	49	320	180	185.80	190.12	-5.80	-4.31	323.76	3.76
9	49	340	0	3.12	5.50	-3.12	-2.38	337.57	2.42
9	49	340	20	23.46	26.09	-3.46	-2.63	335.53	4.46
9	49	340	40	43.75	46.59	-3.75	-2.83	334.18	5.81
9	49	340	60	63.96	66.92	-3.96	-2.96	333.63	6.36
9	49	340	80	84.05	87.06	-4.05	-3.00	333.87	6.12
9	49	340	100	104.03	106.99	-4.03	-2.95	334.79	5.20
9	49	340	120	123.89	126.72	-3.89	-2.83	336.23	3.76
9	49	340	140	143.65	146.29	-3.65	-2.63	338.02	1.97
9	49	340	160	163.35	165.76	-3.35	-2.40	340.00	0.00
9	49	340	180	183.01	185.17	-3.01	-2.16	341.97	1.97

DISTRIBUTION LIST

	Copy No.
AUSTRALIA	
DEPARTMENT OF DEFENCE	
Central Office	
Chief Defence Scientist	1
Executive Controller, ADSS	2
Superintendent, Defence Science Administration	3
Defence Library	4
Joint Intelligence Organization	5
Assistant Secretary, DISB	6–22
Aeronautical Research Laboratories	
Chief Superintendent	23
Superintendent Systems division	24
Divisional File Systems division	25
Author — G. J. Murray	26
Library	27
Materials Research Laboratories	
Library	28
Weapons Research Establishment	
Library	29
Central Studies Establishment	
Library	30
Engineering Development Establishment	
Library	31
Air Office	
Air Force Scientific Adviser	32
Engineering (CAFTS) Branch, Library	33
D. Air Eng.	34
H.Q. Support Command (SENGSO)	35
Army Office	
Royal Military College, Bridges Library	36
US Army Standardisation Group	37
Navy Office	
Naval Scientific Adviser	38
RAN Research Laboratory	39
DEPARTMENT OF PRODUCTIVITY	
Australian Government Engine Works	
Mr. J. L. Kerin	40
DEPARTMENT OF TRANSPORT	
Airworthiness Branch (Mr. R. Ferrari)	41
Spares	42–51