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TABLES FOR DETERMINING LEAD, URANIUM,  
AND THORIUM ISOTOPE AGES

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LEAD, URANIUM, AND THORIUM ISOTOPE AGES  
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AND THORIUM ISOTOPE AGES

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TABLES FOR DETERMINING LEAD, URANIUM,  
AND THORIUM ISOTOPE AGES

By Ernest Schonfeld  
Lyndon B. Johnson Space Center

SUMMARY

Tables for determining lead, uranium, and thorium isotope ages are contained in this report. A computer program written in BASIC language was used with a PDP-11 computer to make these calculations. This report uses the new decay constants selected by Tatsumoto and others. The precision of these calculations is better than 1 part in  $10^5$  and more than 100 times better than the error introduced by the uncertainties in the isotope decay constants.

INTRODUCTION

The tables for determining lead (Pb), uranium (U), and thorium (Th) isotope ages use several isotope ratios. The new decay constants selected by Tatsumoto and others (ref. 1) for uranium-238 ( $^{238}\text{U}$ ), uranium-235 ( $^{235}\text{U}$ ), and thorium-232 ( $^{232}\text{Th}$ ) and the  $^{238}\text{U}/^{235}\text{U}$  ratio are used in this report.

DESCRIPTION OF TABLES

The tables for determining ages (see appendix) use the lead-206 ( $^{206}\text{Pb}$ )/ $^{238}\text{U}$ , lead-207 ( $^{207}\text{Pb}$ )/ $^{235}\text{U}$ ,  $^{207}\text{Pb}/^{206}\text{Pb}$ , and lead-208 ( $^{208}\text{Pb}$ )/ $^{232}\text{Th}$  isotope ratios. The new decay constants for  $^{238}\text{U}$ ,  $^{235}\text{U}$ , and  $^{232}\text{Th}$ , and the  $^{238}\text{U}/^{235}\text{U}$  ratio are those selected by Tatsumoto and others (ref. 1). These values are

$$\lambda_8 = \lambda(^{238}\text{U}) = 0.15525 \times 10^{-9} \text{ yr} \quad (\text{ref. 2}) \quad (1)$$

$$\lambda_5 = \lambda(^{235}\text{U}) = 0.98485 \times 10^{-9} \text{ yr} \quad (\text{ref. 2}) \quad (2)$$

$$\lambda_2 = \lambda(^{232}\text{Th}) = 0.049475 \times 10^{-9} \text{ yr} \quad (\text{ref. 3}) \quad (3)$$

$$^{238}\text{U}/^{235}\text{U} = 137.88 \quad (\text{See bibliography in ref. 1.}) \quad (4)$$

The analytical expressions for the functions evaluated in this report are

$$^{206}\text{Pb}/^{238}\text{U} = e^{\lambda_8 t} - 1 \quad (5)$$

$$^{207}\text{Pb}/^{235}\text{U} = e^{\lambda_5 t} - 1 \quad (6)$$

$$^{208}\text{Pb}/^{232}\text{Th} = e^{\lambda_2 t} - 1 \quad (7)$$

$$^{207}\text{Pb}/^{206}\text{Pb} = \left( ^{207}\text{Pb} \times ^{238}\text{U} \right) / \left( ^{206}\text{Pb} \times ^{235}\text{U} \times 137.88 \right) \quad (8)$$

here  $t$  is time. These expressions were calculated by programing a PDP-11 computer with a computer program (appendix) written in BASIC language.

#### CONCLUDING REMARKS

The precision of the calculations in this report is better than 1 part in  $10^5$ . This precision is approximately 100 times better than the error introduced by the uncertainties in the isotope decay constants.

Lyndon B. Johnson Space Center  
National Aeronautics and Space Administration  
Houston, Texas, December 19, 1974  
195-42-89-00-72

## REFERENCES

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2. Jaffey, A. H.; Flynn, K. F.; Glendenin, L. E.; Bentley, W. C.; and Essling, A. M.: Precision Measurement of Half-Lives and Specific Activities of Uranium-235 and Uranium-238. *Phys. Rev.*, vol. C 4, no. 5, Nov. 1971, pp. 1889-1906.
3. LeRoux, L. J.; and Glendenin, L. E.: Half-Life of Thorium-232. National Conference on Nuclear Energy: Application of Isotopes and Radiation. Atomic Energy Board (Pelindaba, South Africa), 1963, pp. 83-94.

## APPENDIX

### COMPUTER PROGRAM (BASIC)

In this appendix, the computer program listing written in BASIC language and the tables for determining lead, uranium, and thorium isotope ages are given. In the value columns, the "E" (exponent) codes are used to denote powers of 10. For example, the first entry opposite "2" (million years), ".310421E-03" is equivalent to  $0.310421 \times 10^{-3}$ .

#### LIST

```

20 REMARK- AGES OF LEAD URANIUM THORIUM USING DECAY CONSTANTS
21 REMARK- BY TATSUMOTO ET AL, SCIENCE VOL 180, PAGE 1279 (1973)
22 LET L8=0.15525
23 LET L5=0.98485
24 LET L2=0.049475
25 LET C=1/137.88
26 LET T=0.0
27 FOR M=0 TO 9
28 PRINT
29 PRINT
30 PRINT
31 PRINT
32 PRINT
33 PRINT
34 PRINT
35 PRINT "TIME", " PB 206", " PB 207", " PB 207", " PB 208"
36 PRINT " MY ", " U 238", " U 235", " PB 206", " TH 232"
37 PRINT
75 FOR I=0 TO 49
80 LET T=T+0.002
85 LET R8=EXP(L8*T)-1
90 LET R5=EXP(L5*T)-1
95 LET R2=EXP(L2*T)-1
100 LET R6=C*R5/R8
105 LET T1=T*1000
110 PRINT T1,R8,R5,R6,R2
115 NEXT I
120 NEXT M
125 END
READY

```

RUN

TIME  
MY

PB 206  
U 238

PB 207  
U 235

PB 207  
PB 206

PB 208  
TH 232

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310421E-03  
6212E-03  
931978E-03  
124276E-02  
155365E-02  
186479E-02  
186479E-02  
186479E-02  
217581E-02  
248706E-02  
279832E-02  
310969E-02  
342143E-02  
373304E-02  
404453E-02  
435638E-02  
466847E-02  
498033E-02  
529254E-02  
560474E-02  
591695E-02  
622928E-02  
654185E-02  
68543E-02  
716698E-02  
747979E-02  
779283E-02  
810564E-02  
84188E-02  
873196E-02  
904524E-02  
935853E-02  
967205E-02  
998545E-02  
102991E-01  
106128E-01  
109268E-01  
112406E-01  
11547E-01  
11869E-01  
121831E-01  
124974E-01  
128119E-01  
131265E-01  
134411E-01  
137558E-01  
140705E-01  
143856E-01  
147004E-01  
150155E-01  
153309E-01  
156461E-01

197172E-02  
394714E-02  
592649E-02  
790989E-02  
989699E-02  
118884E-01  
118884E-01  
138832E-01  
158824E-01  
178853E-01  
198922E-01  
219032E-01  
239179E-01  
259367E-01  
279595E-01  
299864E-01  
32017E-01  
340518E-01  
360905E-01  
381335E-01  
401801E-01  
42231E-01  
44286E-01  
463449E-01  
484079E-01  
504751E-01  
525461E-01  
546215E-01  
56701E-01  
587841E-01  
608717E-01  
629635E-01  
650593E-01  
671592E-01  
692631E-01  
713716E-01  
734837E-01  
756003E-01  
777209E-01  
798459E-01  
819749E-01  
841082E-01  
862457E-01  
883871E-01  
905333E-01  
926833E-01  
948379E-01  
969963E-01  
991591E-01  
101326  
103498

460674E-01  
46084E-01  
461201E-01  
461619E-01  
462006E-01  
462372E-01  
462774E-01  
463156E-01  
463552E-01  
463943E-01  
46435E-01  
464686E-01  
465099E-01  
46548E-01  
465852E-01  
466253E-01  
466632E-01  
46702E-01  
46742E-01  
467812E-01  
468198E-01  
4686E-01  
468991E-01  
469381E-01  
469765E-01  
470167E-01  
470557E-01  
470953E-01  
471345E-01  
471745E-01  
472138E-01  
472542E-01  
472939E-01  
473335E-01  
473728E-01  
474133E-01  
474529E-01  
474924E-01  
475329E-01  
475728E-01  
476128E-01  
476527E-01  
47693E-01  
477333E-01  
477739E-01  
478138E-01  
478547E-01  
478952E-01  
479351E-01  
479759E-01

989437E-04  
197887E-03  
296831E-03  
395775E-03  
494838E-03  
59402E-03  
692964E-03  
791907E-03  
89097E-03  
989914E-03  
10891E-02  
118816E-02  
12871E-02  
138617E-02  
148547E-02  
158441E-02  
168347E-02  
178278E-02  
188172E-02  
198102E-02  
208008E-02  
217938E-02  
227845E-02  
237775E-02  
247681E-02  
257611E-02  
267518E-02  
277448E-02  
287354E-02  
297296E-02  
307226E-02  
317132E-02  
327063E-02  
337005E-02  
346935E-02  
356853E-02  
366783E-02  
376725E-02  
386655E-02  
396574E-02  
406516E-02  
416446E-02  
426388E-02  
43633E-02  
446272E-02  
456214E-02  
466144E-02  
476086E-02  
486028E-02  
49597E-02



<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
102	.159614E-01	.105673	.480168E-01	.505924E-02
104	.16277E-01	.107853	.480573E-01	.515866E-02
106	.165926E-01	.110038	.480978E-01	.525808E-02
108	.169083E-01	.112226	.481387E-01	.53575E-02
110	.172242E-01	.114419	.481792E-01	.545716E-02
112	.1754E-01	.116617	.482203E-01	.55567E-02
114	.17856E-01	.118818	.482611E-01	.565612E-02
116	.18172E-01	.121024	.483023E-01	.575554E-02
118	.184882E-01	.123234	.483433E-01	.585508E-02
120	.188047E-01	.125449	.483838E-01	.595474E-02
122	.191208E-01	.127668	.484255E-01	.605428E-02
124	.194374E-01	.129891	.484663E-01	.61537E-02
126	.197539E-01	.132119	.485076E-01	.625324E-02
128	.200708E-01	.134351	.485484E-01	.63529E-02
130	.203875E-01	.136588	.485898E-01	.645244E-02
132	.207045E-01	.138828	.486309E-01	.655198E-02
134	.210215E-01	.141074	.486723E-01	.665164E-02
136	.213386E-01	.143324	.487137E-01	.675118E-02
138	.216557E-01	.145578	.487554E-01	.685096E-02
140	.219729E-01	.147836	.48797E-01	.69505E-02
142	.222904E-01	.1501	.488384E-01	.705028E-02
144	.226078E-01	.152367	.488801E-01	.714982E-02
146	.229254E-01	.154639	.489218E-01	.724959E-02
148	.23243E-01	.156916	.489637E-01	.734913E-02
150	.235609E-01	.159197	.490052E-01	.744891E-02
152	.238786E-01	.161482	.490473E-01	.754845E-02
154	.241965E-01	.163773	.490894E-01	.764823E-02
156	.245146E-01	.166067	.491313E-01	.774801E-02
158	.248328E-01	.168366	.49173E-01	.784767E-02
160	.25151E-01	.17067	.492153E-01	.794745E-02
162	.254694E-01	.172978	.492573E-01	.804722E-02
164	.25788E-01	.175291	.492993E-01	.814688E-02
166	.261065E-01	.177608	.493415E-01	.824666E-02
168	.26425E-01	.17993	.49384E-01	.834644E-02
170	.267439E-01	.182256	.494261E-01	.844634E-02
172	.270629E-01	.184587	.494681E-01	.854588E-02
174	.273815E-01	.186923	.495111E-01	.864577E-02
176	.277008E-01	.189263	.495532E-01	.874567E-02
178	.280199E-01	.191608	.495958E-01	.884545E-02
180	.283393E-01	.193957	.496382E-01	.894535E-02
182	.286584E-01	.196311	.496812E-01	.904524E-02
184	.289779E-01	.19867	.497238E-01	.91449E-02
186	.292974E-01	.201033	.497666E-01	.924468E-02
188	.296172E-01	.203401	.498091E-01	.934458E-02
190	.299368E-01	.205774	.498521E-01	.944448E-02
192	.302566E-01	.208151	.49895E-01	.954437E-02
194	.305766E-01	.210533	.499379E-01	.964427E-02
196	.308967E-01	.21292	.499808E-01	.974417E-02
198	.312169E-01	.215311	.500238E-01	.984407E-02
200	.315371E-01	.217708	.500669E-01	.994396E-02

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
202	.318574E-01	.220108	.501101E-01	.100442E-01
204	.321778E-01	.222514	.501533E-01	.101441E-01
206	.324984E-01	.224924	.501965E-01	.10244E-01
208	.32819E-01	.22734	.502398E-01	.103439E-01
212	.331397E-01	.22976	.502833E-01	.104439E-01
212	.334605E-01	.232184	.503268E-01	.105438E-01
214	.337815E-01	.234614	.503701E-01	.10644E-01
216	.341027E-01	.237048	.504134E-01	.10744E-01
218	.344237E-01	.239487	.504571E-01	.108439E-01
220	.347451E-01	.24193	.505005E-01	.109439E-01
222	.350665E-01	.244379	.505441E-01	.11044E-01
224	.353879E-01	.246833	.50588E-01	.11144E-01
226	.357093E-01	.249291	.506319E-01	.112441E-01
228	.360309E-01	.251754	.506758E-01	.113442E-01
230	.363526E-01	.254222	.507197E-01	.114442E-01
232	.366745E-01	.256695	.507636E-01	.115442E-01
234	.369965E-01	.259173	.508075E-01	.116445E-01
236	.373183E-01	.261656	.508518E-01	.117445E-01
238	.376407E-01	.264143	.508956E-01	.118446E-01
240	.379629E-01	.266636	.509398E-01	.119447E-01
242	.382853E-01	.269133	.50984E-01	.120449E-01
244	.386077E-01	.271635	.510282E-01	.121449E-01
246	.389302E-01	.274142	.510727E-01	.122453E-01
248	.392529E-01	.276655	.51117E-01	.123453E-01
250	.395755E-01	.279172	.511616E-01	.124456E-01
252	.398983E-01	.281694	.512061E-01	.125458E-01
254	.402215E-01	.284221	.512503E-01	.126458E-01
256	.405444E-01	.286752	.51295E-01	.127462E-01
258	.408674E-01	.28929	.513398E-01	.128465E-01
260	.411907E-01	.291832	.513844E-01	.129465E-01
262	.41514E-01	.294379	.514293E-01	.130469E-01
264	.418375E-01	.296931	.514741E-01	.131471E-01
266	.421611E-01	.299488	.515188E-01	.132475E-01
268	.424846E-01	.30205	.515639E-01	.133475E-01
270	.428084E-01	.304617	.516088E-01	.134479E-01
272	.431323E-01	.30719	.516538E-01	.135481E-01
274	.434562E-01	.309767	.51699E-01	.136485E-01
276	.437803E-01	.312349	.51744E-01	.137489E-01
278	.441046E-01	.314937	.517891E-01	.138491E-01
280	.444286E-01	.317529	.518346E-01	.139493E-01
282	.44753E-01	.320127	.518799E-01	.140497E-01
284	.450776E-01	.32273	.519251E-01	.1415E-01
286	.454019E-01	.325338	.519708E-01	.142504E-01
288	.457268E-01	.327951	.52016E-01	.143508E-01
290	.460515E-01	.330569	.520616E-01	.144511E-01
292	.463763E-01	.333193	.521072E-01	.145515E-01
294	.467012E-01	.335821	.52153E-01	.146519E-01
296	.470264E-01	.338455	.521985E-01	.147523E-01
298	.473514E-01	.341094	.522444E-01	.148526E-01
300	.476767E-01	.343738	.522902E-01	.149533E-01

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
302	.48002E-01	.346387	.523361E-01	.150537E-01
304	.483276E-01	.349042	.523819E-01	.151541E-01
306	.48653E-01	.351702	.524281E-01	.152545E-01
308	.489787E-01	.354367	.524741E-01	.15355E-01
310	.493045E-01	.357037	.525201E-01	.154554E-01
312	.496303E-01	.359713	.525664E-01	.155561E-01
314	.499562E-01	.362394	.526127E-01	.156565E-01
316	.502824E-01	.36508	.526588E-01	.15757E-01
318	.506086E-01	.367771	.52705E-01	.158573E-01
320	.509348E-01	.370468	.527516E-01	.159581E-01
322	.512612E-01	.37317	.527979E-01	.160586E-01
324	.515876E-01	.375878	.528445E-01	.161589E-01
326	.519142E-01	.37859	.52891E-01	.162597E-01
328	.52241E-01	.381308	.529375E-01	.163602E-01
330	.525677E-01	.384032	.529842E-01	.164609E-01
332	.528945E-01	.386761	.530312E-01	.165613E-01
334	.532216E-01	.389495	.530778E-01	.16662E-01
336	.535486E-01	.392235	.531247E-01	.167625E-01
338	.538758E-01	.39498	.531716E-01	.168632E-01
340	.54203E-01	.39773	.532186E-01	.169637E-01
342	.545304E-01	.400486	.532656E-01	.170646E-01
344	.54858E-01	.403247	.533126E-01	.171651E-01
346	.551853E-01	.406014	.5336E-01	.172658E-01
348	.55513E-01	.408786	.534072E-01	.173663E-01
350	.558411E-01	.411563	.534542E-01	.17467E-01
352	.561689E-01	.414347	.535016E-01	.175679E-01
354	.564967E-01	.417135	.535491E-01	.176684E-01
356	.568249E-01	.419929	.535965E-01	.177691E-01
358	.571531E-01	.422729	.53644E-01	.1787E-01
360	.574814E-01	.425534	.536915E-01	.179704E-01
362	.578097E-01	.428345	.537392E-01	.180713E-01
364	.581384E-01	.431161	.537867E-01	.18172E-01
366	.58467E-01	.433982	.538344E-01	.182729E-01
368	.587957E-01	.43681	.538823E-01	.183737E-01
370	.591245E-01	.439643	.539301E-01	.184742E-01
372	.594533E-01	.442481	.539781E-01	.185751E-01
374	.597824E-01	.445325	.54026E-01	.186759E-01
376	.601115E-01	.448175	.54074E-01	.187768E-01
378	.604408E-01	.45103	.541221E-01	.188775E-01
380	.6077E-01	.453891	.541702E-01	.189784E-01
382	.610994E-01	.456758	.542185E-01	.190792E-01
384	.61429E-01	.45963	.542667E-01	.191801E-01
386	.617586E-01	.462507	.54315E-01	.192809E-01
388	.620884E-01	.465391	.543634E-01	.193818E-01
390	.624181E-01	.468281	.54412E-01	.194826E-01
392	.627482E-01	.471175	.544603E-01	.195835E-01
394	.630781E-01	.474076	.545091E-01	.196844E-01
396	.634083E-01	.476982	.545576E-01	.197853E-01
398	.637385E-01	.479895	.546063E-01	.198861E-01
400	.640687E-01	.482812	.546552E-01	.19987E-01

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400	.640687E-01	.482812	.546551E-01	.19987E-01
402	.643993E-01	.485735	.547038E-01	.20088E-01
404	.647297E-01	.488665	.547528E-01	.20189E-01
406	.650603E-01	.4916	.548018E-01	.2029E-01
408	.653911E-01	.494541	.548507E-01	.203909E-01
410	.65722E-01	.497487	.548997E-01	.204918E-01
412	.660529E-01	.50044	.549489E-01	.205929E-01
414	.66384E-01	.503398	.549981E-01	.206939E-01
416	.667151E-01	.506363	.550473E-01	.207949E-01
418	.670464E-01	.509332	.550966E-01	.20896E-01
420	.673779E-01	.512308	.551458E-01	.209969E-01
422	.677092E-01	.51529	.551954E-01	.210979E-01
424	.680409E-01	.518277	.552448E-01	.211991E-01
426	.683725E-01	.521271	.552944E-01	.213E-01
428	.687043E-01	.524271	.55344E-01	.214012E-01
430	.690363E-01	.527276	.553936E-01	.215021E-01
432	.693681E-01	.530287	.554434E-01	.216031E-01
434	.697002E-01	.533304	.554931E-01	.217043E-01
436	.700324E-01	.536327	.55543E-01	.218053E-01
438	.703648E-01	.539356	.555928E-01	.219066E-01
440	.706972E-01	.542391	.556429E-01	.220078E-01
442	.710298E-01	.545433	.556929E-01	.221088E-01
444	.713624E-01	.54848	.557429E-01	.2221E-01
446	.716951E-01	.551533	.557931E-01	.22311E-01
448	.720278E-01	.554592	.558434E-01	.224123E-01
450	.723609E-01	.557657	.558936E-01	.225135E-01
452	.726937E-01	.560728	.559441E-01	.226146E-01
454	.730268E-01	.563805	.559946E-01	.227158E-01
456	.7336E-01	.566888	.56045E-01	.228171E-01
458	.736935E-01	.569978	.560954E-01	.229181E-01
460	.740268E-01	.573074	.561461E-01	.230194E-01
462	.743604E-01	.576175	.561968E-01	.231206E-01
464	.74694E-01	.579283	.562475E-01	.23222E-01
466	.750277E-01	.582396	.562983E-01	.233233E-01
468	.753617E-01	.585517	.563491E-01	.234245E-01
470	.756955E-01	.588642	.564001E-01	.235256E-01
472	.760297E-01	.591774	.56451E-01	.236269E-01
474	.763638E-01	.594913	.565021E-01	.237283E-01
476	.766979E-01	.598058	.565533E-01	.238296E-01
478	.770324E-01	.601208	.566044E-01	.239309E-01
480	.773671E-01	.604366	.566555E-01	.240322E-01
482	.777016E-01	.607528	.567068E-01	.241336E-01
484	.780363E-01	.610698	.567582E-01	.242349E-01
486	.783709E-01	.613874	.568097E-01	.243362E-01
488	.787058E-01	.617055	.568612E-01	.244375E-01
490	.790408E-01	.620244	.569128E-01	.24539E-01
492	.793759E-01	.623439	.569645E-01	.246403E-01
494	.797111E-01	.62664	.570161E-01	.247417E-01
496	.800465E-01	.629846	.570678E-01	.248433E-01
498	.803818E-01	.63306	.571197E-01	.249447E-01

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500	.807173E-01	.63628	.571716E-01	.25046E-01
502	.81053E-01	.639506	.572234E-01	.251474E-01
504	.813887E-01	.642738	.572755E-01	.252488E-01
506	.817244E-01	.645977	.573277E-01	.253505E-01
508	.820605E-01	.649222	.573797E-01	.254519E-01
510	.823965E-01	.652474	.574319E-01	.255532E-01
512	.827327E-01	.655732	.574842E-01	.256547E-01
514	.830689E-01	.658997	.575365E-01	.257564E-01
516	.83405E-01	.662267	.57589E-01	.258577E-01
518	.837416E-01	.665545	.576415E-01	.259591E-01
520	.840782E-01	.668829	.576939E-01	.260608E-01
522	.844149E-01	.672119	.577465E-01	.261623E-01
524	.847515E-01	.675416	.577993E-01	.26264E-01
526	.850885E-01	.678719	.57852E-01	.263654E-01
528	.854255E-01	.682029	.579047E-01	.264671E-01
530	.857624E-01	.685345	.579577E-01	.265685E-01
532	.860998E-01	.688668	.580105E-01	.266702E-01
534	.86437E-01	.691998	.580636E-01	.267717E-01
536	.867742E-01	.695333	.581167E-01	.268734E-01
538	.871118E-01	.698676	.581697E-01	.269749E-01
540	.874494E-01	.702025	.582229E-01	.270766E-01
542	.87787E-01	.705381	.582763E-01	.271781E-01
544	.88125E-01	.708743	.583295E-01	.272799E-01
546	.884627E-01	.712112	.58383E-01	.273815E-01
548	.888008E-01	.715488	.584365E-01	.274831E-01
550	.89139E-01	.71887	.5849E-01	.275848E-01
552	.894771E-01	.722259	.585436E-01	.276866E-01
554	.898156E-01	.725655	.585972E-01	.277883E-01
555.999	.901538E-01	.729057	.586511E-01	.278899E-01
557.999	.904925E-01	.732466	.587048E-01	.279917E-01
559.999	.908311E-01	.735882	.587588E-01	.280933E-01
561.999	.911697E-01	.739304	.588127E-01	.281951E-01
563.999	.915088E-01	.742733	.588666E-01	.28297E-01
565.999	.918478E-01	.74617	.589207E-01	.283985E-01
567.999	.921868E-01	.749612	.589748E-01	.285003E-01
569.999	.92526E-01	.753062	.59029E-01	.286021E-01
571.999	.928652E-01	.756519	.590834E-01	.287038E-01
573.999	.932047E-01	.759982	.591376E-01	.288057E-01
575.999	.93544E-01	.763452	.591922E-01	.289075E-01
577.999	.938836E-01	.766928	.592466E-01	.290093E-01
579.999	.942233E-01	.770412	.593012E-01	.291112E-01
581.999	.945633E-01	.773903	.593557E-01	.29213E-01
583.999	.949032E-01	.7774	.594104E-01	.293148E-01
585.999	.952432E-01	.780904	.594651E-01	.294167E-01
587.999	.955831E-01	.784415	.595201E-01	.295185E-01
589.999	.959233E-01	.787933	.59575E-01	.296203E-01
591.999	.962638E-01	.791459	.596299E-01	.297225E-01
593.999	.966043E-01	.794991	.596848E-01	.298243E-01
595.999	.969449E-01	.79853	.5974E-01	.299262E-01
597.999	.972855E-01	.802076	.597952E-01	.30028E-01

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599.999	.976262E-01	.805629	.598504E-01	.301299E-01
601.999	.979672E-01	.809189	.599057E-01	.302317E-01
603.999	.98308E-01	.812756	.599612E-01	.303339E-01
605.999	.98649E-01	.81633	.600167E-01	.304358E-01
607.999	.989902E-01	.819911	.600722E-01	.305376E-01
609.999	.993316E-01	.823499	.601277E-01	.306398E-01
611.999	.996729E-01	.827095	.601834E-01	.307417E-01
613.999	.100014	.830697	.602391E-01	.308436E-01
615.999	.100356	.834307	.60295E-01	.309458E-01
617.999	.100698	.837923	.603509E-01	.310477E-01
619.999	.10104	.841547	.604067E-01	.311499E-01
621.999	.101381	.845178	.604628E-01	.312518E-01
623.999	.101723	.848816	.605189E-01	.31354E-01
625.999	.102066	.85246	.60575E-01	.314559E-01
627.999	.102408	.856113	.606313E-01	.31558E-01
629.999	.10275	.859773	.606875E-01	.3166E-01
631.999	.103093	.863439	.607438E-01	.317622E-01
633.999	.103435	.867113	.608002E-01	.318642E-01
635.998	.103778	.870795	.608568E-01	.319663E-01
637.998	.104121	.874482	.609134E-01	.320684E-01
639.998	.104464	.878178	.6097E-01	.321705E-01
641.998	.104806	.881882	.610269E-01	.322728E-01
643.998	.10515	.885592	.610836E-01	.323747E-01
645.998	.105493	.889309	.611405E-01	.32477E-01
647.998	.105836	.893035	.611974E-01	.325792E-01
649.998	.106179	.896767	.612545E-01	.326812E-01
651.998	.106523	.900507	.613115E-01	.327835E-01
653.998	.106867	.904254	.613687E-01	.328857E-01
655.998	.10721	.908008	.61426E-01	.32988E-01
657.998	.107554	.91177	.614832E-01	.330902E-01
659.998	.107898	.915539	.615405E-01	.331923E-01
661.998	.108242	.919316	.61598E-01	.332946E-01
663.998	.108587	.9231	.616554E-01	.333968E-01
665.998	.108931	.926892	.617131E-01	.334991E-01
667.998	.109275	.930691	.617708E-01	.336014E-01
669.998	.10962	.934498	.618286E-01	.337037E-01
671.998	.109964	.938311	.618863E-01	.33806E-01
673.998	.110309	.942134	.619443E-01	.339083E-01
675.998	.110654	.945962	.620021E-01	.340105E-01
677.998	.110999	.949799	.620602E-01	.341129E-01
679.998	.111344	.953644	.621184E-01	.342152E-01
681.998	.111689	.957495	.621765E-01	.343175E-01
683.998	.112034	.961354	.622348E-01	.344199E-01
685.998	.112379	.965222	.622931E-01	.345222E-01
687.998	.112725	.969097	.623516E-01	.346246E-01
689.998	.11307	.972979	.6241E-01	.347271E-01
691.998	.113416	.976869	.624685E-01	.348295E-01
693.998	.113762	.980766	.625272E-01	.349318E-01
695.998	.114108	.984671	.625858E-01	.350342E-01
697.998	.114454	.988585	.626446E-01	.351366E-01

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699.998	.1148	.992505	.627033E-01	.352391E-01
701.998	.115146	.996434	.627623E-01	.353415E-01
703.998	.115492	1.000037	.628214E-01	.354439E-01
705.998	.115839	1.00431	.628804E-01	.355465E-01
707.998	.116185	1.00827	.629395E-01	.356489E-01
709.998	.116532	1.01222	.629987E-01	.357513E-01
711.998	.116878	1.01619	.63058E-01	.35854E-01
713.998	.117225	1.02017	.631174E-01	.359564E-01
715.997	.117572	1.02415	.631768E-01	.360588E-01
717.997	.117919	1.02814	.632363E-01	.361614E-01
719.997	.118266	1.03214	.632959E-01	.362638E-01
721.997	.118614	1.03615	.633557E-01	.363665E-01
723.997	.118961	1.04016	.634155E-01	.364689E-01
725.997	.119308	1.04418	.634752E-01	.365716E-01
727.997	.119656	1.04821	.635351E-01	.366743E-01
729.997	.120004	1.05225	.635951E-01	.367767E-01
731.997	.120352	1.0563	.636551E-01	.368794E-01
733.997	.1207	1.06035	.637153E-01	.369818E-01
735.997	.121048	1.06441	.637754E-01	.370846E-01
737.997	.121396	1.06849	.638357E-01	.371872E-01
739.997	.121744	1.07256	.638961E-01	.372897E-01
741.997	.122092	1.07665	.639566E-01	.373925E-01
743.997	.122441	1.08074	.640171E-01	.374951E-01
745.997	.122789	1.08485	.640777E-01	.375977E-01
747.997	.123138	1.08896	.641383E-01	.377004E-01
749.997	.123487	1.09308	.641991E-01	.378032E-01
751.997	.123836	1.0972	.642599E-01	.379059E-01
753.997	.124185	1.10134	.643209E-01	.380086E-01
755.997	.124534	1.10548	.643818E-01	.381111E-01
757.997	.124883	1.10963	.644427E-01	.382139E-01
759.997	.125232	1.11379	.645039E-01	.383166E-01
761.997	.125582	1.11796	.645651E-01	.384194E-01
763.997	.125931	1.12213	.646265E-01	.385222E-01
765.997	.126281	1.12632	.646878E-01	.38625E-01
767.997	.126631	1.13051	.647491E-01	.387278E-01
769.997	.126981	1.13471	.648107E-01	.388305E-01
771.997	.127331	1.13892	.648723E-01	.389333E-01
773.997	.127681	1.14314	.64934E-01	.390362E-01
775.997	.128031	1.14736	.649957E-01	.391389E-01
777.997	.128381	1.1516	.650576E-01	.392418E-01
779.997	.128731	1.15584	.651195E-01	.393446E-01
781.997	.129082	1.16009	.651814E-01	.394474E-01
783.997	.129433	1.16435	.652435E-01	.395502E-01
785.997	.129783	1.16862	.653057E-01	.396533E-01
787.997	.130134	1.17289	.653679E-01	.397561E-01
789.997	.130485	1.17717	.654302E-01	.398589E-01
791.996	.130836	1.18147	.654926E-01	.399618E-01
793.996	.131188	1.18577	.65555E-01	.400649E-01
795.996	.131539	1.19008	.656176E-01	.401677E-01
797.996	.13189	1.1944	.656803E-01	.402706E-01

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799.996	.132242	1.19872	.65743E-01	.403734E-01
801.996	.132593	1.20306	.658057E-01	.404766E-01
803.996	.132945	1.2074	.658686E-01	.405794E-01
805.996	.133297	1.21175	.659316E-01	.406823E-01
807.996	.133649	1.21611	.659946E-01	.407854E-01
809.996	.134001	1.22048	.660577E-01	.408883E-01
811.996	.134353	1.22486	.661208E-01	.409914E-01
813.996	.134705	1.22925	.661841E-01	.410944E-01
815.996	.135058	1.23364	.662475E-01	.411975E-01
817.996	.13541	1.23805	.66311E-01	.413004E-01
819.996	.135763	1.24246	.663744E-01	.414035E-01
821.996	.136116	1.24688	.664379E-01	.415065E-01
823.996	.136468	1.25131	.665016E-01	.416097E-01
825.996	.136821	1.25575	.665654E-01	.417126E-01
827.996	.137174	1.2602	.666292E-01	.418158E-01
829.996	.137527	1.26465	.666931E-01	.419188E-01
831.996	.137881	1.26912	.667571E-01	.420219E-01
833.996	.138234	1.27359	.668212E-01	.421251E-01
835.996	.138587	1.27807	.668855E-01	.422281E-01
837.996	.138941	1.28257	.669497E-01	.423312E-01
839.996	.139295	1.28707	.67014E-01	.424345E-01
841.996	.139648	1.29158	.670784E-01	.425377E-01
843.996	.140002	1.29609	.671428E-01	.426407E-01
845.996	.140356	1.30062	.672074E-01	.427439E-01
847.996	.14071	1.30516	.672721E-01	.428472E-01
849.996	.141065	1.3097	.673368E-01	.429504E-01
851.996	.141419	1.31426	.674017E-01	.430536E-01
853.996	.141774	1.31882	.674665E-01	.431569E-01
855.996	.142128	1.32339	.675315E-01	.432599E-01
857.996	.142483	1.32797	.675966E-01	.433631E-01
859.996	.142838	1.33256	.676617E-01	.434663E-01
861.996	.143193	1.33716	.677269E-01	.435697E-01
863.996	.143548	1.34177	.677922E-01	.436729E-01
865.996	.143903	1.34638	.678577E-01	.437762E-01
867.995	.144258	1.35101	.679232E-01	.438795E-01
869.995	.144613	1.35565	.679888E-01	.439827E-01
871.995	.144969	1.36029	.680544E-01	.440861E-01
873.995	.145324	1.36494	.681202E-01	.441893E-01
875.995	.14568	1.36961	.68186E-01	.442929E-01
877.995	.146036	1.37428	.682519E-01	.443962E-01
879.995	.146392	1.37896	.683178E-01	.444995E-01
881.995	.146748	1.38365	.683839E-01	.446029E-01
883.995	.147104	1.38835	.684501E-01	.447061E-01
885.995	.14746	1.39306	.685163E-01	.448095E-01
887.995	.147816	1.39778	.685827E-01	.449131E-01
889.995	.148173	1.4025	.686492E-01	.450164E-01
891.995	.148529	1.40724	.687156E-01	.451198E-01
893.995	.148886	1.41199	.687821E-01	.452231E-01
895.995	.149243	1.41674	.688488E-01	.453267E-01
897.995	.1496	1.42151	.689156E-01	.454301E-01



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899.995	.149957	1.42628	.689825E-01	.455334E-01
901.995	.150314	1.43107	.690494E-01	.45637E-01
903.995	.150671	1.43586	.691164E-01	.457404E-01
905.995	.151028	1.44066	.691835E-01	.45844E-01
907.995	.151386	1.44547	.692507E-01	.459474E-01
909.995	.151743	1.4503	.693179E-01	.460508E-01
911.995	.152101	1.45513	.693854E-01	.461544E-01
913.995	.152459	1.45997	.694528E-01	.462579E-01
915.995	.152817	1.46482	.695202E-01	.463614E-01
917.995	.153175	1.46968	.695879E-01	.464648E-01
919.995	.153533	1.47455	.696555E-01	.465685E-01
921.995	.153891	1.47942	.697234E-01	.466722E-01
923.995	.154249	1.48431	.697913E-01	.467756E-01
925.995	.154608	1.48921	.698592E-01	.468793E-01
927.995	.154966	1.49412	.699272E-01	.469828E-01
929.995	.155325	1.49904	.699955E-01	.470864E-01
931.995	.155684	1.50396	.700637E-01	.471901E-01
933.995	.156043	1.5089	.701319E-01	.472938E-01
935.995	.156402	1.51385	.702003E-01	.473973E-01
937.995	.156761	1.5188	.702689E-01	.47501E-01
939.995	.15712	1.52377	.703374E-01	.476047E-01
941.995	.157479	1.52875	.704061E-01	.477084E-01
943.994	.157839	1.53373	.704749E-01	.478119E-01
945.994	.158198	1.53873	.705438E-01	.479156E-01
947.994	.158558	1.54373	.706126E-01	.480193E-01
949.994	.158918	1.54875	.706817E-01	.48123E-01
951.994	.159278	1.55377	.707508E-01	.482267E-01
953.994	.159638	1.55881	.7082E-01	.483305E-01
955.994	.159998	1.56385	.708893E-01	.484343E-01
957.994	.160358	1.56891	.709587E-01	.48538E-01
959.994	.160718	1.57397	.710282E-01	.486418E-01
961.994	.161079	1.57905	.710977E-01	.487455E-01
963.994	.161439	1.58413	.711673E-01	.488493E-01
965.994	.1618	1.58923	.712371E-01	.489531E-01
967.994	.162161	1.59433	.713068E-01	.490569E-01
969.994	.162522	1.59945	.713769E-01	.491606E-01
971.994	.162883	1.60457	.714468E-01	.492644E-01
973.994	.163244	1.60971	.715169E-01	.493683E-01
975.994	.163605	1.61485	.715871E-01	.494721E-01
977.994	.163967	1.62001	.716574E-01	.49576E-01
979.994	.164328	1.62517	.717277E-01	.496799E-01
981.994	.16469	1.63035	.717982E-01	.497837E-01
983.994	.165051	1.63554	.718688E-01	.498875E-01
985.994	.165413	1.64073	.719394E-01	.499914E-01
987.994	.165775	1.64594	.720101E-01	.500954E-01
989.994	.166137	1.65116	.720809E-01	.501993E-01
991.994	.166499	1.65638	.721518E-01	.503031E-01
993.994	.166861	1.66162	.722229E-01	.504072E-01
995.994	.167224	1.66687	.72294E-01	.505111E-01
997.994	.167586	1.67213	.723652E-01	.50615E-01

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999.994	.167949	1.67739	.724365E-01	.50719E-01
1001.99	.168311	1.68267	.725078E-01	.508229E-01
1003.99	.168674	1.68796	.725792E-01	.50927E-01
1005.99	.169037	1.69326	.726508E-01	.510309E-01
1007.99	.1694	1.69857	.727225E-01	.511351E-01
1009.99	.169763	1.70389	.727943E-01	.512389E-01
1011.99	.170127	1.70922	.72866E-01	.513431E-01
1013.99	.17049	1.71457	.72938E-01	.514469E-01
1015.99	.170854	1.71992	.7301E-01	.515511E-01
1017.99	.171217	1.72528	.730821E-01	.516551E-01
1019.99	.171581	1.73065	.731543E-01	.517591E-01
1021.99	.171945	1.73604	.732265E-01	.518633E-01
1023.99	.172309	1.74143	.732989E-01	.519673E-01
1025.99	.172673	1.74684	.733715E-01	.520715E-01
1027.99	.173037	1.75225	.734441E-01	.521756E-01
1029.99	.173401	1.75768	.735167E-01	.522796E-01
1031.99	.173766	1.76312	.735894E-01	.523838E-01
1033.99	.17413	1.76856	.736623E-01	.52488E-01
1035.99	.174495	1.77402	.737353E-01	.525922E-01
1037.99	.174859	1.77949	.738084E-01	.526963E-01
1039.99	.175224	1.78497	.738816E-01	.528003E-01
1041.99	.175589	1.79046	.739547E-01	.529045E-01
1043.99	.175954	1.79596	.740281E-01	.530088E-01
1045.99	.176319	1.80148	.741016E-01	.53113E-01
1047.99	.176685	1.807	.741751E-01	.532172E-01
1049.99	.17705	1.81253	.742487E-01	.533215E-01
1051.99	.177416	1.81808	.743223E-01	.534257E-01
1053.99	.177781	1.82364	.743962E-01	.5353E-01
1055.99	.178147	1.8292	.744701E-01	.536342E-01
1057.99	.178513	1.83478	.745441E-01	.537385E-01
1059.99	.178879	1.84037	.746182E-01	.538427E-01
1061.99	.179245	1.84597	.746924E-01	.53947E-01
1063.99	.179611	1.85158	.747667E-01	.540513E-01
1065.99	.179978	1.8572	.74841E-01	.541555E-01
1067.99	.180344	1.86284	.749155E-01	.542598E-01
1069.99	.180711	1.86848	.749901E-01	.543641E-01
1071.99	.181077	1.87414	.750648E-01	.544684E-01
1073.99	.181444	1.8798	.751394E-01	.545729E-01
1075.99	.181811	1.88548	.752144E-01	.546773E-01
1077.99	.182178	1.89117	.752894E-01	.547816E-01
1079.99	.182545	1.89687	.753645E-01	.548859E-01
1081.99	.182912	1.90258	.754396E-01	.549904E-01
1083.99	.18328	1.90831	.755148E-01	.550947E-01
1085.99	.183647	1.91404	.755901E-01	.55199E-01
1087.99	.184015	1.91978	.756656E-01	.553037E-01
1089.99	.184382	1.92554	.757412E-01	.55408E-01
1091.99	.18475	1.93131	.758169E-01	.555123E-01
1093.99	.185118	1.93709	.758926E-01	.55617E-01
1095.99	.185486	1.94288	.759684E-01	.557213E-01
1097.99	.185854	1.94868	.760444E-01	.558256E-01

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1099.99	.186222	1.9545	.761204E-01	.559303E-01
1101.99	.186591	1.96032	.761965E-01	.560347E-01
1103.99	.186959	1.96616	.762728E-01	.561392E-01
1105.99	.187328	1.97201	.763492E-01	.562437E-01
1107.99	.187697	1.97786	.764255E-01	.563482E-01
1109.99	.188066	1.98374	.765021E-01	.564529E-01
1111.99	.188434	1.98962	.765788E-01	.565573E-01
1113.99	.188803	1.99551	.766555E-01	.56662E-01
1115.99	.189173	2.00142	.767324E-01	.567664E-01
1117.99	.189542	2.00734	.768092E-01	.568711E-01
1119.99	.189912	2.01327	.768862E-01	.569757E-01
1121.99	.190281	2.01921	.769634E-01	.5708E-01
1123.99	.190651	2.02516	.770406E-01	.571848E-01
1125.99	.19102	2.03112	.77118E-01	.572895E-01
1127.99	.19139	2.0371	.771955E-01	.573941E-01
1129.99	.19176	2.04309	.772729E-01	.574986E-01
1131.99	.19213	2.04909	.773506E-01	.576032E-01
1133.99	.1925	2.0551	.774283E-01	.577079E-01
1135.99	.192871	2.06112	.775062E-01	.578127E-01
1137.99	.193241	2.06716	.775842E-01	.579174E-01
1139.99	.193612	2.07321	.776622E-01	.58022E-01
1141.99	.193982	2.07926	.777403E-01	.581266E-01
1143.99	.194353	2.08534	.778186E-01	.582312E-01
1145.99	.194724	2.09142	.778969E-01	.58336E-01
1147.99	.195095	2.09751	.779753E-01	.584407E-01
1149.99	.195466	2.10362	.78054E-01	.585455E-01
1151.99	.195838	2.10974	.781325E-01	.586503E-01
1153.99	.196209	2.11587	.782114E-01	.587549E-01
1155.99	.19658	2.12202	.782901E-01	.588597E-01
1157.99	.196952	2.12817	.783691E-01	.589645E-01
1159.99	.197323	2.13434	.784483E-01	.590693E-01
1161.99	.197695	2.14052	.785274E-01	.591743E-01
1163.99	.198067	2.14671	.786066E-01	.592791E-01
1165.99	.198439	2.15291	.786861E-01	.593839E-01
1167.99	.198812	2.15913	.787654E-01	.594887E-01
1169.99	.199184	2.16536	.788451E-01	.595934E-01
1171.99	.199556	2.1716	.789248E-01	.596982E-01
1173.99	.199929	2.17785	.790045E-01	.598032E-01
1175.99	.200302	2.18412	.790844E-01	.59908E-01
1177.99	.200674	2.1904	.791644E-01	.600129E-01
1179.99	.201047	2.19669	.792445E-01	.60118E-01
1181.99	.20142	2.20299	.793247E-01	.602227E-01
1183.99	.201793	2.2093	.79405E-01	.603277E-01
1185.99	.202166	2.21563	.794854E-01	.604327E-01
1187.99	.20254	2.22197	.79566E-01	.605375E-01
1189.99	.202913	2.22832	.796465E-01	.606424E-01
1191.99	.203287	2.23469	.797273E-01	.607475E-01
1193.99	.20366	2.24107	.798081E-01	.608523E-01
1195.99	.204034	2.24746	.79889E-01	.609574E-01
1197.99	.204408	2.25386	.799701E-01	.610622E-01

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1200	.204784	2.2603	.800516E-01	.611678E-01
1202	.205158	2.26673	.801329E-01	.612727E-01
1204	.205532	2.27317	.802143E-01	.613779E-01
1206	.205907	2.27963	.802957E-01	.614828E-01
1208	.206281	2.28609	.803773E-01	.615879E-01
1210	.206655	2.29257	.80459E-01	.616928E-01
1212	.20703	2.29906	.805407E-01	.61798E-01
1214	.207405	2.30557	.806226E-01	.619031E-01
1216	.20778	2.31208	.807047E-01	.620083E-01
1218	.208155	2.31861	.807868E-01	.621132E-01
1220	.20853	2.32516	.80869E-01	.622183E-01
1222	.208906	2.33171	.809513E-01	.623235E-01
1224	.209281	2.33828	.810337E-01	.624287E-01
1226	.209657	2.34486	.811163E-01	.625336E-01
1228	.210032	2.35146	.811989E-01	.626388E-01
1230	.210408	2.35807	.812817E-01	.62744E-01
1232	.210784	2.36469	.813645E-01	.628492E-01
1234	.21116	2.37132	.814475E-01	.629544E-01
1236	.211536	2.37797	.815306E-01	.630596E-01
1238	.211912	2.38463	.816137E-01	.631648E-01
1240	.212289	2.3913	.81697E-01	.632699E-01
1242	.212665	2.39799	.817805E-01	.63375E-01
1244	.213042	2.40469	.81864E-01	.634803E-01
1246	.213418	2.4114	.819476E-01	.635855E-01
1248	.213795	2.41813	.820314E-01	.636908E-01
1250	.214172	2.42486	.821152E-01	.637959E-01
1252	.214549	2.43162	.821992E-01	.639014E-01
1254	.214926	2.43838	.822833E-01	.640067E-01
1256	.215304	2.44516	.823674E-01	.641119E-01
1258	.215681	2.45195	.824517E-01	.642172E-01
1260	.216059	2.45876	.825361E-01	.643225E-01
1262	.216436	2.46558	.826206E-01	.644279E-01
1264	.216814	2.47241	.827051E-01	.645331E-01
1266	.217192	2.47926	.827899E-01	.646386E-01
1268	.21757	2.48612	.828748E-01	.647439E-01
1270	.217948	2.49299	.829598E-01	.648493E-01
1272	.218326	2.49988	.830447E-01	.649545E-01
1274	.218704	2.50678	.831299E-01	.6506E-01
1276	.219083	2.51369	.832152E-01	.651654E-01
1278	.219461	2.52062	.833006E-01	.652707E-01
1280	.21984	2.52756	.833861E-01	.653763E-01
1282	.220219	2.53452	.834717E-01	.654815E-01
1284	.220598	2.54149	.835574E-01	.655869E-01
1286	.220977	2.54847	.836432E-01	.656926E-01
1288	.221356	2.55546	.837292E-01	.657978E-01
1290	.221735	2.56248	.838153E-01	.659034E-01
1292	.222115	2.5695	.839016E-01	.660088E-01
1294	.222494	2.57654	.839878E-01	.661144E-01
1296	.222874	2.58359	.840741E-01	.662198E-01
1298	.223254	2.59065	.841607E-01	.663254E-01

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1300	.223634	2.59773	.842474E-01	.664308E-01
1302	.224014	2.60483	.843341E-01	.665364E-01
1304	.224394	2.61193	.84421E-01	.666421E-01
1306	.224774	2.61905	.845079E-01	.667474E-01
1308	.225154	2.62619	.845951E-01	.668531E-01
1310	.225535	2.63334	.846822E-01	.669587E-01
1312	.225915	2.6405	.847695E-01	.670642E-01
1314	.226296	2.64768	.84857E-01	.671698E-01
1316	.226677	2.65487	.849445E-01	.672754E-01
1318	.227058	2.66208	.850322E-01	.673811E-01
1320	.227439	2.6693	.851199E-01	.674865E-01
1322	.22782	2.67653	.852079E-01	.675923E-01
1324	.228201	2.68378	.852959E-01	.676979E-01
1326	.228583	2.69105	.85384E-01	.678036E-01
1328	.228964	2.69832	.854723E-01	.679092E-01
1330	.229346	2.70561	.855606E-01	.68015E-01
1332	.229728	2.71292	.856491E-01	.681205E-01
1334	.23011	2.72024	.857376E-01	.682263E-01
1336	.230492	2.72758	.858263E-01	.683318E-01
1338	.230874	2.73493	.859151E-01	.684376E-01
1340	.231256	2.74229	.860041E-01	.685433E-01
1342	.231638	2.74967	.860931E-01	.686491E-01
1344	.232021	2.75706	.861823E-01	.687548E-01
1346	.232403	2.76447	.862716E-01	.688605E-01
1348	.232786	2.77189	.86361E-01	.689665E-01
1350	.233169	2.77933	.864505E-01	.690723E-01
1352	.233552	2.78678	.865402E-01	.69178E-01
1354	.233935	2.79424	.866299E-01	.692838E-01
1356	.234318	2.80172	.867199E-01	.693896E-01
1358	.234701	2.80922	.868098E-01	.694953E-01
1360	.235085	2.81673	.868999E-01	.696011E-01
1362	.235468	2.82426	.869901E-01	.697072E-01
1364	.235852	2.8318	.870805E-01	.698129E-01
1366	.236236	2.83935	.871709E-01	.699188E-01
1368	.23662	2.84692	.872615E-01	.700247E-01
1370	.237004	2.8545	.873523E-01	.701306E-01
1372	.237388	2.86211	.874431E-01	.702363E-01
1374	.237772	2.86972	.87534E-01	.703424E-01
1376	.238156	2.87735	.876252E-01	.704483E-01
1378	.238541	2.88499	.877163E-01	.705541E-01
1380	.238926	2.89265	.878076E-01	.706601E-01
1382	.239311	2.90033	.878991E-01	.70766E-01
1384	.239695	2.90802	.879906E-01	.708721E-01
1386	.24008	2.91572	.880822E-01	.709779E-01
1388	.240466	2.92344	.88174E-01	.71084E-01
1390	.240851	2.93118	.882659E-01	.711899E-01
1392	.241236	2.93893	.88358E-01	.71296E-01
1394	.241621	2.9467	.884501E-01	.714018E-01
1396	.242007	2.95448	.885424E-01	.715079E-01
1398	.242393	2.96227	.886348E-01	.716141E-01

<u>TIME</u> MY	<u>PB 206</u> U 238	<u>PB 207</u> U 235	<u>PB 207</u> PB 206	<u>PB 208</u> TH 232
1400	.242778	2.97009	.887274E-01	.7172E-01
1402	.243164	2.97791	.8882E-01	.718261E-01
1404	.24355	2.98575	.889127E-01	.719321E-01
1406	.243937	2.99361	.890057E-01	.720382E-01
1408	.244323	3.00149	.890987E-01	.721443E-01
1410	.244709	3.00938	.891918E-01	.722505E-01
1412	.245096	3.01728	.89285E-01	.723564E-01
1414	.245482	3.0252	.893784E-01	.724626E-01
1416	.245869	3.03314	.894719E-01	.725688E-01
1418	.246256	3.04109	.895655E-01	.726749E-01
1420	.246643	3.04906	.896592E-01	.727811E-01
1422	.24703	3.05704	.897531E-01	.728873E-01
1424	.247418	3.06504	.898472E-01	.729933E-01
1426	.247805	3.07306	.899412E-01	.730994E-01
1428	.248193	3.08109	.900355E-01	.732056E-01
1430	.24858	3.08913	.901299E-01	.733118E-01
1432	.248968	3.09719	.902244E-01	.73418E-01
1434	.249356	3.10527	.90319E-01	.735242E-01
1436	.249744	3.11337	.904136E-01	.736305E-01
1438	.250132	3.12148	.905085E-01	.737367E-01
1440	.25052	3.1296	.906036E-01	.73843E-01
1442	.250908	3.13774	.906987E-01	.739492E-01
1444	.251297	3.1459	.907939E-01	.740557E-01
1446	.251686	3.15408	.908893E-01	.741619E-01
1448	.252074	3.16227	.909848E-01	.742682E-01
1450	.252463	3.17047	.910804E-01	.743744E-01
1452	.252852	3.1787	.911762E-01	.744808E-01
1454	.253241	3.18693	.91272E-01	.74587E-01
1456	.25363	3.19519	.91368E-01	.746936E-01
1458	.25402	3.20346	.914642E-01	.747998E-01
1460	.254409	3.21175	.915605E-01	.749061E-01
1462	.254798	3.22005	.916568E-01	.750124E-01
1464	.255188	3.22837	.917533E-01	.751189E-01
1466	.255578	3.23671	.9185E-01	.752252E-01
1468	.255968	3.24506	.919467E-01	.753316E-01
1470	.256358	3.25343	.920437E-01	.754381E-01
1472	.256748	3.26182	.921407E-01	.755445E-01
1474	.257138	3.27022	.922379E-01	.756511E-01
1476	.257529	3.27864	.92335E-01	.757574E-01
1478	.257919	3.28708	.924326E-01	.75864E-01
1480	.25831	3.29553	.9253E-01	.759703E-01
1482	.258701	3.304	.926277E-01	.760769E-01
1484	.259092	3.31248	.927255E-01	.761832E-01
1486	.259482	3.32099	.928235E-01	.762898E-01
1488	.259874	3.32951	.929215E-01	.763961E-01
1490	.260265	3.33804	.930197E-01	.765028E-01
1492	.260656	3.34659	.93118E-01	.766091E-01
1494	.261048	3.35516	.932164E-01	.767157E-01
1496	.261439	3.36375	.93315E-01	.768224E-01
1498	.261831	3.37235	.934138E-01	.769287E-01

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
1500	.262224	3.38099	.935127E-01	.770357E-01
1505	.263204	3.40262	.937604E-01	.773022E-01
1510	.264185	3.42435	.940089E-01	.775687E-01
1515	.265166	3.44619	.942583E-01	.778353E-01
1520	.266149	3.46814	.945084E-01	.781019E-01
1525	.267132	3.4902	.947594E-01	.783686E-01
1530	.268116	3.51236	.950112E-01	.786355E-01
1535	.269101	3.53464	.952639E-01	.789024E-01
1540	.270087	3.55702	.955173E-01	.791694E-01
1545	.271073	3.57952	.957717E-01	.794361E-01
1550	.27206	3.60212	.960269E-01	.797031E-01
1555	.273048	3.62484	.962829E-01	.799705E-01
1560	.274036	3.64767	.965398E-01	.802376E-01
1565	.275026	3.67061	.967975E-01	.805048E-01
1570	.276016	3.69367	.970561E-01	.807722E-01
1575	.277007	3.71684	.973156E-01	.810397E-01
1580	.277998	3.74012	.975759E-01	.813071E-01
1585	.278991	3.76352	.978371E-01	.815747E-01
1590	.279984	3.78704	.980992E-01	.818422E-01
1595	.280978	3.81067	.983621E-01	.821098E-01
1600	.281973	3.83442	.986259E-01	.823774E-01
1605	.282968	3.85828	.988906E-01	.826453E-01
1610	.283964	3.88226	.991562E-01	.829133E-01
1615	.284961	3.90636	.994227E-01	.831809E-01
1620	.285959	3.93058	.996899E-01	.83449E-01
1625	.286958	3.95492	.999581E-01	.83717E-01
1630	.287957	3.97938	.100227	.839853E-01
1635	.288957	4.00396	.100497	.842534E-01
1640	.289958	4.02866	.100768	.845215E-01
1645	.29096	4.05349	.10104	.8479E-01
1650	.291963	4.07843	.101313	.850584E-01
1655	.292966	4.1035	.101587	.853267E-01
1660	.29397	4.12869	.101861	.855951E-01
1665	.294975	4.15401	.102137	.858637E-01
1670	.295981	4.17945	.102413	.861325E-01
1675	.296987	4.20502	.10269	.864012E-01
1680	.297994	4.23071	.102969	.866701E-01
1685	.299002	4.25653	.103248	.869388E-01
1690	.300011	4.28248	.103528	.872078E-01
1695	.30102	4.30856	.103809	.874767E-01
1700	.302031	4.33477	.104091	.877458E-01
1705	.303042	4.3611	.104374	.880148E-01
1710	.304054	4.38756	.104658	.882841E-01
1715	.305066	4.41416	.104943	.885533E-01
1720	.30608	4.44089	.105229	.888227E-01
1725	.307094	4.46774	.105515	.890921E-01
1730	.308109	4.49474	.105803	.893614E-01
1735	.309125	4.52186	.106092	.89631E-01
1740	.310141	4.54912	.106382	.899005E-01
1745	.311159	4.57651	.106672	.901703E-01

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
1750	.312177	4.60404	.106964	.904399E-01
1755	.313196	4.6317	.107256	.907098E-01
1760	.314215	4.6595	.10755	.909795E-01
1765	.315236	4.68744	.107845	.912495E-01
1770	.316257	4.71552	.10814	.915195E-01
1775	.317279	4.74373	.108437	.917895E-01
1780	.318302	4.77208	.108734	.920595E-01
1785	.319326	4.80058	.109033	.923299E-01
1790	.320351	4.82921	.109332	.926E-01
1795	.321376	4.85798	.109633	.928705E-01
1800	.322402	4.8869	.109935	.931406E-01
1805	.323429	4.91596	.110237	.934111E-01
1810	.324457	4.94517	.110541	.936816E-01
1815	.325485	4.97451	.110846	.939524E-01
1820	.326514	5.00401	.111151	.94223E-01
1825	.327545	5.03364	.111458	.944936E-01
1830	.328576	5.06343	.111766	.947645E-01
1835	.329607	5.09336	.112074	.950352E-01
1840	.33064	5.12344	.112384	.953062E-01
1845	.331673	5.15367	.112695	.955771E-01
1850	.332707	5.18404	.113007	.958482E-01
1855	.333742	5.21457	.11332	.961195E-01
1860	.334778	5.24525	.113634	.963906E-01
1865	.335815	5.27608	.113949	.966617E-01
1870	.336852	5.30706	.114265	.969331E-01
1875	.33789	5.33819	.114582	.972046E-01
1880	.338929	5.36948	.114901	.97476E-01
1885	.339969	5.40092	.11522	.977476E-01
1890	.341009	5.43252	.11554	.980191E-01
1895	.342051	5.46427	.115862	.982907E-01
1900	.343093	5.49618	.116185	.985624E-01
1905	.344136	5.52825	.116508	.988343E-01
1910	.34518	5.56048	.116833	.991062E-01
1915	.346224	5.59286	.117159	.993781E-01
1920	.34727	5.62541	.117486	.996502E-01
1925	.348316	5.65811	.117814	.999222E-01
1930	.349363	5.69098	.118143	.100194
1935	.350411	5.72401	.118474	.100466
1940	.351459	5.7572	.118805	.100739
1945	.352509	5.79056	.119138	.101011
1950	.353559	5.82408	.119471	.101283
1955	.35461	5.85776	.119806	.101556
1960	.355662	5.89162	.120142	.101828
1965	.356715	5.92564	.120479	.102101
1970	.357769	5.95983	.120818	.102374
1975	.358823	5.99418	.121157	.102646
1980	.359878	6.02871	.121498	.102919
1985	.360934	6.0634	.121839	.103192
1990	.361991	6.09827	.122182	.103465
1995	.363048	6.13331	.122526	.103738



<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
2000	.364107	6.16852	.122871	.104011
2005	.365166	6.20391	.123218	.104284
2010	.366226	6.23947	.123565	.104557
2015	.367287	6.27521	.123914	.104831
2020	.368349	6.31113	.124264	.105104
2025	.369412	6.34722	.124615	.105377
2030	.370475	6.38349	.124968	.105651
2035	.371539	6.41994	.125321	.105924
2040	.372604	6.45656	.125676	.106198
2045	.37367	6.49337	.126032	.106472
2050	.374737	6.53036	.126389	.106745
2055	.375805	6.56754	.126747	.107019
2060	.376873	6.6049	.127107	.107293
2065	.377942	6.64244	.127468	.107567
2070	.379013	6.68016	.12783	.107841
2075	.380083	6.71807	.128193	.108115
2080	.381155	6.75618	.128558	.10839
2085	.382228	6.79446	.128923	.108664
2090	.383301	6.83294	.12929	.108938
2095	.384375	6.87161	.129659	.109212
2100	.38545	6.91047	.130028	.109487
2105	.386526	6.94952	.130399	.109761
2110	.387603	6.98876	.130771	.110036
2115	.388681	7.0282	.131144	.110311
2120	.389759	7.06783	.131519	.110585
2125	.390838	7.10766	.131895	.11086
2130	.391918	7.14768	.132272	.111135
2135	.392999	7.1879	.132651	.11141
2140	.394081	7.22832	.13303	.111685
2145	.395164	7.26894	.133411	.11196
2150	.396247	7.30976	.133794	.112235
2155	.397331	7.35078	.134177	.11251
2160	.398417	7.39201	.134562	.112785
2165	.399503	7.43343	.134949	.113061
2170	.40059	7.47506	.135336	.113336
2175	.401677	7.5169	.135725	.113612
2180	.402765	7.55894	.136116	.113887
2185	.403855	7.6012	.136507	.114163
2190	.404945	7.64365	.1369	.114438
2195	.406036	7.68632	.137294	.114714
2200	.407128	7.7292	.13769	.11499
2205	.408221	7.7723	.138087	.115266
2210	.409314	7.8156	.138486	.115542
2215	.410409	7.85912	.138885	.115817
2220	.411504	7.90285	.139286	.116094
2225	.4126	7.9468	.139689	.11637
2230	.413697	7.99097	.140093	.116646
2235	.414795	8.03535	.140498	.116922
2240.01	.415894	8.07995	.140905	.117198
2245.01	.416993	8.12478	.141313	.117475

<u>TIME</u> MY	<u>PB 206</u> U 238	<u>PB 207</u> U 235	<u>PB 207</u> PB 206	<u>PB 208</u> TH 232
2250.01	.418093	8.16982	.141722	.117751
2255.01	.419195	8.21509	.142133	.118028
2260.01	.420297	8.26058	.142545	.118304
2265.01	.4214	8.3063	.142959	.118581
2270.01	.422504	8.35223	.143374	.118858
2275.01	.423608	8.3984	.143791	.119135
2280.01	.424714	8.4448	.144209	.119412
2285.01	.42582	8.49142	.144628	.119689
2290.01	.426927	8.53828	.145049	.119966
2295.01	.428035	8.58536	.145471	.120243
2300.01	.429145	8.63268	.145895	.12052
2305.01	.430254	8.68023	.14632	.120797
2310.01	.431365	8.72802	.146747	.121075
2315.01	.432477	8.77604	.147175	.121352
2320.01	.433589	8.8243	.147605	.121629
2325.01	.434702	8.8728	.148036	.121907
2330.01	.435817	8.92154	.148469	.122184
2335.01	.436932	8.97051	.148903	.122462
2340.01	.438047	9.01973	.149338	.12274
2345.01	.439164	9.0692	.149775	.123017
2350.01	.440282	9.1189	.150214	.123295
2355.01	.4414	9.16885	.150654	.123573
2360.01	.44252	9.21905	.151096	.123851
2365.01	.44364	9.2695	.151539	.124129
2370.01	.444761	9.32019	.151984	.124408
2375.01	.445882	9.37114	.15243	.124686
2380.01	.447006	9.42234	.152878	.124964
2385.01	.448129	9.47379	.153327	.125242
2390.01	.449254	9.52549	.153778	.125521
2395.01	.450379	9.57745	.154231	.125799
2400.01	.451505	9.62967	.154685	.126078
2405.01	.452633	9.68214	.15514	.126356
2410.01	.453761	9.73487	.155597	.126635
2415.01	.45489	9.78786	.156056	.126914
2420.01	.45602	9.84112	.156516	.127192
2425.01	.45715	9.89463	.156978	.127471
2430.01	.458282	9.94842	.157442	.12775
2435.01	.459414	10.0025	.157907	.128029
2440.01	.460548	10.0568	.158374	.128308
2445.01	.461682	10.1114	.158842	.128588
2450.01	.462817	10.1662	.159312	.128867
2455.01	.463953	10.2213	.159784	.129146
2460.01	.46509	10.2767	.160257	.129425
2465.01	.466228	10.3324	.160732	.129705
2470.01	.467366	10.3883	.161208	.129984
2475.01	.468506	10.4446	.161687	.130264
2480.01	.469646	10.5011	.162166	.130544
2485.01	.470787	10.5578	.162648	.130823
2490.01	.47193	10.6149	.163131	.131103
2495.01	.473073	10.6722	.163616	.131383

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
2500	.474214	10.7297	.164101	.131662
2510	.476505	10.8458	.16508	.132222
2520	.478799	10.963	.166065	.132783
2530	.481096	11.0814	.167056	.133343
2540	.483397	11.201	.168055	.133904
2550	.485702	11.3218	.169061	.134465
2560	.48801	11.4437	.170074	.135026
2570	.490323	11.5669	.171093	.135588
2580	.492638	11.6913	.17212	.13615
2590	.494957	11.8169	.173154	.136712
2600	.49728	11.9437	.174196	.137275
2610	.499606	12.0718	.175244	.137838
2620	.501936	12.2012	.1763	.138401
2630	.50427	12.3318	.177363	.138964
2640	.506607	12.4638	.178434	.139528
2650	.508948	12.597	.179512	.140092
2660	.511292	12.7316	.180598	.140656
2670	.51364	12.8675	.181691	.14122
2680	.515992	13.0048	.182793	.141785
2690	.518348	13.1434	.183901	.14235
2700	.520706	13.2834	.185018	.142915
2710	.523069	13.4247	.186142	.143481
2720	.525436	13.5675	.187274	.144047
2730	.527806	13.7117	.188415	.144613
2740	.530179	13.8573	.189563	.14518
2750	.532557	14.0043	.190719	.145746
2760	.534938	14.1528	.191884	.146313
2770	.537323	14.3028	.193056	.146881
2780	.539711	14.4542	.194237	.147448
2790	.542104	14.6072	.195426	.148016
2800	.5445	14.7617	.196624	.148584
2810	.546899	14.9177	.19783	.149152
2820	.549303	15.0752	.199044	.149721
2830	.55171	15.2343	.200267	.15029
2840	.554121	15.395	.201499	.150859
2850	.556536	15.5572	.202739	.151429
2860	.558954	15.7211	.203988	.151999
2870	.561376	15.8866	.205246	.152569
2880	.563802	16.0537	.206513	.153139
2890	.566232	16.2225	.207789	.15371
2900	.568665	16.3929	.209074	.154281
2910	.571102	16.5651	.210368	.154852
2920	.573543	16.7389	.211671	.155423
2930	.575983	16.9145	.212983	.155995
2940	.578437	17.0918	.214304	.156567
2950	.580889	17.2709	.215635	.15714
2960	.583345	17.4517	.216975	.157712
2970	.585806	17.6343	.218325	.158285
2980	.588269	17.8187	.219684	.158859
2990	.590737	18.005	.221053	.159432

<u>TIME</u>	<u>PB 206</u>	<u>PB 207</u>	<u>PB 207</u>	<u>PB 208</u>
<u>MY</u>	<u>U 238</u>	<u>U 235</u>	<u>PB 206</u>	<u>TH 232</u>
3000	.593209	18.1931	.222432	.160006
3010	.595684	18.383	.223821	.16058
3020	.598163	18.5749	.225219	.161154
3030	.600646	18.7686	.226627	.161729
3040	.603133	18.9643	.228046	.162304
3050	.605624	19.1618	.229474	.162879
3060	.608119	19.3614	.230912	.163454
3070	.610617	19.5629	.232361	.16403
3080	.61312	19.7664	.23382	.164606
3090	.615626	19.972	.235289	.165182
3100	.618136	20.1795	.236769	.165759
3110	.62065	20.3891	.23826	.166336
3120	.623168	20.6008	.239761	.166913
3130	.625691	20.8146	.241272	.167491
3140	.628216	21.0305	.242795	.168068
3150	.630746	21.2486	.244328	.168646
3160	.633279	21.4688	.245873	.169225
3170	.635817	21.6911	.247428	.169804
3180	.638359	21.9157	.248994	.170382
3190	.640904	22.1425	.250572	.170962
3200	.643454	22.3716	.252161	.171541
3210	.646007	22.6029	.253761	.172121
3220	.648565	22.8365	.255373	.172701
3230	.651126	23.0724	.256996	.173281
3240	.653691	23.3106	.258631	.173862
3250	.656261	23.5512	.260277	.174443
3260	.658834	23.7942	.261935	.175024
3270	.661411	24.0396	.263605	.175606
3280	.663993	24.2874	.265288	.176187
3290	.666578	24.5377	.266982	.176769
3300	.669167	24.7905	.268688	.177352
3310	.671761	25.0457	.270407	.177934
3320	.674358	25.3035	.272138	.178517
3330	.67696	25.5638	.273881	.1791
3340	.679565	25.8267	.275637	.179684
3350	.682175	26.0922	.277405	.180268
3360	.684789	26.3604	.279186	.180852
3370	.687406	26.6312	.28098	.181436
3380	.690028	26.9046	.282787	.182021
3390	.692653	27.1808	.284607	.182606
3400	.695283	27.4597	.286439	.183191
3410	.697917	27.7414	.288286	.183776
3420	.700555	28.0258	.290145	.184362
3430	.703197	28.3131	.292018	.184948
3440	.705844	28.6032	.293904	.185535
3450	.708494	28.8962	.295804	.186121
3460	.711149	29.1921	.297717	.186708
3470	.713807	29.4909	.299644	.187296
3480	.71647	29.7927	.301585	.187883
3490	.719137	30.0974	.303541	.188471

<u>TIME</u> MY	<u>PB 206</u> U 238	<u>PB 207</u> U 235	<u>PB 207</u> PB 206	<u>PB 208</u> TH 232
3500	.721808	30.4052	.30551	.189059
3510	.724483	30.7161	.307493	.189648
3520	.727162	31.0299	.309491	.190236
3530	.729846	31.347	.311503	.190825
3540	.732534	31.6671	.31353	.191415
3550	.735226	31.9904	.315572	.192004
3560	.737922	32.3169	.317628	.192594
3570	.740622	32.6467	.319699	.193185
3580	.743326	32.9797	.321785	.193775
3590	.746035	33.316	.323886	.194366
3600	.748747	33.6556	.326002	.194957
3610	.751465	33.9986	.328134	.195548
3620	.754186	34.345	.330281	.19614
3630	.756911	34.6948	.332444	.196732
3640	.759641	35.0481	.334622	.197324
3650	.762375	35.4048	.336816	.197917
3660	.765114	35.7651	.339026	.198509
3670	.767856	36.129	.341252	.199102
3680	.770603	36.4965	.343494	.199696
3690	.773353	36.8676	.345753	.200289
3700	.776108	37.2424	.348028	.200883
3710	.778868	37.6209	.350319	.201478
3720	.781632	38.0031	.352627	.202072
3730	.7844	38.3891	.354952	.202667
3740	.787173	38.779	.357293	.203262
3750	.789949	39.1727	.359652	.203858
3760	.79273	39.5703	.362028	.204453
3770	.795516	39.9718	.364421	.205049
3780	.798306	40.3773	.366832	.205646
3790	.8011	40.7868	.369259	.206242
3800	.803898	41.2004	.371705	.20684
3810	.806701	41.618	.374169	.207437
3820	.809508	42.0398	.37665	.208034
3830	.812319	42.4658	.379151	.208632
3840	.815135	42.896	.381668	.20923
3850	.817955	43.3304	.384204	.209829
3860	.820779	43.7692	.386759	.210427
3870	.823608	44.2123	.389333	.211026
3880	.826442	44.6597	.391925	.211626
3890	.82928	45.1116	.394536	.212225
3900	.832122	45.568	.397166	.212825
3910	.834968	46.0289	.399815	.213426
3920	.83782	46.4944	.402484	.214026
3930	.840675	46.9644	.405172	.214627
3940	.843535	47.4391	.40788	.215228
3950	.846399	47.9185	.410608	.215829
3960	.849268	48.4027	.413355	.216431
3970	.852141	48.8916	.416123	.217033
3980	.855019	49.3854	.418911	.217635
3990	.857901	49.8841	.42172	.218238

<u>TIME</u> MY	<u>PB 206</u> U 238	<u>PB 207</u> U 235	<u>PB 207</u> PB 206	<u>PB 208</u> TH 232
4000	.860788	50.3877	.424548	.21884
4010	.863679	50.8963	.427398	.219444
4020	.866575	51.4099	.430269	.220047
4030	.869475	51.9287	.433161	.220651
4040	.87238	52.4525	.436073	.221255
4050	.875289	52.9816	.439008	.221859
4060	.878203	53.5158	.441963	.222464
4070	.881121	54.0554	.444941	.223069
4080	.884044	54.6003	.44794	.223674
4090	.886971	55.1506	.450962	.22428
4100	.889903	55.7064	.454005	.224886
4110	.892839	56.2676	.457071	.225492
4120	.895779	56.8344	.46016	.226098
4130	.898725	57.4068	.463271	.226705
4140	.901675	57.9849	.466405	.227312
4150	.90463	58.5687	.469562	.22792
4160	.90759	59.1582	.472742	.228527
4170	.910554	59.7537	.475946	.229135
4180	.913522	60.355	.479173	.229744
4190	.916495	60.9622	.482425	.230352
4200	.919473	61.5755	.4857	.230961
4210	.922455	62.1948	.488999	.23157
4220	.925442	62.8203	.492322	.23218
4230	.928434	63.4519	.49567	.23279
4240	.93143	64.0898	.499043	.2334
4250	.934431	64.7341	.50244	.23401
4260	.937436	65.3846	.505863	.234621
4270.01	.940447	66.0417	.50931	.235231
4280.01	.943462	66.7052	.512784	.235843
4290.01	.946481	67.3753	.516283	.236454
4300.01	.949506	68.052	.519807	.237066
4310.01	.952534	68.7355	.523359	.237679
4320.01	.955568	69.4257	.526935	.238291
4330.01	.958607	70.1227	.530539	.238904
4340.01	.96165	70.8266	.534169	.239517
4350.01	.964698	71.5376	.537826	.24013
4360.01	.967751	72.2555	.541509	.240744
4370.01	.970809	72.9805	.54522	.241358
4380.01	.97387	73.7127	.54896	.241972
4390.01	.976938	74.4522	.552725	.242587
4400.01	.980009	75.199	.55652	.243202
4410.01	.983086	75.9531	.560342	.243817
4420.01	.986166	76.7148	.564193	.244433
4430.01	.989253	77.484	.568072	.245049
4440.01	.992344	78.2607	.57198	.245665
4450.01	.995439	79.0452	.575917	.246281
4460.01	.998539	79.8375	.579883	.246898
4470.01	1.00164	80.6375	.583879	.247515
4480.01	1.00475	81.4455	.587904	.248133
4490.01	1.00787	82.2615	.591959	.24875

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
4500.01	1.01099	83.0856	.596044	.249368
4510.01	1.01411	83.9178	.600159	.249986
4520.01	1.01724	84.7583	.604305	.250605
4530.01	1.02038	85.6071	.608482	.251224
4540.01	1.02352	86.4642	.61269	.251843
4550.01	1.02666	87.3299	.616929	.252463
4560.01	1.02981	88.2041	.621199	.253083
4570.01	1.03296	89.087	.625502	.253703
4580.01	1.03612	89.9787	.629836	.254323
4590.01	1.03929	90.8791	.634203	.254944
4600.01	1.04245	91.7885	.638602	.255565
4610.01	1.04563	92.7068	.643033	.256186
4620.01	1.04881	93.6343	.647498	.256808
4630.01	1.05199	94.5709	.651996	.25743
4640.01	1.05518	95.5168	.656528	.258052
4650.01	1.05837	96.4721	.661093	.258675
4660.01	1.06157	97.4368	.665693	.259297
4670.01	1.06477	98.4111	.670326	.259921
4680.01	1.06798	99.395	.674994	.260544
4690.01	1.07119	100.389	.679697	.261168
4700.02	1.07441	101.392	.684435	.261792
4710.02	1.07763	102.406	.689209	.262417
4720.02	1.08086	103.429	.694018	.263042
4730.02	1.0841	104.463	.698863	.263667
4740.02	1.08733	105.506	.703743	.264292
4750.02	1.09058	106.561	.708661	.264917
4760.02	1.09382	107.625	.713616	.265544
4770.02	1.09708	108.7	.718607	.26617
4780.02	1.10034	109.786	.723636	.266797
4790.02	1.1036	110.882	.728701	.267424
4800.02	1.10687	111.99	.733806	.268051
4810.02	1.11014	113.108	.738948	.268678
4820.02	1.11342	114.237	.744128	.269306
4830.02	1.1167	115.378	.749348	.269934
4840.02	1.11999	116.53	.754606	.270563
4850.02	1.12329	117.693	.759904	.271191
4860.02	1.12659	118.868	.765242	.271821
4870.02	1.12989	120.054	.770619	.27245
4880.02	1.1332	121.252	.776037	.27308
4890.02	1.13651	122.462	.781495	.27371
4900.02	1.13983	123.684	.786994	.27434
4910.02	1.14316	124.918	.792535	.274971
4920.02	1.14649	126.164	.798116	.275602
4930.02	1.14982	127.423	.803741	.276233
4940.02	1.15316	128.694	.809407	.276865
4950.02	1.15651	129.978	.815115	.277496
4960.02	1.15986	131.274	.820866	.278129
4970.02	1.16322	132.583	.826661	.278761
4980.02	1.16658	133.905	.832490	.279394
4990.02	1.16994	135.241	.838381	.280027

<u>TIME</u> <u>NY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
5000	1.17331	136.586	.844294	.280659
5020	1.18007	139.323	.856279	.281927
5040	1.18685	142.114	.868446	.283196
5060	1.19365	144.961	.880796	.284467
5080	1.20047	147.865	.893332	.285738
5100	1.20731	150.826	.906057	.287011
5120	1.21418	153.846	.918976	.288285
5140	1.22106	156.926	.932089	.28956
5160	1.22797	160.068	.945401	.290837
5180	1.2349	163.272	.958914	.292115
5200	1.24185	166.54	.972632	.293394
5220	1.24882	169.872	.986557	.294675
5240	1.25581	173.271	1.00069	.295956
5260	1.26283	176.738	1.01504	.297239
5280	1.26986	180.274	1.02961	.298524
5300	1.27692	183.88	1.0444	.299809
5320	1.284	187.557	1.05942	.301096
5340	1.29111	191.308	1.07466	.302384
5360	1.29823	195.134	1.09013	.303673
5380	1.30538	199.035	1.10584	.304964
5400	1.31255	203.014	1.12179	.306256
5420	1.31974	207.073	1.13798	.307549
5440	1.32695	211.212	1.15441	.308844
5460	1.33419	215.433	1.1711	.31014
5480	1.34145	219.738	1.18804	.311437
5500	1.34873	224.129	1.20524	.312735
5520	1.35603	228.608	1.2227	.314034
5540	1.36336	233.175	1.24042	.315335
5560	1.37071	237.833	1.25842	.316637
5580	1.37808	242.584	1.27669	.317941
5600	1.38548	247.43	1.29524	.319245
5620	1.3929	252.372	1.31407	.320552
5640	1.40034	257.412	1.3332	.321859
5660	1.4078	262.552	1.35261	.323167
5680	1.41529	267.795	1.37232	.324477
5700	1.4228	273.142	1.39233	.325789
5720	1.43034	278.595	1.41265	.327101
5740	1.4379	284.157	1.43327	.328415
5760	1.44548	289.829	1.45422	.32973
5780	1.45308	295.614	1.47548	.331046
5800	1.46071	301.515	1.49707	.332364
5820	1.46836	307.532	1.51899	.333683
5840	1.47604	313.67	1.54125	.335004
5860	1.48374	319.929	1.56385	.336325
5880	1.49146	326.313	1.5868	.337648
5900	1.49921	332.824	1.61009	.338972
5920	1.50698	339.465	1.63375	.340298
5940	1.51478	346.237	1.65777	.341625
5960	1.5226	353.145	1.68215	.342953
5980	1.53044	360.189	1.70692	.344282



<u>PB 208</u>	<u>TH 232</u>	<u>PB 207</u>	<u>U 235</u>	<u>PB 206</u>	<u>U 238</u>	<u>PB 206</u>	<u>U 238</u>	<u>TIME</u>
345613	346946	1.73206	367.374	1.73206	1.53831	6000	1.53831	6000
349614	348279	1.78351	374.702	1.75759	1.54621	6020	1.54621	6040
353626	354966	1.89125	413.586	1.80983	1.55412	6060	1.56207	6080
35765	356308	1.97649	430.245	1.83656	1.57803	6100	1.57804	6120
361687	363035	2.06574	438.823	2.00579	1.60215	6140	1.61836	6160
365735	364384	2.15919	447.572	2.03554	1.62651	6180	1.63467	6200
369787	367087	2.19131	456.495	2.22392	1.64287	6220	1.64287	6240
373867	373867	2.3595	465.596	2.25704	1.65109	6260	1.65109	6280
377951	377951	2.46679	474.877	2.29067	1.6759	6300	1.6759	6320
382048	382048	2.57915	484.344	2.32482	1.69257	6340	1.69257	6360
386156	386156	2.69682	493.998	2.3595	1.70934	6380	1.70934	6400
388903	388903	2.77835	503.845	2.43048	1.72622	6420	1.72622	6440
391654	391654	2.86243	513.887	2.46679	1.74352	6460	1.74352	6480
394411	394411	2.94914	524.13	2.49642	1.76029	6500	1.76029	6520
397173	397173	3.03857	534.576	2.53867	1.77748	6540	1.77748	6560
399941	399941	3.13081	545.229	2.57915	1.79478	6580	1.79478	6600
402714	402714	3.22594	556.095	2.61777	1.81219	6620	1.81219	6640
405493	405493	3.32406	567.177	2.657	1.82971	6660	1.82971	6680
408277	408277	3.42527	578.479	2.69682	1.84734	6700	1.84734	6720
411267	411267	3.52966	589.989	2.73727	1.86508	6740	1.86508	6760
412464	412464	3.58308	601.763	2.77835	1.88292	6780	1.88292	6800
			613.753	2.82006	1.89189	6820	1.89189	6840
			625.982	2.86243	1.90088	6860	1.90088	6880
			638.454	2.90545	1.91895	6900	1.91895	6920
			651.174	2.94914	1.92999	6940	1.92999	6960
			664.147	2.99351	1.94627	6980	1.94627	6990
			677.668	3.03857	1.96207			
			690.873	3.08434	1.97803			
			704.636	3.13081	1.99409			
			718.673	3.17801	1.51895			
			732.989	3.22594	1.53714			
			747.589	3.27428	1.55543			
			762.48	3.32406				
			777.668	3.37428				
			793.157	3.42527				
			808.955	3.47706				
			825.067	3.52966				
			841.499	3.58308				
			858.258					
			875.351					
			892.784					
			910.563					
			928.696					
			947.19					
			966.251					

<u>TIME</u> <u>MY</u>	<u>PB 206</u> <u>U 238</u>	<u>PB 207</u> <u>U 235</u>	<u>PB 207</u> <u>PB 206</u>	<u>PB 208</u> <u>TH 232</u>
7000	1.96462	985.288	3.63733	.413862
7020	1.97384	1004.91	3.69243	.415262
7040	1.98309	1024.92	3.74839	.416663
7060	1.99237	1045.33	3.80523	.418065
7080	2.00167	1066.14	3.86295	.419469
7100	2.01101	1087.37	3.92158	.420874
7120	2.02037	1109.02	3.98112	.422281
7140	2.02976	1131.1	4.0416	.423689
7160	2.03919	1153.62	4.10302	.425098
7180	2.04864	1176.59	4.1654	.426509
7200	2.05812	1200.01	4.22876	.427921
7220	2.06763	1223.9	4.29312	.429335
7240	2.07717	1248.27	4.35848	.43075
7260	2.08674	1273.12	4.42486	.432166
7280	2.09634	1298.46	4.49228	.433584
7300	2.10597	1324.31	4.56076	.435004
7320	2.11563	1350.68	4.63032	.436424
7340	2.12531	1377.56	4.70097	.437846
7360	2.13503	1404.99	4.77272	.43927
7380	2.14478	1432.95	4.8456	.440695
7400	2.15456	1461.48	4.91963	.442121
7420	2.16437	1490.57	4.99482	.443548
7440	2.17421	1520.24	5.07118	.444977
7460	2.18408	1550.5	5.14875	.446408
7480	2.19399	1581.36	5.22753	.44784
7500	2.20392	1612.84	5.30756	.449274
7520	2.21388	1644.95	5.38885	.450708
7540	2.22388	1677.69	5.4714	.452145
7560	2.2339	1711.08	5.55527	.453582
7580	2.24396	1745.14	5.64044	.455021
7600	2.25405	1779.87	5.72696	.456461
7620	2.26417	1815.3	5.81484	.457903
7640	2.27432	1851.43	5.90411	.459347
7660	2.2845	1888.28	5.99477	.460791
7680	2.29472	1925.86	6.08687	.462238
7700	2.30496	1964.19	6.18042	.463685
7720	2.31524	2003.28	6.27544	.465134
7740	2.32555	2043.15	6.37197	.466585
7760	2.33589	2083.81	6.47001	.468037
7780	2.34627	2125.28	6.56959	.46949
7800	2.35667	2167.58	6.67075	.470944
7820	2.36711	2210.72	6.77351	.472401
7840	2.37758	2254.71	6.87789	.473859
7860	2.38808	2299.59	6.98391	.475318
7880	2.39862	2345.35	7.09161	.476778
7900	2.40919	2392.02	7.20101	.47824
7920	2.41979	2439.63	7.31213	.479704
7940	2.43043	2488.17	7.42501	.481169
7960	2.4411	2537.69	7.53968	.482635
7980	2.4518	2588.19	7.65616	.484103

<u>TIME</u> MY	<u>PB 206</u> U 238	<u>PB 207</u> U 235	<u>PB 207</u> PB 206	<u>PB 208</u> TH 232
8000	2.46253	2639.7	7.77447	.485572
8020	2.4733	2692.23	7.89467	.487043
8040	2.4841	2745.8	8.01676	.488515
8060	2.49494	2800.44	8.14078	.489988
8080	2.5058	2856.17	8.26677	.491464
8100	2.51671	2913.01	8.39476	.49294
8120	2.52764	2970.98	8.52476	.494418
8140	2.53861	3030.1	8.65682	.495898
8160	2.54962	3090.39	8.79098	.497379
8180	2.56066	3151.89	8.92727	.498861
8200	2.57173	3214.61	9.0657	.500345
8220	2.58284	3278.58	9.20634	.50183
8240	2.59398	3343.82	9.34919	.503317
8260	2.60516	3410.36	9.49433	.504805
8280	2.61637	3478.22	9.64176	.506295
8300	2.62762	3547.43	9.79152	.507787
8320.01	2.6389	3618.01	9.94366	.50928
8340.01	2.65021	3690.01	10.0982	.510774
8360.01	2.66157	3763.43	10.2552	.512269
8380.01	2.67295	3838.31	10.4147	.513766
8400.01	2.68438	3914.69	10.5768	.515265
8420.01	2.69583	3992.58	10.7414	.516765
8440.01	2.70733	4072.03	10.9086	.518267
8460.01	2.71886	4153.05	11.0785	.51977
8480.01	2.73042	4235.69	11.251	.521274
8500.01	2.74202	4319.97	11.4264	.52278
8520.01	2.75366	4405.92	11.6045	.524288
8540.01	2.76533	4493.58	11.7854	.525797
8560.01	2.77704	4583	11.9692	.527308
8580.01	2.78879	4674.18	12.1559	.52882
8600.01	2.80057	4767.18	12.3456	.530333
8620.01	2.81239	4862.04	12.5384	.531848
8640.01	2.82425	4958.78	12.7342	.533365
8660.01	2.83614	5057.44	12.9331	.534883
8680.01	2.84807	5158.07	13.1351	.536403
8700.01	2.86004	5260.7	13.3404	.537924
8720.01	2.87204	5365.36	13.549	.539446
8740.01	2.88408	5472.11	13.7609	.54097
8760.02	2.89616	5580.99	13.9761	.542496
8780.02	2.90828	5692.03	14.1948	.544023
8800.02	2.92043	5805.28	14.417	.545552
8820.02	2.93263	5920.78	14.6427	.547082
8840.02	2.94486	6038.59	14.872	.548613
8860.02	2.95713	6158.73	15.105	.550146
8880.02	2.96943	6281.26	15.3417	.551681
8900.02	2.98178	6406.23	15.5821	.553217
8920.02	2.99416	6533.69	15.8264	.554755
8940.02	3.00658	6663.68	16.0746	.556294
8960.02	3.01904	6796.26	16.3268	.557835
8980.02	3.03154	6931.48	16.5829	.559377