

06009C

NEW MOON AND FULL MOON DAY OF MONTH

This program follows an empirical algorithm published in one issue of the amateur astronomers monthly, SKY & TELESCOPE. The author of the article, O.L. Harvey claims, "By testing hundreds of dates across the interval from 1001 B.C. to A.D. 2003, I found that about half the answers obtained with this device agree exactly with the day of new moon, and about half are off by one day. A very small number (two percent in my sample) are two days in error." Mr. Harvey developed a three part table based on repeating patterns in an enormous data source and on averages of date differences. An entry point was calculated for the first part, the resultant was the entry point for the second part. A calculated difference on the second part produced a number. The month provided the key for the third part of the table. These numbers are combined with other calculations to determine the day of month. Mr. Vanderburgh devised an HP-65 program to calculate the entry points and when used with the table and additional inputs would complete the calculations for the day of month.

This program uniquely incorporates that table into the registers and selects the appropriate numbers to perform the complete calculations for day of month.

This program also requires an additional memory module.

Example 1:

Determine the date of the new moon in November, 1979.

Keystrokes:

Display:

[XEQ] [ALPHA] SIZE [ALPHA] 026

[XEQ] [ALPHA] MOONS [ALPHA]

N OR F MOON?

N [R/S]

MM.YYYY ?

11.1979 [R/S]

11-18-1979

Example 2:

Find the date of the full moon in January of 1956.

Keystrokes:

Display:

[XEQ] [ALPHA] MOON [ALPHA]

N OR F MOON?

F [R/S]

MM.YYYY ?

1.1956 [R/S]

1-27-1956

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Program Listings

01♦LBL "MOO NS" 02 .0925102 612 03 STO 00 04 .2813291 501 05 STO 01 06 .1703190 420 07 STO 02 08 .0622072 3 09 STO 03 10 .1113000 2 11 STO 04 12 .0204040 6 13 STO 05 14 .0708091 0 15 STO 06 16 .301020 17 STO 10 18 .112101 19 STO 11 20 .220212 21 STO 12 22 .031323 23 STO 13 24 .142404 25 STO 14 26 .250515 27 STO 15 28 .061626 29 STO 16 30 .172707 31 STO 17 32 .280818 33 STO 18 34 .091929 35 STO 19 36♦LBL "MOO N" 37 "F" 38 ASTO Y 39 "N OR F MOON?" 40 AON 41 PROMPT	Initialization	42 AOFF 43 ASTO X 44 X=Y? 45 SF 05 46 "MM.YYYY ?" 47 PROMPT 48 CLA 49 FIX 4 50 INT 51 STO 20 52 LASTX 53 FRC 54 STO 22 55 1 E4 56 * 57 STO 21 58 2 59 RCL 20 60 X<=Y? 61 DSE 21 62♦LBL 00 63 RCL 21 64♦LBL 01 65 0 66 STO 07 67 1582 68 RCL 21 69 X<=Y? 70 GTO 03 71 13 72 STO 07 73 1900 74 STO 23 75♦LBL 02 76 RCL 21 77 RCL 23 78 X<=Y? 79 GTO 03 80 1 E2 81 - 82 STO 23 83 1 84 ST- 07 85 GTO 02 86♦LBL 03 87 RCL 21 88 4712 89 + 90 76 91 /	Prompt for year	Check for Jan. or Feb.	Check for year before 1582	Check for year after 1582	Calculate Julian year
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Program Listings

92 INT		143 2	
93 STO 23		144 ST+ 09	
94 LASTX		145 XEQ 09	
95 FRC		146 LBL 08	Count down in
96 76		147 RCL 25	table L by
97 *		148 RCL 08	difference
98 RND		149 -	
99 4		150 10	
100 /		151 X>Y?	
101 INT		152 GT0 06	
102 STO 24	Entry point to	153 RDN	
103 LASTX	table R	154 STO 25	
104 FRC		155 LBL 07	
105 4		156 XEQ 09	Number from
106 *		157 ST+ 07	table L
107 STO 08		158 RCL 20	
108 RCL 23	Difference in	159 1	
109 4	table L	160 -	
110 /		161 4	
111 INT		162 /	
112 ST- 07		163 4	
113 RCL 24		164 +	
114 5		165 STO 25	
115 /		166 FRC	
116 STO 25		167 8	
117 FRC		168 *	
118 10		169 STO 09	
119 *		170 XEQ 09	
120 STO 09	Number from	171 ST- 07	Number from
121 XEQ 09	table R	172 FS?C 05	table M
122 STO 24		173 XEQ 05	
123 10		174 RCL 07	
124 /		175 30	
125 FRC		176 X<=Y?	Check date for
126 10		177 -	range 0 and 30
127 *		178 0	
128 LASTX		179 RCL 07	
129 +		180 X>Y?	
130 STO 25		181 GT0 04	
131 0		182 30	
132 STO 09		183 RCL 07	
133 XEQ 09		184 +	
134 RCL 24		185 GT0 04	
135 X=Y?	Search for	186 LBL 09	
136 GT0 08	number from	187 RCL 09	Obtain appro-
137 2	table R in table	188 10TX	prate number
138 ST+ 09	L	189 RCL IND	from selected
139 XEQ 09		25	register
140 RCL 24		190 *	
141 X=Y?		191 FRC	
142 GT0 08		192 1 E2	

Program Listings

193 *	Check for re- turn to table L	51	
194 INT			
195 RTN			
196♦LBL 06			
197 +			
198 STO 25			
199 5			
200 RCL 09			
201 2			
202 +		60	
203 X>Y?			
204 0			
205 STO 09			
206 GT0 07			
207♦LBL 04			
208 1 E2			
209 /			
210 RCL 22			
211 LASTX			
212 /	Put output into proper display format: MM-DD-YYYY	70	
213 +			
214 RCL 20			
215 +			
216 FIX 0			
217 CF 29			
218 INT			
219 ARCL X			
220 "I--"			
221 LASTX			
222 FRC		80	
223 1 E2			
224 *			
225 INT			
226 ARCL X			
227 "I--"			
228 LASTX			
229 FRC			
230 1 E4			
231 *			
232 ARCL X		90	
233 AVIEW			
234 RTN			
235♦LBL 05			
236 15			
237 ST+ 07			
238 RTN			
239 .END.			
50		00	

[illegible]

NEW MOON AND FULL MOON
DAY OF MONTH
PROGRAM REGISTERS NEEDED: 73

PAGE 1
OF 3

ROW 1 (1 - 2)



ROW 2 (2 - 4)



ROW 3 (4 - 6)



ROW 4 (6 - 8)



ROW 5 (8 - 11)



ROW 6 (12 - 14)



ROW 7 (14 - 16)



ROW 8 (16 - 20)



ROW 9 (20 - 23)



ROW 10 (24 - 26)



ROW 11 (26 - 30)



ROW 12 (30 - 32)



ROW 13 (32 - 35)



ROW 14 (36 - 39)



ROW 15 (39 - 40)



ROW 16 (41 - 46)



ROW 17 (46 - 53)



ROW 18 (54 - 61)



ROW 19 (61 - 68)



ROW 20 (69 - 75)



ROW 21 (76 - 82)



ROW 22 (83 - 89)



ROW 23 (90 - 99)



ROW 24 (100 - 110)



ROW 25 (111 - 119)



ROW 26 (120 - 127)



ROW 27 (128 - 136)



ROW 28 (136 - 143)



ROW 29 (144 - 151)



ROW 30 (152 - 158)



ROW 31 (159 - 170)



ROW 32 (170 - 176)



ROW 33 (177 - 186)



ROW 34 (187 - 196)



ROW 35 (197 - 207)



ROW 36 (208 - 216)



ROW 37 (216 - 223)



ROW 38 (223 - 230)



ROW 39 (231 - 239)



ROW 40 (239 - 239)

