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A New Sample of Mid-Infrared Bright, Long-Period Mira Variables from the MACHO Galactic Bulge Fields

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Abstract: Mid-infrared bright objects in the direction of the Galactic Bulge were investigated using time series photometry from the MACHO data archive, which led to the discovery of a large number of long-period variables. Among these, a total of 192 bona-fide Mira variables was identified, which – to the best of our knowledge – are reported here for the first time. Together with the results from our previous investigations, we thereby bring the number of Mira variables found in the MACHO Galactic Bulge fields to a new total of 1286 stars. Light curves, folded light curves and summary data for all new Mira variables are presented and their properties in colour-colour, period-colour and period-magnitude space are investigated. In agreement with our expectations, the present sample of mid-infrared bright objects is composed mostly of luminous, long-period variables.

1. Introduction

Mira stars, named after their bright prototype Mira ('the wonderful', o Ceti), are radially pulsating variables exhibiting large photometric amplitudes and periods on the order of $80 \leq P(d) \leq 1000$, although stars with longer periods of up to 2000 days exist [1]. By definition, Mira stars show amplitudes of $\Delta V \geq 2.5$ mag [2], although this cut-off is to some extent arbitrary and results in physically similar stars being classified as semi-regular variables (GCVS-type SRA). Observed light amplitudes in the infrared are much smaller (e.g. $\Delta I \geq 0.8$ or 0.9 mag; $\Delta K \geq 0.4$ mag [3]).

Miras are low- and intermediate-mass stars in an advanced, short-lived ($\sim 2 \times 10^5$ years) state and populate the tip of the asymptotic giant branch (AGB) [4]. They are late-type stars with spectra indicative of strong molecular absorption features (e.g. TiO, ZrO, CN) and emission lines that result from pulsation-related shock waves. Thus, they are found at spectral types Me (oxygen-rich atmosphere), Ce (carbon-rich atmosphere), or, more rarely, Se (intermediate) [3]. The Mira phase is characterised by heavy mass loss, which is why Miras often show considerable circumstellar extinction because of thick dust shells (e.g. [5]). This holds true especially for the longer-period objects.

Mira variables have been shown to follow a distinct period luminosity relation [6]. Because of their luminosity, they are important distance indicators and tools for investigating Galactic structure (e.g. [7]). It is therefore important to increase the sample size of known Mira variables. Our own efforts

in this respect [8,9,10] have led to the identification of 1094 Mira variables in the Massive Compact Halo Object (MACHO) project data archive.

In the present investigation, we report on the discovery of an additional 192 Mira variables in the MACHO data archive that have been found by a different methodological approach. Observations and target selection are described in Section 2, data are analysed in Section 3. Results are presented and discussed in Section 4, and we conclude in Section 5.

2. Observations and Target Selection

2.1 The Massive Compact Halo Object (MACHO) Project

Aim of the MACHO Project was the search for dark matter in the form of massive compact halo objects, so called 'MACHOs'. To this end, millions of stars were monitored in the Magellanic Clouds and the Galactic Bulge in order to search for gravitational microlensing events caused by the – otherwise invisible – MACHOs [11]. As a by-product, thousands of variable stars were discovered in the resulting photometric data.

Observations were carried out between 1992 and 2000 with the 1.27m Great Melbourne Telescope situated at Mount Stromlo in Australia. Using a dichroic beam-splitter, all observations were taken simultaneously through the non-standard MACHO blue filter (~4500-6300 Å; hereafter MACHO *B*-band) and MACHO red filter (~6300-7600 Å; hereafter MACHO *R*-band) with a combination of eight 2048*2048 CCD cameras [12]. For more information on the MACHO project, the reader is referred to [11,12]. MACHO observations are available online through the MACHO Project data archive¹.

2.2 Target Selection

In our previous searches for Mira variables in the MACHO data archive, objects whose MACHO *R*band light curves show a larger deviation than that of other stars of similar magnitude were selected and visually inspected in order to find suitable candidates. For the present investigation, a different methodological approach was taken. Mid-infrared bright objects in the direction of the Galactic Bulge² were chosen using observations from the Wide-field Infrared Survey Explorer (WISE), which surveyed the whole sky in the four infrared bands *W1*, *W2*, *W3*, and *W4*, which are centered at 3.4, 4.6, 12, and 22 µm, respectively [13]. Only objects with $W4 \le 4$ mag were selected for the construction of an initial sample of candidate variable stars. This cut-off was imposed because these *W4*-bright objects appear as a general 'nuisance' in studies of star-formation regions towards the Galactic bulge (J. Alves, private communication). We also expect that with this cut-off we can identify objects with a clear shell signal that are likely to correspond to dust-veiled AGB stars.

3. Data Analysis

Light curves of our candidate stars were downloaded from the MACHO data archive and MACHO instrumental magnitudes were transformed on to the Kron-Cousins system by using equation (2) of [12]. The light curves were visually inspected, which led to the discovery of 1169 clearly variable objects (mostly large amplitude semi-regular and Mira variables). Doubtful cases and stars whose variability is obviously caused by instrumental artifacts (mostly blending issues) were rejected.

In order to separate Miras from semi-regular variables, stars with an amplitude > 2 mag (R_c) were selected (cf. [9,10]). Objects exhibiting significant changes in amplitude, mean magnitude and / or period suggesting semi-regularity were subsequently rejected. The sample of Mira variables was cross-matched with the 2MASS Catalog [15], from which we derived astrometric positions and

¹ http://macho.anu.edu.au/

² Centre coordinates of the MACHO Galactic Bulge fields are found at http://macho.nci.org.au/Macho_fields.html.

near-infrared color indices. Each object was checked against the VizieR service [16] and the AAVSO International Variable Star Index (VSX; [17]) for any information in variability catalogues about the existence of a Mira star at the given position. Known Mira variables were dropped from the sample. In total, we identified 192 new bona-fide Mira variables.

4. Results

4.1 The New Sample

Following the methodology outlined above, a total of 192 Mira variables in the direction of the Galactic Bulge were found in the MACHO data archive. To the best of our knowledge, these Miras are reported here for the first time. Light curves, folded light curves and summary data for all new Mira variables are presented in the Appendix (Table 1 and Figure 6).

4.2 Statistical Analyses

In the following subsections, statistical properties of the present sample of mid-infrared bright Mira variables (N = 192) are investigated and compared to the properties of the sample of Mira variables from the MACHO Galactic Bulge fields presented in [8,9,10] (N = 1094). For ease of use, the present sample is referred to in the following as the MIBR (**m**id-infrared **br**ight) sample.

4.2.1 Period Distribution

A comparison of the period distribution of the MIBR sample (N = 192) with the sample of Mira variables presented in [8,9,10] (N = 1094) is shown in Figure 1 (cf. also Figure 6 in [10]). It becomes obvious that the MIBR sample contains considerably more Miras of longer period, particularly in the range $350 \le P(d) \le 500$. Several Miras of the sample show periods close to one year, which results in poor phase coverage that may pose problematic for standard period search algorithms. However, in our previous searches for Mira variables in the MACHO database [8,9,10], suitable candidates were chosen by visual inspection only. We therefore expect no bias in the discovery of variables with periods close to one year in our previous samples and are confident that the excess of long-period Miras in the MIBR sample is significant and an intrinsic characteristic of the sample.

An excess of long-period Miras is to be expected as the present sample is exclusively made up of mid-infrared bright stars with $W4 \le 4$ mag (cf. Section 2.2), which correspond to highly reddened objects. It is a well-known fact that long-period (log(P) ≥ 2.5 ; cf. e.g. [19]) Miras are prone to exhibiting considerable colour excess due to circumstellar dust shells [19]; thus, very red Miras are usually also long-period Miras. This phenomenon is also obvious in the period-colour diagram presented below (cf. Figure 3).



Figure 1 – Period distribution of Mira variables found in the MACHO Galactic Bulge fields, based on the MIBR sample (red; N = 192) and the samples presented in [8,9,10] (blue, N = 1094).

4.2.2 Colour-Magnitude Diagram

A colour-magnitude diagram, based on 2MASS photometry, is presented in Figure 2. 2MASS observations generally consist of six consecutive exposures for a total integration time of 7.8 seconds [15]. Most objects were visited only once during the course of the survey, which also applies to the Miras of the MIBR sample. Some scatter, therefore, would be expected due to the unknown pulsational phase at which the 2MASS observations were taken.

However, the observed amplitudes of Mira variables in the K_s -band are relatively small (cf. Section 1), and the scatter introduced by the single-epoch measurements is very small in comparison to the distribution of brightness in Figure 2. This also holds true for the (*H*- K_s) colour index derived from 2MASS and employed in Figure 3. Thus, the scatter introduced by the single-epoch measurements is negligible in this context and does not preclude us from drawing conclusions from Figures 2 and 3.

Note the 'red tail' of Miras with $(H-K_s) \ge 1$ that extends to $(H-K_s) \sim 1.5$, which is present in both samples. The presence of this feature confirms the findings of [19] (cf. in particular their Figure 7) and is most obvious in the colour-magnitude diagram for the sample of Mira stars from the OGLE-III Catalog of Long-Period Variables (LPVs) in the Galactic Bulge [20], which is presented in Figure 7 of [10]. Apparently, Miras with $(H-K_s) \ge 1$ become fainter in the K_s band with increasing $(H-K_s)$, which is likely caused by circumstellar extinction due to dust (e.g. [21]). As expected, the Miras of the MIBR sample are mostly situated at the red $((H-K_s) \ge 0.60 \text{ mag})$ and bright $(K_s \le 7.5 \text{ mag})$ end of the 'main clump' of Mira variables in the diagram.



Figure 2 - 2MASS (*H*-*K*_s) vs. *K*_s diagram, illustrating the positions of the Mira variables of the MIBR sample (red crosses; N = 192) and the samples presented in [8,9,10] (black dots, N = 1094).

4.2.3 Period-Colour Diagram

A period-colour diagram is given in Figure 3, which confirms that Miras of longer period have larger $(H-K_s)$ values and hence redder colours. This agrees with earlier findings from OGLE data [19, in particular their Fig. 10], where a significant increase or even a step in $(H-K_s)$ colour is reported at $\log(P) \sim 2.6$. This is likely caused by colour excess due to circumstellar dust that is observed for Miras with periods longer than this value (cf. Section 4.2.1 and [19]). The Miras of the MIBR sample are nearly exclusively found among the long-period objects with $\log(P) \gtrsim 2.5$.



Figure 3 – Log(*P*) vs. 2MASS (*H*- K_s) diagram, illustrating the positions of the Mira variables of the MIBR sample (red crosses; *N* = 192) and the samples presented in [8,9,10] (black dots, *N* = 1094). The blue line indicates the moving average. Note the increase in (*H*- K_s) colour at log(*P*) ~ 2.6.

4.2.4 Period-Magnitude Diagram

Variable red giant stars occupy several well-known sequences in period-luminosity space [22]. Miras and Mira-like semi-regular variables occupy what is commonly referred to as sequence C and are well separated from semi-regular variables of smaller amplitude (like e.g. the so-called OSARG (OGLE Small Amplitude Red Giant) variables). We have investigated the distribution of the MACHO Mira samples in the near-infrared period-magnitude diagram, using 2MASS K_s photometry, which – for red giant stars in the Galactic Bulge – serves as a reasonable proxy for absolute magnitude (Figure 4). Again, as expected, the Miras of the MIBR sample are situated almost exclusively at the bright, long-period end.



Figure 4 – Log(*P*) vs. 2MASS K_s diagram, illustrating the positions of the Mira variables of the MIBR sample (red crosses; N = 192) and the samples presented in [8,9,10] (black dots, N = 1094).

Although there is considerable scatter due to reddening (line-of-sight extinction, circumstellar extinction), the general trend is clearly visible and our result is in excellent agreement with the findings in the literature (cf. e.g. [20], especially their Figure 5, and [22]).

At very strong circumstellar extinction, even the near-IR K_s band loses its power as luminosity indicator of red giant stars. In order to reduce the effects of extinction, we have constructed a period-magnitude diagram for the MIBR sample that is based on the reddening-independent Wesenheit index W_{JK} (e.g. [20]), the result of which is shown in Figure 5. The Wesenheit W_{JK} index is defined as

$$W_{JK} = K - 0.686(J - K).$$
(1)

This helps to reduce the scatter and narrow down the sequence, although some clear outliers remain that have a severe effect on the linear regression fit. Nevertheless, sequence C is clearly visible in the plot.



Figure 5 – Log(*P*) vs. W_{JK} diagram, illustrating the positions of the Mira variables of the MIBR sample (red crosses; N = 192). The dashed red line is a linear fit to the data; the solution is reproduced in the upper right of the diagram. The green line roughly indicates the position of sequence C based on an approximate fit to the data in Fig. 5 of [20].

5. Conclusion

We have investigated mid-infrared bright objects (WISE $W4 \le 4$ mag) in the direction of the Galactic Bulge using time series photometry from the MACHO data archive, which led to the discovery of a large number of long-period variables. A total of 192 bona-fide Mira variables was found, which have not been included in existing variability catalogues, and which are – to the best of our knowledge – announced here for the first time. Together with the results from our previous investigations [8,9,10], we bring the number of Mira variables found in the MACHO Galactic Bulge fields to a new total of 1286 stars.

We present light curves, folded light curves and summary data for all new Mira variables and investigate their properties in colour-colour, period-colour and period-magnitude space. As expected, the present sample of mid-infrared bright objects is composed mostly of luminous, long-period Miras.

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Appendix

MACHO ID	RA (J2000)	DEC (J2000)	2MASS ID	J-K _s	P(d)	Epoch (max)	Max (Rc)	Min (Rc)
103 17517 31	17 54 56 370	-20 /8 33 53	175/5637-20/8335	1 630	202	2451041	(11.2	15.2
403.47.547.54	17 55 25 487	-28 48 10 67	17552548-2848106	2.046	382	2451220	~1/ 2	17.6
402 47676 192	17 55 33 638	-29 11 30 60	17553363-2911305	1 837	380	2451241	13.2	17.0
402.47741.111	17 55 46 512	-28 51 10.54	17554651-2851105	2.154	314	2451432	13.1	18.0
402,47745,888	17 55 49 681	-28 35 14 71	17554968-2835147	2,650	406	2450174	16.4	19.7
402,47864,438	17 56 21,990	-28 39 59 89	17562192-2839598	1.825	412	2450547	14.8	17.6
403,47853,1588	17 56 26 667	-29 25 41.71	17562666-2925417	2.520	387	2449976	15.0	17.8
401.47877.236	17 56 26.781	-27 50 12.92	17562678-2750129	2.449	369	2451220	16.0	19.6
403.47906.1195	17 56 37.073	-29 52 33.25	17563707-2952332	2.191	417	2450907	15.0	18.9
403.47909.1283	17 56 40.307	-29 40 37.18	17564030-2940371	2.264	450	2449942	14.4	16.7
401.48053.1848	17 57 09.327	-28 05 43.88	17570932-2805438	2.306	379	2450040	15.1	18.6
401.48050.561	17 57 09.307	-28 15 22.60	17570930-2815226	2.112	339	2451444	14.4	17.3
402.48099.17	17 57 31.212	-29 00 04.53	17573121-2900045	2.017	452	2450182	13.1	15.4
402.48096.271	17 57 32.987	-29 11 00.12	17573298-2911001	2.270	397	2451463	14.8	17.7
118.18270.862	17 58 56.439	-30 05 10.29	17585643-3005102	2.024	475	2451326	14.2	17.8
118.18796.636	18 00 05.315	-29 43 28.64	18000531-2943286	1.741	352	2450646	12.7	16.7
176.18832.33	18 00 17.705	-27 17 36.55	18001770-2717365	1.954	363	2451344	14.0	16.4
118.18921.2024	18 00 32.809	-29 59 44.55	18003280-2959445	2.963	461	2450345	15.5	19.5
176.18955.1440	18 00 33.529	-27 47 05.09	18003352-2747050	2.506	382	2450534	15.6	19.5
176.19089.44	18 00 52.958	-27 30 19.14	18005295-2730191	2.260	452	2449816	13.0	18.1
176.19352.3590	18 01 16.258	-27 19 12.75	18011625-2719127	2.264	382	2450517	15.2	18.6
176.19481.2463	18 01 41.482	-27 22 22.05	18014148-2722220	2.381	401	2451310	15.8	19.5
104.20384.163	18 03 50.474	-27 50 42.30	18035047-2750422	1.684	359	2449054	<12.9	18.0
120.21002.18	18 05 19.463	-29 56 51.69	18051946-2956516	1.586	360	2449061	11.8	15.8
120.21395.12	18 06 18.306	-29 44 11.89	18061830-2944118	1.055	374	2450259	13.1	>15.7
121.21382.110	18 06 23.626	-30 36 21.13	18062362-3036211	1.630	405	2451305	12.0	17.0
179.21577.71	18 06 37.262	-26 19 25.07	18063726-2619250	1.954	342	2450505	13.5	16.3
121.21517.25	18 06 43.807	-30 18 38.00	18064380-3018380	1.723	410	2449156	13.0	15.3
124.21640.914	18 06 47.617	-30 47 15.72	18064761-3047157	1.832	408	2449109	12.1	16.8
179.21712.731	18 06 51.813	-25 59 21.91	18065181-2559219	2.205	430	2451305	14.1	17.7
124.21632.42	18 06 51.930	-31 16 45.67	18065193-3116456	1.591	410	2450247	12.5	15.9
120.21784.522	18 07 07.436	-29 49 13.39	18070743-2949133	2.452	380	2450018	13.7	16.7
121.21777.223	18 07 09.804	-30 17 39.49	18070980-3017394	1.799	366	2450664	13.2	17.0
124.21894.182	18 07 24.097	-31 10 43.65	18072409-3110436	1.933	391	2449843	14.4	>17.8
120.21911.3312	18 07 33.449	-30 01 00.98	18073344-3001009	1.593	320	2449900	10.6	14.8
180.22499.1546	18 08 45.662	-25 27 45.86	18084566-2527458	2.270	412	2451251	15.8	18.8
121.22423.17	18 08 48.124	-30 31 45.03	18084812-3031450	1.617	324	2449105	11.7	15.7
110.22582.55	18 09 01.782	-28 35 48.48	18090178-2835484	1.843	336	2449843	11.8	17.5
121.22555.10	18 09 02.714	-30 26 14.82	18090271-3026148	1.763	438	2451384	10.5	14.2
178.22751.265	18 09 15.219	-26 01 03.54	18091521-2601035	2.560	446	2450273	15.1	18.3
110.22708.392	18 09 16.297	-28 53 02.57	18091629-2853025	2.130	395	2449988	14.0	18.3
127.22793.24	18 09 44.504	-31 53 52.23	18094450-3153522	2.007	389	2449153	13.1	16.8
180.23019.926	18 10 02.169	-25 31 12.57	18100216-2531125	2.699	443	2450601	15.8	20.0
180.23151.26	18 10 12.393	-25 20 05.55	18101239-2520055	1.730	366	2450942	12.6	>17.0
125.23200.58	18 10 33.182	-30 44 33.30	18103318-3044333	1.365	351	2450715	10.9	15.6
102.23380.29	18 10 56.783	-27 26 58.29	18105678-2726582	1.614	269	2449109	12.5	18.0
122.23464.38	18 11 04.391	-30 31 12.28	18110439-3031122	1.693	459	2450657	13.2	15.6
167.23649.338	18 11 30.270	-26 50 25.20	18113026-2650252	1.807	323	2449179	12.7	16.3
178.23785.139	18 11 41.056	-26 25 36.51	18114105-2625365	1.736	3/5	2449950	12.9	16.7
116.23736.60	18 11 43.594	-29 43 30.48	18114359-2943304	2.140	522	2450580	12.4	15.5
167.23774.170	18 11 44.238	-27 09 24.44	18114423-2709244	1.857	387	2451281	<12.8	15.9
122.23730.28	18 11 44.212	-30 06 30.15	18114421-3006301	2.009	402	2449154	13.5	15.8
167.23776.107	18 11 48.762	-27 01 32.15	18114876-2701321	1.920	3007	2451361	13.0	>15.8
101.23110.011	10 11 53.409	-27 01 19.42	10110340-2701194	2.249	30/ 200	2431280	13.9	11.2
107.23903.02	10 12 01.200	-27 00 42.02	10120120-2700420	1.401	200	2401010	10.0	14.0
111 23872 16	18 12 09 092	-20 32 40.27	18120301-2032402	1.001	324	2431313	11.0	14.9
161 24051 244	18 12 12 207	-23 12 30.34	18121220 2812300	2.001	320	2401001	12.0	17.5
116 2/126 2002	18 12 13.207	-20 02 20.44	1812/729 2020504	2.214	333	2443201	13.2	17.0
167 24204 22	10 12 47.200	-23 33 33.43	18125300 2700050	2.047	353	2400902	13.7	15.9
116 24294.00	18 12 55 /66	-20 15 17 20	181255/6 20/5177	2 204	111	2449000	15.2	18.5
167 24/200./12	18 13 11 970	-23 43 17.00	18131186 2701052	2.234	444	2449920	13.6	15.8
116 24302 070	18 13 17 /01	-20 16 30 00	18131742-2016200	2.000	420	2430301	14.3	17 /
116 2/202 1227	18 12 25 544	-20 16 07 04	18132554-2016070	1 0/3	384	2443234	-1/1 1 ∠1/1 1	17.9
167 24550 704	18 13 43 036	-26 40 41 12	18134303-26/0/11	2 100	510	2440224	14 4	17.0
161.24825.451	18 14 02 530	-26 26 51 95	18140252-2626519	1.909	375	2450875	14.4	16.8

Table 1: Essential data for the new sample of 192 Mira variables identified in the MACHO data archive. Positional information and $(J-K_s)$ indices were derived from the 2MASS catalogue.

307 35039 28	18 14 27 622	-23 47 45 08	18142762-2347450	2 1 2 2	374	2450020	13.6	16.7
207 25025 02	10 14 27.022	24 02 24 49	10142702 2047400	2.122	402	2440064	14.4	17.2
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162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 34.989 18 17 36.617 18 17 38.272 18 17 42.579 18 17 46.105	-26 35 55.69 -26 38 51.09 -25 16 58.36 -25 52 51.90 -30 11 07.97 -25 26 22.79 -27 14 48.52 -22 04 44.67 -27 11 09.98 -27 14 54.66 -23 52 19.41 -25 34 27.67 -22 57 07.48 -24 02 24 07	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173498-2711099 18173661-2714546 18173827-2352194 18174257-2534276 18174610-2257074	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164	396 348 353 376 324 407 406 518 480 396 452 345 365	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 245002	13.2 10.7 <14.2	15.6 >13.3 17.6 >16.0 17.6 15.9 17.2 16.5 19.5 16.7 15.6 17.0 16.4 45.5
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162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 36.617 18 17 36.272 18 17 36.272 18 17 36.279 18 17 46.105 18 17 45.94 18 17 51.027 18 17 51.117	-26 35 55.69 -26 38 51.09 -25 16 58.36 -25 52 51.90 -30 11 07.97 -25 26 22.79 -27 14 48.52 -22 04 44.67 -27 11 09.98 -27 14 54.66 -23 52 19.41 -25 34 27.67 -22 57 07.48 -24 02 31.07 -23 22 37.44 -25 43 47.84	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173498-2711099 18173661-2714546 18173827-2352194 18174257-2534276 18174610-2257074 18174759-2402310 18175102-2322374 18175111-2543478	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827	$\begin{array}{c c} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ \end{array}$	15.6 >13.3 17.6 >16.0 17.6 15.9 17.2 16.5 19.5 16.7 15.6 17.0 16.4 15.8 19.4 15.8
162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 36.617 18 17 36.272 18 17 36.272 18 17 36.279 18 17 42.579 18 17 46.105 18 17 45.027 18 17 51.027 18 17 52.604	-26 35 55.69 -26 38 51.09 -25 16 58.36 -25 52 51.90 -30 11 07.97 -25 26 22.79 -27 14 48.52 -22 04 44.67 -27 11 09.98 -27 14 54.66 -23 52 19.41 -25 34 27.67 -22 57 07.48 -24 02 31.07 -23 22 37.44 -25 43 47.84 -22 13 10.51	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173406-2526227 18173498-2711099 18173661-2714546 18173661-2714546 18173661-2714546 18173627-2534276 18174610-2257074 18174759-2402310 18175102-2322374 18175111-2543478 18175260-2213105	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450973	$\begin{array}{c c} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 12.9\end{array}$	$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 17.7 \end{array}$
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162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37225.69 309.37413.667 310.37400.99 148.26588.65 200.2724.1004	18 16 50.900 18 17 08.790 18 17 08.790 18 17 13.971 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 36.617 18 17 36.272 18 17 45.0579 18 17 47.594 18 17 51.027 18 17 53.054 18 18 17.106 18 18	-26 35 55.69 -26 38 51.09 -25 16 58.36 -25 52 51.90 -30 11 07.97 -25 26 22.79 -27 14 48.52 -22 04 44.67 -27 11 09.98 -27 14 54.66 -23 52 19.41 -25 34 27.67 -22 57 07.48 -24 02 31.07 -23 22 37.44 -25 43 47.84 -22 13 10.51 -21 25 00.44 -22 38 04.59 -24 03 58.06 -23 42 04.49 -22 20 15.91 -23 11 54.96 -30 12 43.81 -30 12 43.81	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173498-2711099 18173661-2714546 18173661-2714546 18173627-2534276 18174610-2257074 18174510-22320374 181745102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180710-2238045 1818071-2403580 18181385-2342044 18182008-2220159 18182284-2311549 18182674-3012438	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.252	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 348 423 270	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450973 2450222 2449775 2450222 2449775 2451289 2449787 2450159 2449770 2450577	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 17.7 \\ 20.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 19.2 \\ 10.2 $
162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37225.69 309.37413.667 310.37400.99 148.26588.65 308.37421.1264	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 35.6017 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 53.054 18 18 07.106 18 18 07.106 18 18 13.858 18 18 20.084 18 18 22.842 18 18 22.6748 18 18 29.231	-26 35 55.69 -26 38 51.09 -25 16 58.36 -25 52 51.90 -30 11 07.97 -25 26 22.79 -27 14 48.52 -22 04 44.67 -27 11 09.98 -27 14 54.66 -23 52 19.41 -25 34 27.67 -22 57 07.48 -24 02 31.07 -23 22 37.44 -25 43 47.84 -22 13 10.51 -21 25 00.44 -22 38 04.59 -24 03 58.06 -23 42 04.49 -22 20 15.91 -23 11 54.96 -30 12 43.81 -21 49 33.62 -22 20 44.02	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173432-2204446 18173498-2711099 18173661-2714546 18173661-2714546 18173627-2534276 18174610-2257074 18174579-2402310 18175102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180710-2238045 18180710-2238045 1818071-2403580 18181385-2342044 18182008-2220159 18182284-2311549 18182674-3012438 18182923-2149336	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.652	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 348 423 378	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450973 2450222 2449775 2451289 2449775 2451289 2449770 2450577 2450030	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 17.7 \\ 20.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 19.4 \\ 15.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 19.4 \\ 19.4 \\ 10.4 $
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162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37068.189 311.37052.34 310.37068.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37219.401 311.37219.401 311.37225.69 309.37413.667 310.37400.99 148.26588.65 308.37421.1264 309.37411.685 163.26649.58	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.989 18 17 34.989 18 17 36.617 18 17 36.617 18 17 36.617 18 17 36.617 18 17 42.579 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 51.027 18 17 52.604 18 17 53.054 18 18 07.106 18 18 07.106 18 18 13.858 18 18 22.842 18 18 22.842 18 18 22.842 18 18 20.084 18 18 29.231 18 18 30.771 18 18 30.771 18 18 31.640	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 01\ 5.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ \end{array}$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173452-2352194 18173661-2714546 18173627-2534276 18174610-2257074 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180771-2403580 18181385-2342044 1818208-2220159 18182284-2311549 18182284-2311549 18182674-3012438 18183077-2228418 18183164-2610030	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 345 365 302 494 335 442 480 348 423 378 568 300	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450222 2449775 2450222 2449775 2450159 2449787 2450159 2449770 2450577 2450030 2450295 2449877	$\begin{array}{r} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 12.9\\ 17.1\\ <13.1\\ 14.0\\ 12.6\\ 15.7\\ <12.9\\ 17.1\\ 14.0\\ 15.7\\ <12.9\\ 14.0\\ 15.4\\ 16.4\\ 11.5\\ \end{array}$	$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 17.7 \\ 20.6 \\ 16.7 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 18.4 \\ 15.3 \\ \end{array}$
162.25992.77 162.26122.17 159.26142.374 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37219.401 311.37225.69 309.37413.667 310.37400.99 148.26588.65 308.37421.1264 309.37411.685 163.26649.58 152.26706.50	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 34.325 18 17 34.989 18 17 36.617 18 17 36.617 18 17 36.617 18 17 36.272 18 17 42.579 18 17 51.027 18 17 51.027 18 17 51.027 18 17 53.054 18 18 07.106 18 18 07.710 18 18 22.842 18 18 22.842 18 18 20.084 18 18 22.842 18 18 20.748 18 18 30.771 18 18 30.771 18 18 30.400 18 18 40.928	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 52\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ \end{array}$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173432-2204446 18173498-2711099 18173661-2714546 18173627-2352194 1817457-2534276 18174610-2257074 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180710-2238045 18180710-2238045 1818028-220159 1818284-2311549 18182284-2311549 18182674-3012438 18183077-2228418 18183164-2610030 18184092-3102395	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519 1.651	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 348 423 378 568 300 374	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2450026 2450640 2449827 2450073 2450222 2449775 2451289 2449775 2451289 2449770 2450577 2450030 2450295 2449877 2450246	$\begin{array}{c c} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 12.9\\ 17.1\\ <13.1\\ 14.0\\ 12.6\\ 15.7\\ <12.9\\ 17.1\\ 14.0\\ 15.4\\ 15.7\\ <12.9\\ 15.4\\ 16.4\\ 11.5\\ 13.0\\ \end{array}$	$\begin{array}{r c c c c c c c c c c c c c c c c c c c$
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162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.377079.321 308.37091.896 309.37241.101 311.37219.401 311.37219.401 311.3725.69 309.37413.667 309.3741.264 309.37411.685 163.26649.58 152.26706.50 308.37594.263 152.26778.30 311.37723.52 309.37754.2055	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 21.573 18 17 33.061 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 35.054 18 17 53.054 18 18 07.106 18 18 07.106 18 18 07.106 18 18 22.842 18 18 22.842 18 18 20.842 18 18 22.842 18 18 20.231 18 18 20.231 18 18 30.771 18 18 40.928 18 18 41.073 18 18 45.428 18 18 50.816 18 18 50.779 </td <td>$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 28\ 42\ 20\ 59\ 10\ 10\ 10\ 10\ 10\ 10\ 10\ 10\ 10\ 10$</td> <td>18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172906-2526227 18173310-2714485 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2352194 18173661-2714546 18173627-2352194 1817457-2534276 18174610-2257074 18175102-2322374 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<td>$\begin{array}{c c} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 12.9\\ 17.1\\ <13.1\\ 14.0\\ 12.6\\ 15.5\\ 11.6\\ 12.9\\ 17.1\\ <13.1\\ 14.0\\ 15.5\\ 13.0\\ 15.4\\ 16.4\\ 11.5\\ 13.0\\ 15.9\\ 11.7\\ 12.2\\ 13.4\\ 13.6\\ <12.6\\ 12.9\\ 13.6\\ 12.9\\ 14.0\\ 15.4\\ 13.6\\ 15.9\\ 11.7\\ 12.2\\ 13.4\\ 13.6\\ <12.6\\ 12.6\\ 12.6\\ 12.6\\ 12.6\\ 12.6\\ 13.6\\ 12.6\\ 13.6\\ 12.6\\ 13.$</td> <td>$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 17.7 \\ 20.6 \\ 16.7 \\ 18.8 \\ 19.4 \\ 15.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 18.4 \\ 15.3 \\ > 15.7 \\ 18.7 \\ 16.0 \\ 15.4 \\ 16.4 \\ 15.6 \\ 15.4 \\ 16.4 \\ 15.6 \\ 15.7 \\ 18.7 \\ 16.0 \\ 15.4 \\ 16.4 \\ 15.6 \\ 15.7 \\ 18.7 \\ 16.0 \\ 15.4 \\ 16.4 \\ 15.6 \\ 15.7 \\ 15.$</td>	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 28\ 42\ 20\ 59\ 10\ 10\ 10\ 10\ 10\ 10\ 10\ 10\ 10\ 10$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172906-2526227 18173310-2714485 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2204446 18173432-2352194 18173661-2714546 18173627-2352194 1817457-2534276 18174610-2257074 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 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162.25992.77 162.26122.17 159.26142.374 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37219.401 311.37219.401 311.37225.69 309.37413.667 310.37400.99 148.26588.655 308.37421.1264 309.37411.685 163.26649.58 152.26706.50 308.37594.263 152.26703.17 148.26717.152 163.26778.30 311.37723.52 308.37754.2956	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 42.579 18 17 51.027 18 17 51.027 18 17 53.054 18 18 07.106 18 18 07.710 18 18 18.20.84 18 18 20.844 18 18 20.844 18 18 20.842 18 18 20.841 18 18 20.231 18 18 30.771 18 18 30.771 18 18 40.928 18 18 40.928 18 18 50.816 18 18 50.816	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 38.43\\ -26\ 10\ 92.77\\ -27\ 72\ 57\ 72\ 72\ 72\ 72\ 72\ 72\ 72\ 72\ 72\ 7$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173498-2711099 18173661-2714546 18173627-2352194 1817457-2534276 18174610-2257074 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 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2450974 2450671 245067</td> <td>$\begin{array}{c c} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 12.9\\ 17.1\\ <13.1\\ 14.0\\ 12.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ 15.5\\ 13.1\\ 14.0\\ 15.4\\ 15.7\\ <12.9\\ 14.0\\ 15.4\\ 16.4\\ 11.5\\ 13.0\\ 15.9\\ 11.7\\ 12.2\\ 13.4\\ 13.6\\ <12.6\\ 14.2\\ 13.6\\ <12.6\\ 14.2\\ 13.6\\ 14.2\\ 14.$</td> <td>$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 17.7 \\ 20.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 16.7 \\ 18.8 \\ 16.6 \\ 15.7 \\ 18.7 \\ 16.0 \\ 15.4 \\ 15.6 \\ 15.8$</td>	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519 1.651 2.387 1.677 1.895 2.111 1.712 1.838 1.955	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 348 423 378 568 300 374 444 501 467 387 384 334	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450667 2449085 2449971 2450640 2449827 2450022 2449775 2450222 2449775 2450222 2449775 2450159 2449770 2450577 2450030 2450295 2449877 2450030 2450295 2449877 2450246 2449931 2450974 2450974 2450671 245067	$\begin{array}{c c} 13.2\\ 10.7\\ <14.2\\ 12.4\\ 13.8\\ 12.5\\ 14.6\\ 14.3\\ 15.9\\ 12.9\\ 13.6\\ <13.4\\ 12.1\\ 12.6\\ 15.5\\ 11.6\\ 12.9\\ 17.1\\ <13.1\\ 14.0\\ 12.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ 15.5\\ 11.6\\ 15.5\\ 13.1\\ 14.0\\ 15.4\\ 15.7\\ <12.9\\ 14.0\\ 15.4\\ 16.4\\ 11.5\\ 13.0\\ 15.9\\ 11.7\\ 12.2\\ 13.4\\ 13.6\\ <12.6\\ 14.2\\ 13.6\\ <12.6\\ 14.2\\ 13.6\\ 14.2\\ 14.$	$\begin{array}{r} 15.6 \\ > 13.3 \\ 17.6 \\ > 16.0 \\ 17.6 \\ 15.9 \\ 17.2 \\ 16.5 \\ 19.5 \\ 16.7 \\ 15.6 \\ 17.0 \\ 16.4 \\ 15.8 \\ 19.4 \\ 15.6 \\ 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162.25992.77 162.26122.17 159.26142.374 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26244.769 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37219.401 311.37225.69 309.37413.667 310.37400.99 148.26588.65 308.37421.1264 309.37411.685 163.26649.58 152.26706.50 308.37594.263 152.26703.17 148.26717.152 163.26778.30 311.37723.52 308.37754.2956 160.26916.12	18 16 50.900 18 17 08.790 18 17 13.971 18 17 14.354 18 17 21.573 18 17 29.061 18 17 34.354 18 17 34.354 18 17 34.354 18 17 34.325 18 17 34.325 18 17 34.989 18 17 36.617 18 17 36.617 18 17 36.617 18 17 36.272 18 17 36.271 18 17 36.272 18 17 42.579 18 17 46.105 18 17 51.027 18 17 51.027 18 17 51.027 18 17 53.054 18 18 07.710 18 18 07.710 18 18 13.858 18 18 20.084 18 18 20.422 18 18 20.422 18 18 30.771 18 18 30.771 18 18 30.771 18 18 30.771 18 18 30.771 18 18 40.928 18 18 41.073 18 18 50.816 18 18 50.816 18 18 50.6779 18 19 01.968 18 19 0.96565	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 38.43\\ -25\ 41\ 03.57\\ -20\ 22\ 50\ 20\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\\ -20\ 50\ 50\ 50\\ -20\ 50\ 50\ 50\\ -20\ 50\ 50\ 50\\ -20\ 50\ 50\ 50\\ -20\ 50\ 50\ 50\ 50\ 50\\ -20\ 50\ 50\ 50\ 50\ 50\ 50\ 50\ 50\ 50\ 5$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173310-2714485 18173432-2204446 18173498-2711099 18173661-2714546 18173498-2711099 18173661-2714546 18173827-2352194 18174610-2257074 18174610-2257074 181745102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175305-2125004 18180710-2238045 18180710-2238045 18180771-2403580 18181385-2342044 1818208-2220159 1818284-2311549 18182674-3012438 1818208-2220159 1818264-3012438 18183077-2228418 18183077-2228418 18183164-2610030 18184092-3102395 18184107-2130474 18185081-3019331 18185110-2614221 18185677-2404196 18190196-2159384 18190565-2541035	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519 1.651 2.387 1.677 1.895 2.111 1.712 1.838 1.955 2.75	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 344 399 346 423 378 568 300 374 444 501 467 387 384 334 400 260	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2450640 2449827 245026 2450222 2449775 2450222 2449775 2451289 2449775 2450159 2449770 2450577 2450030 2450295 2449877 2450246 2450295 2449877 2450246 2449931 2450274 2450671 2450671 2450671 2450682	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{r c c c c c c c c c c c c c c c c c c c$
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07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 38.43\\ -25\ 41\ 03.57\\ -22\ 35\ 2.22\\ 35\ 38.43\\ -25\ 41\ 03.57\\ -22\ 35\ 32.22\\ 35\ 35\ 35\ 2.22\\ 35\ 35\ 35\ 35\ 35\ 35\ 35\ 35\ 35\ 35\$</td> <td>18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173432-2204446 18173432-2204446 18173432-2204446 18173498-2711099 18173661-2714546 18173627-2352194 18173627-2352194 18173627-2354276 1817459-2402310 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180771-2403580 18180771-2403580 18181385-2342044 18182008-2220159 1818208-220159 1818208-220159 18182284-2311549 18182072-228418 18183077-2228418 18183077-228418 18183010-2614221 18184092-3102395 18184107-2130474 181850110-2614221 18185011-261422</td> <td>1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519 1.651 2.387 1.677 1.895 2.111 1.712 1.838 1.955 2.275</td> <td>396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 344 399 346 430 346 430 348 423 378 568 300 374 444 501 467 387 384 334 400 396</td> <td>2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450973 2450222 2449775 2450222 2449775 2450159 2449770 2450277 2450295 2449877 2450295 2449877 2450246 2449931 2450974 2450246 2449933 2451402 2450682 2449036</td> <td>$\begin{array}{c ccccc} 13.2 \\ 10.7 \\ < 14.2 \\ 12.4 \\ 13.8 \\ 12.5 \\ 14.6 \\ 14.3 \\ 15.9 \\ 12.9 \\ 13.6 \\ < 13.4 \\ 12.1 \\ 12.6 \\ 15.5 \\ 11.6 \\ 12.9 \\ 17.1 \\ < 13.1 \\ 14.0 \\ 12.6 \\ 15.7 \\ < 12.9 \\ 17.1 \\ < 13.1 \\ 14.0 \\ 12.6 \\ 15.7 \\ < 12.9 \\ 14.0 \\ 15.4 \\ 11.5 \\ 13.0 \\ 15.9 \\ 11.7 \\ 12.2 \\ 13.4 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 10.8 \\ 1$</td> <td>$\begin{array}{r c c c c c c c c c c c c c c c c c c c$</td>	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 38.43\\ -25\ 41\ 03.57\\ -22\ 35\ 2.22\\ 35\ 38.43\\ -25\ 41\ 03.57\\ -22\ 35\ 32.22\\ 35\ 35\ 35\ 2.22\\ 35\ 35\ 35\ 35\ 35\ 35\ 35\ 35\ 35\ 35\$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173432-2204446 18173432-2204446 18173432-2204446 18173498-2711099 18173661-2714546 18173627-2352194 18173627-2352194 18173627-2354276 1817459-2402310 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180771-2403580 18180771-2403580 18181385-2342044 18182008-2220159 1818208-220159 1818208-220159 18182284-2311549 18182072-228418 18183077-2228418 18183077-228418 18183010-2614221 18184092-3102395 18184107-2130474 181850110-2614221 18185011-261422	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519 1.651 2.387 1.677 1.895 2.111 1.712 1.838 1.955 2.275	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 344 399 346 430 346 430 348 423 378 568 300 374 444 501 467 387 384 334 400 396	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450973 2450222 2449775 2450222 2449775 2450159 2449770 2450277 2450295 2449877 2450295 2449877 2450246 2449931 2450974 2450246 2449933 2451402 2450682 2449036	$\begin{array}{c ccccc} 13.2 \\ 10.7 \\ < 14.2 \\ 12.4 \\ 13.8 \\ 12.5 \\ 14.6 \\ 14.3 \\ 15.9 \\ 12.9 \\ 13.6 \\ < 13.4 \\ 12.1 \\ 12.6 \\ 15.5 \\ 11.6 \\ 12.9 \\ 17.1 \\ < 13.1 \\ 14.0 \\ 12.6 \\ 15.7 \\ < 12.9 \\ 17.1 \\ < 13.1 \\ 14.0 \\ 12.6 \\ 15.7 \\ < 12.9 \\ 14.0 \\ 15.4 \\ 11.5 \\ 13.0 \\ 15.9 \\ 11.7 \\ 12.2 \\ 13.4 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 11.2 \\ 13.6 \\ < 12.6 \\ 10.8 \\ 1$	$\begin{array}{r c c c c c c c c c c c c c c c c c c c$
162.25992.77 162.26122.17 159.26142.374 159.26133.30 148.26069.278 159.26270.62 168.26243.224 309.36913.38 168.26243.222 311.36886.124 159.26398.18 310.37068.189 311.37052.34 310.37062.2051 159.26395.19 309.37079.321 308.37091.896 309.37241.101 311.37225.69 309.37413.667 310.37400.99 148.26588.65 308.37421.1264 309.37411.685 163.26649.58 152.26706.50 308.37594.263 152.26778.30 311.37723.52 308.37754.2956 160.26916.12 309.37913.118 160.27052.8	18 16 50.900 18 17 08.790 18 17 13.971 18 17 13.971 18 17 14.354 18 17 21.573 18 17 21.573 18 17 29.061 18 17 33.106 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 34.325 18 17 36.617 18 17 36.617 18 17 36.617 18 17 51.027 18 17 51.027 18 18 17.53.054 18 18 17.53.054 18 18 17.53.054 18 18	$\begin{array}{r} -26\ 35\ 55.69\\ -26\ 38\ 51.09\\ -25\ 16\ 58.36\\ -25\ 52\ 51.90\\ -30\ 11\ 07.97\\ -25\ 26\ 22.79\\ -27\ 14\ 48.52\\ -22\ 04\ 44.67\\ -27\ 11\ 09.98\\ -27\ 14\ 54.66\\ -23\ 52\ 19.41\\ -25\ 34\ 27.67\\ -22\ 57\ 07.48\\ -24\ 02\ 31.07\\ -23\ 22\ 37.44\\ -25\ 43\ 47.84\\ -22\ 13\ 10.51\\ -21\ 25\ 00.44\\ -22\ 38\ 04.59\\ -24\ 03\ 58.06\\ -23\ 42\ 04.49\\ -22\ 20\ 15.91\\ -23\ 11\ 54.96\\ -30\ 12\ 43.81\\ -21\ 49\ 33.62\\ -22\ 28\ 41.83\\ -26\ 10\ 03.00\\ -31\ 02\ 39.52\\ -21\ 30\ 47.42\\ -31\ 13\ 01.79\\ -30\ 19\ 33.11\\ -26\ 14\ 22.19\\ -24\ 04\ 19.62\\ -21\ 59\ 38.43\\ -25\ 41\ 03.57\\ -22\ 35\ 32.22\\ -25\ 16\ 25.10\\ \end{array}$	18165090-2635556 18170878-2638510 18171397-2516583 18171435-2552518 18172157-3011079 18172906-2526227 18173432-2204446 18173498-2711099 18173661-2714546 1817457-2534276 18174610-2257074 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175102-2322374 18175260-2213105 18175305-2125004 18180710-2238045 1818071-2403580 18181385-2342044 18180771-2403580 18181385-2342044 18182008-220159 1818284-2311549 18182923-2149336 18182923-2149336 18183077-2228418 18184092-3102395 18184107-2130474 18185081-3019331 18185010-2614221 18185081-3019331 18185010-2614221 18185077-2404196 1819086-22353	1.695 1.833 2.029 1.715 2.155 1.906 2.495 2.400 2.841 1.769 1.761 2.053 2.164 1.653 2.978 1.613 2.356 3.001 1.828 1.945 1.792 2.652 1.712 1.881 2.379 2.952 1.519 1.651 2.387 1.651 2.387 1.677 1.895 2.111 1.712 1.838 1.955 2.275 1.786	396 348 353 376 324 407 406 518 480 396 452 345 365 302 494 335 442 480 344 399 346 430 348 423 378 568 3000 374 444 501 467 387 384 334 400 396	2450240 2449891 2450050 2450577 2449888 2451291 2450909 2449919 2450666 2451331 2450617 2449085 2449971 2451026 2450640 2449827 2450973 2450222 2449775 2450222 2449775 2450159 2449770 2450159 2449770 2450295 2449877 2450246 2449931 2450295 2449877 2450246 2449931 2450974 2450671 2450671 2450671 2450682 2449033	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{r c c c c c c c c c c c c c c c c c c c$

162 27020 1205	19 10 20 067	26.00.08.03	18102006 2600080	1 976	259	2451000	-12.6	16.2
309 38080 54	18 19 20.007	-20 09 00.93	18192000-2009009	2 151	307	2431090	13.0	15.8
200 2002 04	10 10 20.024	22 33 02.33	19102006 22239023	2.131	402	2449952	12.0	16.7
162 27022 2749	10 19 29.909	22 32 30.07	10192990-2232300	2.020	40Z	2449971	12.9	16.6
103.27032.2740	10 19 30.000	-20 37 23.72	10193000-2037237	1.022	300	2431304	12.3	10.0
309.30063.49	10 19 32.294	-22 19 04.32	10193229-2219043	1.701	340	2430110	12.3	10.4
310.38237.86	18 19 41.519	-23 25 30.15	18194151-2325301	1.678	360	2449775	12.2	10.1
306.36399.62	10 20 17.077	-21 42 22.94	10201707-2142229	2.120	397	2449970	14.9	10.2
160.27441.217	18 20 17.758	-25 23 28.12	18201775-2523281	2.118	420	2450661	13.3	10.0
310.38742.186	18 20 34.835	-23 20 58.96	18203483-2320589	2.093	369	2451180	<14.6	17.2
163.27555.232	18 20 36.281	-26 26 48.06	18203628-2626480	2.021	357	2449770	13.7	16.3
311.38732.104	18 20 36.475	-24 00 20.43	18203647-2400204	2.108	375	2451210	<14.0	16.0
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142.27779.83	18 21 02.770	-28 49 01.10	18210276-2849011	1.734	422	2450599	13.3	16.9
153.27751.109	18 21 09.507	-30 40 26.89	18210950-3040268	1.547	360	2449567	12.8	16.0
142.27900.1700	18 21 24.929	-29 24 12.56	18212492-2924125	1.550	209	2450606	15.8	19.0
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146.27899.25	18 21 36.608	-29 27 50.58	18213660-2927505	1.730	436	2450224	13.2	17.4
153.28008.17	18 21 40.503	-30 52 53.03	18214050-3052530	2.706	423	2450295	13.7	16.9
156.28515.180	18 23 07.692	-31 46 44.23	18230769-3146442	3.342	450	2449505	16.1	19.5
136.28693.40	18 23 11.439	-28 33 56.24	18231143-2833562	1.488	296	2449919	11.2	15.5
146.28675.49	18 23 17.236	-29 43 46.52	18231723-2943465	1.373	283	2449592	12.0	15.6
137.29336.35	18 24 56.017	-29 00 26.49	18245601-2900264	1.628	347	2451430	12.5	15.6
143.29457.8	18 25 11.231	-29 36 46.90	18251123-2936469	1.703	372	2450607	12.5	<15.3
143.29845.51	18 25 55.396	-29 47 26.72	18255539-2947267	1.827	408	2451334	12.4	15.7
143.30111.38	18 26 34.461	-29 21 02.14	18263446-2921021	1.401	229	2450240	11.4	15.2
143.30110.14	18 26 36.115	-29 23 54.74	18263611-2923547	1.677	472	2449462	13.0	16.0
143.30111.25	18 26 49.095	-29 22 33.65	18264909-2922336	1.358	303	2450609	12.5	16.0
132.30519.13	18 27 39.540	-28 10 52.19	18273954-2810521	1.832	477	2451303	11.7	15.2
132.30776.12	18 28 10.265	-28 20 00.39	18281026-2820003	1.505	312	2450635	11.4	15.2
138.30903.43	18 28 32.977	-28 32 07.03	18283297-2832070	2.022	381	2451260	<13.3	15.6
132.31039.35	18 28 53.158	-28 08 12.36	18285315-2808123	1.560	186	2450973	13.7	18.1
132.31298.385	18 29 21.718	-28 11 45.55	18292171-2811455	2.508	416	2450647	15.6	19.7
303.44071.416	18 29 24.623	-15 16 56.18	18292462-1516561	3.021	216	2450670	17.4	21.6
144.31804.36	18 30 33.284	-29 08 30.76	18303328-2908307	1.875	352	2449395	<13.2	15.8
303.45254.157	18 31 16.914	-14 50 22.75	18311691-1450227	2.040	403	2449789	14.3	>16.8
139.32207.1904	18 31 32.539	-28 18 10.58	18313253-2818105	3.537	500	2450230	16.7	20.4
139.32203.1597	18 31 37.023	-28 32 17.35	18313702-2832173	2.633	431	2450970	15.7	19.6
301.45610.67	18 31 50.324	-13 28 45.18	18315032-1328451	2.134	473	2451301	14.5	17.6
303.45583.155	18 32 02.377	-15 15 06.15	18320237-1515061	2.224	456	2451310	16.1	20.0
301.45778.398	18 32 02.568	-13 27 40.75	18320256-1327407	2.201	351	2451103	14.1	17.1
303.45752.231	18 32 14.204	-15 11 24.71	18321420-1511247	2.122	335	2451401	14.6	18.3
139.32728.13	18 32 40.682	-28 14 59.07	18324068-2814590	1.571	383	2451302	<11.8	15.7
139.32850.23	18 33 00.154	-28 44 01.19	18330015-2844011	1.641	396	2451302	12.0	15.2
139.32982.4362	18 33 22.698	-28 37 39.05	18332269-2837390	1.832	386	2451302	13.2	16.2
134.33253.632	18 33 57.541	-27 52 55.45	18335754-2752554	1.484	360	2449611	12.3	15.6
134.33381.3349	18 34 17.318	-27 59 44.34	18341731-2759443	1.491	357	2449541	12.1	15.6
134.33385.120	18 34 21.530	-27 46 10.28	18342152-2746102	1.798	369	2449400	<13.2	15.9

Figure 6 – Light curves (left panels) and folded light curves (right panels) of the 192 Mira variables identified in this work, based on MACHO R_c data. Data have been folded with the periods listed in Table 1.

































