



FLIGHT DECK

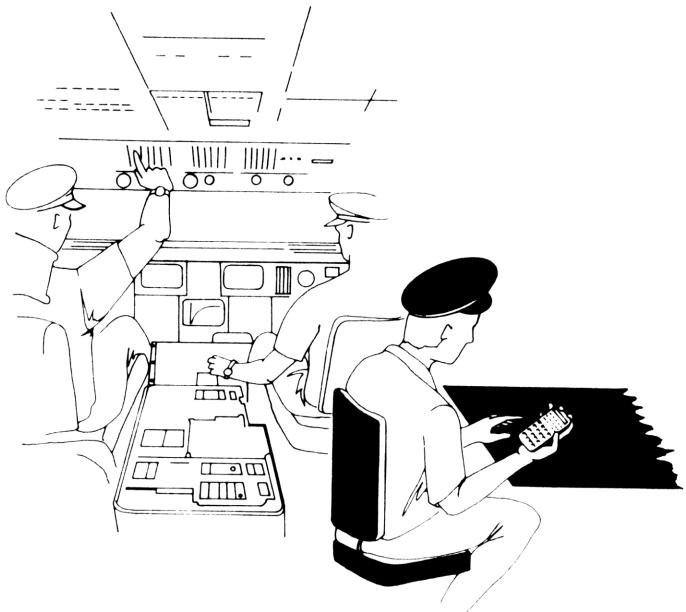
USES FOR THE

HP-41C

VOL. I MANUAL RUN MODE EDITION

BY:
MELVIN N. PETERSON





FLIGHT DECK

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VOL. 1. MANUAL RUN MODE EDITION ©

INTRODUCTION

As an owner of the HP-41C, you will agree that it has a mathematical versatility previously undreamed of in the category of Portable Programmable Calculators.

We have harnessed a goodly portion of its versatility, in the realm of modern aeronautics, and are sharing our intensive research in this book.

This work is essentially addressed to the professional Flight Officers, who are seeking the superior results rendered by the HP-41C. Yet, wish to minimize their involvement in writing their own AERO-FUNCTIONS.

This volume provides a monumental saving of your "software-research-time" on the 42 AERO-FUNCTIONS contained herein.

We have expressly avoided professional software jargon, and buzz-words, wherever possible.

Notice that peripherals (attachments) of the HP-41C are not used in the performance of the AERO-FUNCTIONS contained in this VOL. 1, MANUAL RUN MODE EDITION.

No liability is assumed with respect to the use of the information herein.

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"PREFLIGHT BRIEFING"

The step-by-step format used, is designed to effect results with a minimum amount of research on the part of Flight Officers.

For ease in reading the progress of your calculations in the X DISPLAY, we have labeled the numerical entries, etc. with aeronautical codes, or convenient acronyms which are fully described in the area entitled "SITUATION:".

Each AERO-FUNCTION (MRM) has one or more unknowns, which are fully described in the area entitled "FIND:".

While the HP-41C is far and away, the most exotic Portable Programmable Calculator yet devised, the role of the operator is essential to perform careful and deliberate keying to achieve consistently professional results.

Verification of the AERO-FUNCTIONS (MRM) contained herein is urged, by: keying-in the variables contained in the "SITUATION:" area, and:

- A. Observe that the results shown in the "X DISPLAY" column, are identical to your keying results, displayed on your HP-41C.
- B. Then, key-in a situation of your own choosing, in which all variables and its solution are known to you, as well as in conformance with the description given in the "SITUATION:" area. This will ensure that each AERO-FUNCTION tested, satisfactorily meets your operational requirements.

It is essential to groom the HP-41C so that it will be ready for effective use in conjunction with this VOL. 1, MANUAL RUN MODE EDITION.

This grooming cleanses the HP-41C of cluttered data, etc. that might accumulate in its continuous memory, and to make appropriate assignments. See page 3 for the AERO-PRESET (MRM) step-by-step instructions. This procedure should be performed whenever confronted with cluttered data.

The author encourages Flight Officers to profusely refer to:

- A. HP-41C Owners' Handbook and Programming Guide.
- B. HP-41C Standard Applications.

and notice the concurrence of their instructions, to be compatible with the procedures set forth herein.

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KEY TO NON-ARITHMETIC SYMBOLS
AND NOTES

The following items are listed to ensure clarity:

- (ADD) Corroborates + symbol to its right.
- (ASSIGNED) Reminder that this key had a function assigned to it, during the MRM AERO-PRESET KEYING-IN PROCEDURE.
- { Signifies that two distinct displays will be seen after the accompanying key-in instruction.
- ' We have printed commas in the "KEY-IN" column for ease in reading numbers 1,000 or larger. Do not attempt to key-in these commas.
(However, appropriate commas do appear automatically in the "X DISPLAY" column, after the MRM AERO-PRESET KEY-IN PROCEDURE has been completed.)
- DDD.dd Degrees and decimal degrees.
- (DIVIDE) Corroborates ÷ symbol to its right.
- HHH.MMSS Hours, minutes and seconds.
- MM.m Minutes and decimal minutes.
- n.nnnn Signifies digits which might occur when "SITUATION:" data is different from that used in the AERO-FUNCTION's example.
- 0 Thirteenth letter of the alphabet.
- ø Number zero, when used in "KEY-IN" and "X DISPLAY" columns.
- SHIFT Synonym for the Gold (or Yellow) colored key.
- (SPELL) Implies keying-in, one letter at a time.
- X (White) Multiplication function key.
- X (Blue) Twenty-fourth letter of the alphabet.

AERO-PRESET (MRM)

The completion of keying-in this page of instructions is required before attempting the AERO-FUNCTIONS contained herein.

<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
OFF	(Blank)	
-	(Blank)	(Hold down - as you now press the ON key)
ON	(Blank)	
(Release)	MEMORY LOST	(Simultaneously release: - and ON keys)
OFF	(Blank)	
ON	0.0000	
SHIFT	0.0000	SHIFT
FIX 2	{ FIX 2	
	{ 0.00	
SHIFT	0.00	SHIFT
ASN	ASN -	
ALPHA (ON)	ASN -	ALPHA
(SPELL) HR	ASN HR -	"
ALPHA (OFF)	ASN HR -	
(ASSIGNED) LOG	{ ASN HR 14	
	{ 0.00	
SHIFT	0.00	SHIFT
ASN	ASN -	
ALPHA (ON)	ASN -	ALPHA
(SPELL) HMS	ASN HMS -	"
ALPHA (OFF)	ASN HMS -	
(ASSIGNED) LN	{ ASN HMS 15	
	{ 0.00	
SHIFT	0.00	SHIFT
ASN	ASN -	
ALPHA (ON)	ASN -	ALPHA
(SPELL) ABS	ASN ABS -	"
ALPHA (OFF)	ASN ABS -	
(ASSIGNED) 1/X	{ ASN ABS 12	
	{ 0.00	
SHIFT	0.00	SHIFT
ASN	ASN -	
ALPHA (ON)	ASN -	ALPHA
(SPELL) INT	ASN INT -	"
ALPHA (OFF)	ASN INT -	
(ASSIGNED) Σ+	{ ASN INT 11	
	{ 0.00	
SHIFT	0.00	SHIFT
ASN	ASN -	
ALPHA (ON)	ASN -	ALPHA
(SPELL) FRC	ASN FRC -	"
ALPHA (OFF)	ASN FRC -	
(ASSIGNED) √X	{ ASN FRC 13	
	{ 0.00	

After keying-in the above AERO-PRESET (MRM), your HP-41C is now ready to perform the AERO-FUNCTIONS contained in this Volume 1.

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CELSIUS (CENTIGRADE)

- SITUATION:** A. Fahrenheit ($^{\circ}\text{F}$): 61°F
 B. Numerical Constant #1 for this page (NC_1): 32°
 C. Numerical Constant #2 for this page (NC_2): 5
 D. Numerical Constant #3 for this page (NC_3): 9

- FIND:** A. Celsius (Centigrade) ($^{\circ}\text{C}$): 16°C
-

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	.000	
	SHIFT	.000	
	FIX	FIX	SHIFT
	{	FIX }	
	61	61.....	($^{\circ}\text{F}$)
	ENTER ↑	61.....	
	32	32.....	(NC_1)
	-	29.....	
	5	5.....	(NC_2)
	X	145.....	
	9	9.....	(NC_3)
	(DIVIDE) +	16.....	($^{\circ}\text{C}$)

RESET X DISPLAY:

SHIFT	16.	SHIFT
FIX	FIX	
2	{ FIX 2	
-	16.11	
	.000	

CLIMB TIME

SITUATION: A. Vertical Distance to Cruise Altitude (VDCA): 37,000'
 B. Rate of Climb (ROC): 1,500' Per Minute

FIND: A. Climb Time (CT): 24.7 Minutes

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	ø.øø	
	SHIFT	ø.øø	SHIFT
	FIX	FIX	
1	{	FIX 1	
		ø.ø	
37,øøø		37,øøø	..... (VDCA)
ENTER ↑		37,øøø.ø	
1,5øø		1,5øø (ROC)
(DIVIDE) ÷		24.7 (CT)(MM.m)

RESET X DISPLAY:

SHIFT	24.7	SHIFT
FIX	FIX	
2	{ FIX 2	
←		24.67
		ø.øø

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COMPASS HEADING

SITUATION: A. True Course (TC): 350°
 B. Variation (VAR): 20° WEST
 C. Deviation (DEV): 12° EAST
 D. Drift Angle (DA): 11° LEFT
 E. Numerical Constant for this page (NC₁): 360°

FIND: A. Compass Heading (CH): 009°

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	$\emptyset.\emptyset\emptyset$	
	SHIFT	$\emptyset.\emptyset\emptyset$	SHIFT
	FIX	FIX	
	\emptyset	{ FIX $\overline{\emptyset}$ $\emptyset.$	
	350°	350° (TC)
	ENTER ↑	350°	
	20°	20° (VAR) (If East, Key-In: CHS)
(ADD)	+	370°	
	12	12° (DEV) (If East, Key-In: CHS)
	CHS	-12°	
(ADD)	+	358°	
	11	11° (DA) (If Right Drift, Key-In: CHS)
(ADD)	+	369° (CH) (If Negative, Key-In: 360° and +) (If over 360° , Key-In: 360° and -)
	360°	360° (NC ₁)
	-	9° (CH)

RESET X DISPLAY:

SHIFT	9.	SHIFT
FIX	FIX	
2	{ FIX $\overline{2}$ $9.\emptyset\emptyset$	
-	$\emptyset.\emptyset\emptyset$	

CRUISE TIME

SITUATION: Distance (DIST): 1,076 N.M.
Ground Speed In Cruise (GSIC): 510 KTS

FIND: Cruise Time (CT): 2 Hours, 06 Minutes, 35 Seconds

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	1,076	1.076	..... (DIST)
	ENTER ↑	1,076.00	
	510	510	..... (GSIC)
(DIVIDE) ÷		2.11	
	USER (ON)	2.11	USER
(ASSIGNED) LN	{	HMS	"
		2.06	
	USER (OFF)	2.06	
	SHIFT	2.06	SHIFT
	FIX	FIX	
4	{	FIX 4	
		2.0635 (CT)(H.MMSS)

RESET X DISPLAY:

SHIFT	2.0635	SHIFT
FIX	FIX	
2	{ FIX 2	
←	2.06	

8.

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DESCENT TIME

SITUATION: A. Descent from Cruise Altitude (DFCA): 37,000'
B. Rate of Descent (ROD): 1,500' Per Minute

FIND: A. Descent Time (DT): 24.7 Minutes

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	37,000	37,000	..... (DFCA)
	ENTER ↑	37,000.00	
(DIVIDE)	1,500 +	1.500	..... (ROD)
	SHIFT	24.67	SHIFT
	FIX	FIX	
	1	{ FIX 1 24.7	..... (DT)(MM.MM)

RESET X DISPLAY:

SHIFT	24.7	SHIFT
FIX	FIX	
2	{ FIX 2 24.67	
~	0.00	

DISTANCE FLOWN

SITUATION: A. Ground Speed (GS): 510 Knots
B. Flight Time (FT): 3 Hours, 14 Minutes, 45 Seconds

FIND: A. Distance Flown (DF): 1,655 N.M.

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	Ø.ØØ	
	51Ø	51Ø	..... (GS)
	ENTER ↑	51Ø.ØØ	
	3.1445	3.1445	..... (FT)(H.MMSS)
	USER (ON)	3.1445	USER
(ASSIGNED)	LOG {	HR	
		3.25	"
	USER (OFF)	3.25	
	X	1,655.38	
	SHIFT	1,655.38	SHIFT
	FIX	FIX	
	Ø {	FIX Ø	
		1,655.	..... (DF)

RESET X DISPLAY:

SHIFT	1,655.	SHIFT
FIX	FIX	
2	{ FIX 2	
-	1,655.38	

DRIFT CORRECTION: NEW COMPASS HEADING

- SITUATION:
- A. Distance Off True Course (DOTC): 4 NM LEFT
 - B. Ground Distance Flown...
to a point along the True Course,
which is at right angles to the last fix (GDF): 25 NM
 - C. Ground Distance Remaining...
along the True Course, from (GDF) above,
to the point of intercept (GDR): 115 NM
 - D. Compass Heading Flown, prior to correction (CHF): 90°
 - E. Numerical Constant for this page (N_C_1): 360°
- NOTE: The following factors are considered to be constant, from point of departure, to point of intercept:
- True Air Speed
 - Variation
 - Wind Direction
 - Wind Velocity

- FIND:
- A. Drift Angle, prior to New Compass Heading (DA): 9° LEFT
 - B. Drift Correction: New Compass Heading (DC:NCH): 101°
-

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	ø.øø	
	4	4.øø	..... (DOTC)(If Left Drift: Key-In: STO ø1) (If Right Drift: Key-In: CHS before STO ø1)
	STO ø1	{ STO ø1- 4.øø	
(DIVIDE)	25 +	25 ø.16	..... (GDF)
	SHIFT	ø.16	SHIFT
	TAN ⁻¹	9.øø	
	SHIFT	9.øø	SHIFT
	FIX ø	FIX ø	
		{ 9.	..... (DA) (Positive = Left Drift) (Negative = Right Drift)
(ADD)	9ø +	9ø -	..... (CHF)
	STO ø2	{ STO ø2- 99.	
		{ RCL ø1	
	RCL ø1	{ RCL ø1- 4.	
(DIVIDE)	115 +	115 -ø2	..... (GDR)
	SHIFT	3 -ø2	SHIFT
	TAN ⁻¹	2.	
(CONT.)			

DRIFT CORRECTION: NEW COMPASS HEADING (CONT.)

<u>MRM (CONT.):</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
(ASSIGNED)	USER (ON) 1/x	2. { ABS 2. RCL ø2	USER "
	USER (OFF)	2. RCL ø2	
	(ADD) +	1ø1. 99.	(DC:NCH)(If Negative: Key-In: 36ø and +) (If over 360: Key-In: 36ø and -)

RESET X DISPLAY:

SHIFT	1ø1.	SHIFT
FIX	FIX	
2	{ FIX 2 1ø1.ø8	
-	ø.øø	

ESTIMATED TIME OF ARRIVAL

SITUATION: A. Estimated Time of Departure (ETD): 2013 ZULU
 B. Estimated Flight Time (EFT): 4 Hours, 27 Minutes
 C. Numerical Constant #1 for this page (NC_1): 100
 D. Numerical Constant #2 for this page (NC_2): 0
 E. Numerical Constant #3 for this page (NC_3): 28
 F. Numerical Constant #4 for this page (NC_4): 29
 G. Numerical Constant #5 for this page (NC_5): 2400

FIND: A. Estimated Time of Arrival (ETA): 0040* ZULU

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	20.13	20.13	..... (ETD)(HH.MM)(i.e. 2013 ZULU)
(ASSIGNED) LOG	USER (ON)	20.13-	USER
		{ HR	
		20.22	"
(ASSIGNED) LOG	4.27	4.27-	..... (EFT)(H.MM)
		{ HR	
		4.45	"
(ADD) +	(ASSIGNED) LN	24.67	"
		{ HMS	
		24.40	"
	USER (OFF)	24.40	
	100	100	..... (NC_1)
	X	2,440.00	
	SHIFT	2,440.00	SHIFT
	FIX	2,440.	
	0	{ FIX 0	..... (NC_2)
		2,440.	
	SHIFT	2,440.	SHIFT
	CF	CF	
	28	{ CF 28-	..... (NC_3)
		2,440.	
	SHIFT	2,440.	SHIFT
	CF	CF	
	29	{ CF 29-	..... (NC_4)
		2440	(ETA)(HHMM)(ZULU) (If over 2400, Key-In: 2400 and -)
	2400	2400-	..... (NC_5)
	-	40-	(ETA)(i.e. 0040* ZULU)

(CONT.)

ESTIMATED TIME OF ARRIVAL (CONT.)

*The last display (on the previous page), may be considered to be the equivalent to the normal four digit Zulu Time format, by adopting the following explanation and examples as valid:

Explanation: 1st digit left to right = Minutes
2nd digit left to right = Tens of Minutes
3rd digit left to right = Hours
4th digit left to right = Tens of Hours

Examples: X DISPLAY

9	=	0009 ZULU
40	=	0040 ZULU
200	=	0200 ZULU
2359	=	2359 ZULU
0	=	0000 ZULU

RESET X DISPLAY:

<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
SHIFT	40	SHIFT
FIX	FIX	
2	{ FIX 2	
	{ 40.00	
SHIFT	40.00	SHIFT
SF	SF	
28	{ SF 28	
	{ 40.00	
SHIFT	40.00	SHIFT
SF	SF	
29	{ SF 29	
	{ 40.00	
-	-	

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FAHRENHEIT

- SITUATION:** A. Celsius (Centigrade) ($^{\circ}\text{C}$): 16°C
 B. Numerical Constant #1 for this page (NC_1): 9
 C. Numerical Constant #2 for this page (NC_2): 5
 D. Numerical Constant #3 for this page (NC_3): 32°
 E. Numerical Constant #4 for this page (NC_4): 0

FIND: A. Fahrenheit ($^{\circ}\text{F}$): 61°F

MRM:	KEY-IN	X-DISPLAY	ANNUNCIATORS, ETC.
	ON	$\emptyset.\emptyset\emptyset$	
	16	16	..... ($^{\circ}\text{C}$)
	ENTER ↑	16. $\emptyset\emptyset$	
	9	9	..... (\text{NC_1)
	X	144. $\emptyset\emptyset$	
	5	5	..... (\text{NC_2)
(DIVIDE)	÷	28.8 \emptyset	
	32	32	..... (\text{NC_3)
(ADD)	+	60.8 \emptyset	
	SHIFT	60.8 \emptyset	SHIFT
	FIX	FIX	
	\emptyset	{ FIX $\overline{2}$	..... (\text{NC_4)
		61.	..... ($^{\circ}\text{F}$)

RESET X DISPLAY:

SHIFT	61.	SHIFT
FIX	FIX	
2	{ FIX $\overline{2}$	
-	60.8 \emptyset	
	$\emptyset.\emptyset\emptyset$	

FLIGHT PLAN, PER ZONE

<u>SITUATION:</u>	A. True Course (TC):	256°
	B. Wind Direction, True (WD):	315°
	C. Numerical Constant #1 for this page (NC_1):	360°
	D. Numerical Constant #2 for this page (NC_2):	180°
	E. Wind Velocity (WV):	40 KTS
	F. True Air Speed (TAS):	494 KTS
	G. Zone Distance (DIST):	531 NM
	H. Fuel Burnout, Rate (FBOR):	17.4 M#/HR
	I. Fuel On Board, Start of Zone (FOBSZ):	21.94 M#

<u>FIND:</u>	A. Drift (DA):	3.98° LEFT
	B. True Heading (TH):	259.98°
	C. Ground Speed (GS):	472.21 KTS
	D. Estimated Flight Time (EFT):	1 HR, 07 MIN, 28 SEC
	E. Fuel Burnout, Estimated (FBOE):	19.57 M#
	F. Fuel Remaining at End of Zone (FREZ):	2.37 M#

<u>MRN:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	Ø ØØ	
	256	256_-	..... (TC) (If equal to, or smaller than (WD), continue Key-In as shown) (If larger than (WD), Key-In STO ØØ, then skip to (WD))
	STO ØØ	{ STO ØØ- { 256.ØØ	
	36Ø	36Ø_-	..... (NC_1) (If (TC) larger than (WD), skip this line)
(ADD) +	616.ØØ	.....	(If (TC) larger than (WD), skip this line)
	315	315_-	(WD)
	STO Ø1	{ STO Ø1- { 315.ØØ	
	-	3Ø1.ØØ	
	18Ø	18Ø_-	..... (NC_2)
	-	121.ØØ	
	STO Ø2	{ STO Ø2- { 121.ØØ	
	SIN Ø1	Ø.86	
	STO Ø3	{ STO Ø3- { Ø.86	
	4Ø	4Ø_- (WV)
	STO Ø4	{ STO Ø4- { 4Ø.ØØ	
	X	34.29	

(CONT.)

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FLIGHT PLAN, PER ZONE (CONT.)

<u>MRM (CONT.) : KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
494	494 (TAS)
STO	STO	
ø5	{ STO ø5-	
(DIVIDE) +	{ 494.ø5	
SHIFT	{ ø.ø7	
SIN-1	{ ø.ø7	SHIFT
	3.98	..... (DA) (Positive = Left Drift, N. Hemis.) (Negative = Right Drift, N. Hemis.) (Drift reverses in S. Hemisphere) (If (DA) = ø° (+ .99δ), go now to: MRM PART 2)
STO	STO	
ø6	{ STO ø6-	
RCL	{ 3.98	
ø2	{ RCL ø2-	
(ADD) +	{ 121.ø0	
18ø	124.98	
X ² Y	18ø	..... (NC ₂)
-	124.98	
STO	55.ø2	
ø7	{ STO ø7-	
RCL	{ 55.ø2	
øø	{ RCL øø-	
RCL	{ 256.øø	
ø6	{ RCL ø6-	
(ADD) +	3.98	..... (TH)
RCL	259.98	
ø5	{ RCL ø5-	
RCL	{ 494.øø	
ø7	{ RCL ø7-	
SIN	{ 55.ø2	
X	ø.ø2	
RCL	4ø4.76	
ø3	{ RCL ø3-	
(DIVIDE) +	{ ø.ø6	
531	472.21	..... (GS)
X ² Y	531	..... (DIST)
(DIVIDE) +	472.21	
STO	1.12	
øø	{ STO øø-	
	1.12	

(CONT.)

FLIGHT PLAN, PER ZONE (CONT.)

<u>MRM(CCNT.): KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
USER (ON) (ASSIGNED) LN	1.12 { HMS 1. 07	USER "
USER (OFF)	1. 07	
SHIFT	1. 07	SHIFT
FIX	FIX	
4	{ FIX 4	
SHIFT	1. 07 28	(EFT)(H.MMSS)
FIX	1. 07 28 SHIFT	
2	{ FIX 2	
RCL	RCL	
øø	{ RCL øø	
17.4	17.4	(FBOR)
X	19. 57	(FBOE)
21.94	21.94	(FOBSZ)
ZY	19. 57	
-	2.37	(FREZ)

<u>MRM PART 2: KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
RCL øø	{ RCL RCL øø	
RCL ø1	{ RCL RCL ø1	
-	nnn.nn	(WD)
	nnn.nn	(ø.øø = Headwind: Continue Key-In as shown)
		(18ø.øø = Tailwind: Continue Key-In or as shown, and especially (-18ø.øø) note the need to Key-In CHS 8th line down)
nnn	nnn_	(DIST)
RCL ø5	{ RCL ø5	
RCL ø4	{ RCL ø4	
CHS	nn.nn	(WV)
	-nn.nn	(If Headwind is indicated above, skip this line!)
(DIVIDE) -	nnn.nn	(GS)
STO ø6	{ STO ø6	
	n.nn	

(CONT.)

FLIGHT DECK USES FOR THE HP-41C
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FLIGHT PLAN, PER ZONE (CONT.)

<u>MRM PART 2: KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
(CONT.)		
USER (ON) (ASSIGNED) LN	n,nn HMS	USER "
USER (OFF)	n,nn	
SHIFT	n,nn	SHIFT
FIX	FIX	
4	{ FIX 4	
	n,nnnn	(EFT)(H,MMSS)
SHIFT	n,nnnn	SHIFT
FIX	FIX	
2	{ FIX 2	
	n,nn	
RCL	RCL	
ø6	{ RCL ø6	
	n,nn	
nn,n	nn,n_	{FBOR}
X	nn,nn	{FBOE}
nn,nn	nn,nn_	{FOBSZ}
X,Y	nn,nn	{FBOE}
-	n,nn	{FREZ}

RESET X DISPLAY:

← ø.øø

FLIGHT TIME AVERAGE, MK-I

SITUATION: A. Flight Time, Monday's Trip (FTMT): 2 HRS, 30 MINS, 36 SECS
B. Flight Time, Tuesday's Trip (FTTT): 1 HR, 45 MINS, 09 SECS
C. Flight Time, Wednesday's Trip (FTWT): 2 HRS, 00 MINS, 27 SECS
D. Number of Trips to be Averaged (NTTBA): 3

FIND: A. Flight Time, Average (FTA): 2 HRS, 05 MINS, 24 SECS

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	2.3036	2.3036	..... (FTMT)(H.MMSS)
(ASSIGNED) LOG	USER (ON)	2.3036_	USER
		{ HR	
		2.51	"
(ASSIGNED) LOG	1.4509	1.4509_	..... (FTTT)(H.MMSS)
		{ HR	
		1.75	"
(ADD) +		4.26	"
(ASSIGNED) LOG	2.0027	2.0027_	..... (FTWT)(H.MMSS)
		{ HR	
		2.01"
(ADD) +		6.27	"
(DIVIDE) +	3	3	....." (NTTBA)
(ASSIGNED) LN		2.09	"
		{ HMS	
		2.05	"
USER (OFF)		2.05	
SHIFT		2.05	SHIFT
FIX		FIX	
4		{ FIX 4	
		2.0524	..... (FTA)(H.MMSS)

RESET X DISPLAY:

SHIFT	2.0524	SHIFT
FIX	FIX	
2	{ FIX 2	
-	2.05	
	0.00	

20.

FLIGHT DECK USES FOR THE HP-41C
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FLIGHT TIME LOGGING

<u>SITUATION:</u>	A. Flight Time, Day: Last Flight:	4:22 Hrs. Min.
B. " " Night: " "	3:01 " "	
C. " " Day: Current Month, Excluding Last Flight:	24:19 " "	
D. " " Night: " " " "	18:59 " "	
E. " " Day: " Year, " " " "	300:28 " "	
F. " " Night: " " " "	297:04 " "	

<u>FIND:</u>	A. Flight Time, Combined: Last Flight:	7:23 Hrs. Min.
B. " " Day: Current Month, Including Last Flight:	28:41 " "	
C. " " Night: " " " "	22:00 " "	
D. " " Combined: " " " "	50:41 " "	
E. " " Day: " Year, " " " "	304:50 " "	
F. " " Night: " " " "	300:05 " "	
G. " " Combined: " " " "	604:55 " "	

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
(ASSIGNED) LOG	ON 4.22 USER (ON)	4.22 4.22-	..... (DAY:LAST FLT)(H.MM) USER
(ASSIGNED) LOG	STO #1 3.#1	4.37 STO #1- 4.37	" " "
(ASSIGNED) LN	STO #2 #2	STO #2- 3.#2	" "
(ADD) +	STO #3	7.38 STO #3-	" "
(ASSIGNED) LOG	HMS 24.19	7.38 24.19-	" (COMBINED: LAST FLT)(H.MM)
(ASSIGNED) LOG	RCL #1	24.32 RCL #1-	" "
(ADD) +	STO #4	4.37 28.68 STO #4-	" " "
(ASSIGNED) LN	HMS 28.41	28.68 28.41	" (DAY: CUR. MONTH, INCL. LAST FLT)(HH.MM)

(CONT.)

FLIGHT TIME LOGGING (CONT.)

MRM(CONT.): KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
18.59 (ASSIGNED) LOG	18.59_	.....USER (NIGHT: CUR. MONTH, EXCL. LAST FLT)(HH.MM)
RCL ø2	{ HR RCL ø2- 3.ø2 22.ø0	■ ■ ■ ■ ■
(ADD) + STO ø5	{ STO ø5- 22.ø0 HMS	■ ■ ■
(ASSIGNED) LN	{ 22.ø0	.....■... (NIGHT: CUR. MONTH, INCL. LAST FLT)(HH.MM)
RCL ø4	{ RCL ø4- 28.68	■ ■
RCL -- ø5	{ RCL ø5- 22.ø0 5ø.68	■ ■ ■
(ADD) + STO ø6	{ STO ø6- 5ø.68	■ ■ ■
(ASSIGNED) LN	{ HMS	
3øø.28 (ASSIGNED) LOG	{ 5ø.41 3øø.28_	.....■... (COMBINED: CUR. MONTH, INCL. LAST FLT)(HH.MM)■... (DAY: CUR. YEAR, EXCL. LAST FLT)(HHH.MM)
RCL ø1	{ RCL ø1- 4.37	■ ■ ■
(ADD) + STO ø7	{ STO ø7- 3øø.83	■ ■ ■
(ASSIGNED) LN	{ HMS	
297.ø4 (ASSIGNED) LOG	{ 3øø.5ø 297.ø4_	.....■... (DAY: CUR. YEAR, INCL. LAST FLT)(HHH.MM)■... (NIGHT: CUR. YEAR, EXCL. LAST FLT)(HHH.MM)
RCL ø2	{ RCL ø2- 3.ø2	■ ■ ■
(ADD) + STO ø8	{ STO ø8- 3øø.ø8	■ ■ ■
(ASSIGNED) LN	{ HMS	
	{ 3øø.ø5■... (NIGHT: CUR. YEAR, INCL. LAST FLT)(HHH.MM)

(CONT.)

FLIGHT DECK USES FOR THE HP-41C
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FLIGHT TIME LOGGING (CONT.)

<u>MRM(CONT.):</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
RCL		RCL	USER
PF	{	RCL PF	"
		304.83	"
RCL		RCL	"
PF	{	RCL PF	"
		300.08	"
(ADD) +		604.92	"
(ASSIGNED) LN	{	HMS	
		604.55	..... (COMBINED: CUR. YEAR, INCL. LAST FLT)(HHH.MM)

RESET X DISPLAY:

USER (OFF) 604.55
 ~ 0.00

FLIGHT TIME LOGGING, AND LEGAL TIME REMAINING

<u>SITUATION:</u>	A. Flight Time: Last Flight: B. Flight Time: Current Consecutive 7 Days, Exclud. Last Flt: C. Flight Time: Current Calendar Month, Excluding Last Flt: D. Flight Time: Current Calendar Year, Excluding Last Flt: E. Flight Time, Maximum: In Any Consecutive 7 Days: F. Flight Time, Maximum: In Any Calendar Month: G. Flight Time, Maximum: In Any Calendar Year:	7:23 Hrs. Min. 22:30 " " 43:18 " " 597:32 " " 30:00 " " 100:00 " " 1,000:00 " "
<u>FIND:</u>	A. Flight Time: Current Consecutive 7 Days, Includ. Last Flt: B. Flight Time Legally Remaining: Current Consec. 7 Days: C. Flight Time: Current Calendar Month, Including Last Flt: D. Flight Time Legally Remaining: Current Calendar Month: E. Flight Time: Current Calendar Year, Including Last Flt. F. Flight Time Legally Remaining: Current Calendar Year:	29:53 Hrs. Min. 0:07 " " 50:41 " " 49:19 " " 604:55 " " 395:05 " "

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	7.23	7.23_	..... (LAST FLT)(H.MM)
(ASSIGNED) LOG	USER (ON)	7.23_	USER
		{	
		7.38	"
	STO	STO	"
	ø1	{ STO ø1-	
		7.38	"
(ASSIGNED) LOG	22.30	22.30_	..... (CUR. CONSEC. 7 DAYS, EXCL. LAST FLT)(HH.MM)
		{	
		22.50	"
(ADD) +		29.88	"
	STO	STO	"
	ø2	{ STO ø2-	
		29.88	"
(ASSIGNED) LN		{	
		HMS	
		29.53	..... (CUR. CONSEC. 7 DAYS, INCL. LAST FLT)(HH.MM)
	ø1	30	..... (MAX: CONSEC. 7 DAYS)(HH.)
	RCL	RCL	"
	ø2	{ RCL ø2-	
		29.88	"
		ø12	"
(ASSIGNED) LN	-	{	
		HMS	
		ø.ø7	..... (LEGALLY REMAINING: CUR. CONSEC. 7 DAYS)(H.MM)
	RCL	RCL	"
	ø1	{ RCL ø1-	
		7.38	"
(ASSIGNED) LOG	43.18	43.18_ (CUR.MONTH, EXCL. LAST FLT)(HH.MM)
		{	
		43.30	"
(ADD) +		50.68	"

(CONT.)

FLIGHT DECK USES FOR THE HP-41C
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FLIGHT TIME LOGGING, AND LEGAL TIME REMAINING (CONT.)

<u>MRM(CONT.):</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	STO	STO	USER
(ASSIGNED) LN	Ø3	{ STO Ø3 -	"
		{ 5Ø.68	"
		{ HMS	
	1ØØ	{ 5Ø.41	(CUR. MONTH, INCL. LAST FLT)(HH.MM)
	RCL	{ 1ØØ	(MAX: MONTH)(HHH.)
	Ø3	{ RCL Ø3 -	"
		{ 5Ø.68	"
(ASSIGNED) LN	-	{ 49.32	"
		{ HMS	
	RCL	{ 49.19	(LEGALLY REMAINING: CUR. MONTH)(HH.MM)
	Ø1	{ RCL Ø1 -	"
		{ 7.38	"
(ASSIGNED) LOG	597.32	{ 597.32	(CUR. YEAR, EXCL. LAST FLT)(HH.MM)
		{ HR	
(ADD) +	Ø4	{ 597.53	"
	STO	{ 6Ø4.92	"
	Ø4	{ STO Ø4 -	"
		{ 6Ø4.92	"
	LN	{ HMS	
	1,ØØØ	{ 6Ø4.55	(CUR. YEAR, INCL. LAST FLT)(HHH.MM)
	RCL	{ 1,ØØØ	(MAX: YEAR)(HHHH.)
	Ø4	{ RCL Ø4 -	"
		{ 6Ø4.92	"
(ASSIGNED) LN	-	{ 395.Ø8	"
		{ HMS	
		{ 395.Ø5	(LEGALLY REMAINING: CUR. YEAR)(HHH.MM)

RESET X DISPLAY:

USER (OFF) 395.Ø5
- Ø.ØØ

FLIGHT DECK USES FOR THE HP-41C
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25.

FUEL BURNOUT, CLIMB

SITUATION: A. Rate of Burnout, Climb (RBOCL): 500 Pounds Per Minute
B. Estimated Time of Climb (ETOCL): 28 Minutes

FIND: A. Fuel Burnout, Climb (FBOCL): 14,000 Pounds

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	500	500	... (RBOCL)
	ENTER ↑	500.00	
	28	28	... (ETOCL)
	X	14,000.00	... (FBOCL)

RESET X DISPLAY:

- 0.00

FLIGHT DECK USES FOR THE HP-41C
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FUEL BURNOUT, CLIMB, CRUISE, DESCENT AND TOTAL

SITUATION: A. Rate of Burnout, Climb (RBOCL): 500 Pounds Per Minute
 B. Estimated Time of Climb (ETOCL): 28 Minutes
 C. Rate of Burnout, Cruise (RBOCR): 16,000 Pounds Per Hour
 D. Estimated Time of Cruise (ETOCR): 4 Hours, 30 Minutes, 30 Seconds
 E. Rate of Burnout, Descent (RBODES): 125 Pounds Per Minute
 F. Estimated Time of Descent (ETODES): 28 Minutes

FIND: A. Fuel Burnout, Climb (FBCL): 14,000 Pounds
 B. Fuel Burnout, Cruise (FBOCR): 72,133.33 Pounds
 C. Fuel Burnout, Descent (FBODES): 3,500 Pounds
 D. Fuel Burnout, Total (FBOT): 89,633.33 Pounds

<u>MRN:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	500	500	..... (RBOCL)
	ENTER ↑	500.00	
	28	28	..... (ETOCL)(MM.)
	X	14,000.00	..... (FBCL)
	STO	STO	
	Ø1	{ Ø1-	
		14,000.00	
	16,000	16,000	..... (RBOCR)
	ENTER ↑	16,000.00	
	4.3Ø3Ø	4.3Ø3Ø	..... (ETOCR)(H.MMSS)
	USER (ON)	4.3Ø3Ø	USER
(ASSIGNED) LOG		{ HR	
		4.51	"
	X	72,133.33	.... (FBCR)
	STO	STO	
	Ø2	{ Ø2-	
		72,133.33	"
	125	125	.... (RBODES)
	ENTER ↑	125.00	
	28	28	.... (ETODES)(MM.)
	X	3,500.00	.... (FBODES)
	RCL	RCL	
	Ø1	{ Ø1-	
		14,000.00	"
	+	17,500.00	"
	RCL	RCL	
	Ø2	{ Ø2-	
		72,133.33	"
(ADD) +		89,633.33	.... (FBOT)

RESET X DISPLAY:

USER (OFF) 89,633.33
 ← Ø.ØØ

FUEL BURNOUT, CRUISE

SITUATION: A. Rate of Burnout, Cruise (RBOCR): 16,000 Pounds Per Hour
B. Estimated Time of Cruise (ETOCSR): 4 Hours, 30 Minutes, 30 Seconds

FIND: A. Fuel Burnout, Cruise (FBOCR): 72,133.33 Pounds

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	16,000	16,000	..... (RBOCR)
	ENTER ↑	16,000.00	
	4.3030	4.3030	..... (ETOCSR)(H.MMSS)
	USER (ON)	4.3030	USER
(ASSIGNED) LOG	{	HR	
		4.51	*
	X	72,133.33 (FBOCR)

RESET X DISPLAY:

USER (OFF) 72,133.33
← 0.00

FLIGHT DECK USES FOR THE HP-41C
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FUEL BURNOUT, CRUISE, THREE SEGMENTS

SITUATION: A. Rate of Burnout, Cruise (RBOCR); 60 Gallons Per Hour
 B. Estimated Time of Cruise, 1st Segment (ETOCR-1); 2 Hrs, 00 Min, 00 Sec
 C. Estimated Time of Cruise, 2nd Segment (ETOCR-2); 1 Hr, 55 Min, 30 Sec
 D. Estimated Time of Cruise, 3rd Segment (ETOCR-3); 2 Hrs, 04 Min, 30 Sec

FIND: A. Fuel Burnout, Cruise, 1st Segment (FBOCR-1); 120.00 Gallons
 B. Fuel Burnout, Cruise, 2nd Segment (FBOCR-2); 115.50 Gallons
 C. Fuel Burnout, Cruise, 3rd Segment (FBOCR-3); 124.50 Gallons
 D. Fuel Burnout, Cruise, Total (FBOCR-T); 360.00 Gallons

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	60	60	..... (RBOCR)
	STO	STO	
	00	{ STO 00	
		60.00	
	2.0000	2.0000	..... (ETOCR-1)(H.MMSS)
(ASSIGNED) LOG	USER (ON)	2.0000	USER
		{ HR	
		2.00	"
	X	120.00	..... (FBOCR-1)
	STO	STO	
	01	{ STO 01	
		120.00	"
	RCL	RCL	
	00	{ RCL 00	
		60.00	"
(ASSIGNED) LOG	1.5530	1.5530	..... (ETOCR-2)(H.MMSS)
		{ HR	
		1.93	"
	X	115.50	..... (FBOCR-2)
	STO	STO	
	02	{ STO 02	
		115.50	"
	RCL	RCL	
	00	{ RCL 00	
(ASSIGNED) LOG	2.0430	2.0430	..... (ETOCR-3)(H.MMSS)
		{ HR	
		2.08	"
	USER (OFF)	2.08	
	X	124.50	..... (FBOCR-3)
	RCL	RCL	
	01	{ RCL 01	
		120.00	
(ADD) +	RCL	244.50	
	02	{ RCL 02	
		115.50	
(ADD) +		360.00	..... (FBOCR-T)

RESET X DISPLAY:

- 0.00

FUEL BURNOUT, DESCENT

SITUATION: A. Rate of Burnout, Descent (RBODES): 125 Pounds Per Minute
B. Estimated Time of Descent (ETODES): 28 Minutes

FIND: A. Fuel Burnout, Descent (FBODES): 3,500 Pounds

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
ON		<u>0.00</u>	
125		<u>125</u>	... (RBODES)
ENTER ↑		<u>125.00</u>	
28		<u>28</u>	... (ETODES)
X		<u>3.500.00</u>	... (FBODES)

RESET X DISPLAY:

- 0.00

FLIGHT DECK USES FOR THE HP-41C
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FUEL BURNOUT, RATE OF, MK-I

SITUATION: A. Fuel on board at start of test (FOBSOT): 60,000#
 B. Fuel on board at end of test (FOBEOT): 42,000#
 C. Actual Flight Time of test (AFTOT): 1 Hour, 12 Minutes

FIND: A. Fuel burned out during test (FBODT): 18,000#
 B. Rate of burnout per hour (RBOPH): 15,000# Per Hour

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	60,000	60,000.00	..... (FOBSOT)
	ENTER ↑	60,000.00	
	42,000	42,000.00	..... (FOBEOT)
	-	18,000.00	..... (FBODT)
	1.12	1.12	..... (AFTOT)(H.MM)
(ASSIGNED) LOG	USER (ON)	1.12-	USER
(DIVIDE) +	{	HR	
		1.20	"
		15,000.00	..... (RBOPH)

RESET X DISPLAY:

USER (OFF) 15,000.00
 - 0.00

FUEL BURNOUT, RATE OF, MK-II

- SITUATION: A. Fuel on board at start of test (FOBSOT): 60,000#
 B. Time test started (TTS): 1600Z
 C. Fuel on board at end of test (FOBECT): 42,000#
 D. Time test ended (TTE): 1712Z
- FIND: A. Fuel burned out during test (FBODT): 18,000#
 B. Actual flight time of test (AFTOT): 1 Hour, 12 Minutes
 C. Rate of burnout per hour (RBOPH): 15,000# Per Hour
-

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	60.000	60.000	..... (FOBSOT)
	ENTER ↑	60.000.00	
	42.000	42.000	..... (FOBECT)
	-	18.000.00	..... (FBODT)
	STO	STO	
	Φ1	{ STO Φ1-	
	16.00	18.000.00	
(ASSIGNED) LOG	{ USER (ON)	16.00 16.00-	..... (TTS)(HH.MM)(ZULU) USER
(ASSIGNED) LOG	{ 17.12	16.00 17.12-	"
(ASSIGNED) LN	{ X>Y	HR 17.12	..... (TTE)(HH.MM)(ZULU)
	-	17.20	"
	STO	16.00	"
	Φ2	{ STO Φ2-	
	1.20	1.20	"
(DIVIDE) +	{ USER (OFF)	HMS 1.12	..... (AFTOT)(H.MM)
	RCL	1.12	
	Φ1	{ RCL Φ1-	
	RCL	18.000.00	..... (FBODT)
	Φ2	{ RCL Φ2	
	-	1.20	
		15.000.00 (RBOPH)

RESET X DISPLAY:

- 0.00

FLIGHT DECK USES FOR THE HP-41C
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FUEL REMAINING, AFTER CLIMB, CRUISE AND DESCENT

SITUATION: A. Total Fuel On Board at the End of the Takeoff Runway (TFOB): 116,000#
 B. Fuel Burnout in Climb (FBOCL): 14,000#
 C. Fuel Burnout in Cruise (FBOCR): 72,133#
 D. Fuel Burnout in Descent (FBODES): 3,500#

FIND: A. Fuel Remaining at Reaching Cruise Altitude (FRRCA): 102,000#
 B. Fuel Remaining at Reaching Point of Descent (FRPOD): 29,867#
 C. Fuel Remaining on Landing (FROL): 26,367#

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	SHIFT	0.00	SHIFT
	FIX	FIX	
	0	FIX 0	
	116,000	116,000	..... (TFOB)
	ENTER ↑	116,000.	
	14,000	14,000	..... (FBOCL)
	-	102,000	..... (FRRCA)
	72,133	72,133	..... (FBOCR)
	-	29,867	..... (FRPOD)
	3,500	3,500	..... (FBODES)
	-	26,367.	..... (FROL)

RESET X DISPLAY:

SHIFT	26,367.
FIX	FIX
2	FIX 2
-	26,367.00
	0.00

FUEL REMAINING IN HOURS, MINUTES AND SECONDS; CRUISE

SITUATION: A. Fuel On Board, Over Last Fix (FOBOLF): 37,400#
 B. Rate of Fuel Burnout In Cruise (ROFBOLC): 16,000#

FIND: A. Fuel Remaining in Hours, Minutes and Seconds;
 Cruise (FRIHMSC): 2 Hrs, 20 Min, 15 Sec

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	.00	
	37,400	37,400	..... (FOBOLF)
	ENTER ↑	37,400.00	..... (ROFBOLC)
(DIVIDE) ÷	16,000	16,000	.....
		2.34	
	USER (ON)	2.34	USER
(ASSIGNED) LN	{	HMS	
		2.20	"
	SHIFT	2.20	" SHIFT
	FIX	FIX	"
4	{	FIX 4	
		2.2015	.... (FRIHMSC)(H.MMSS)

RESET X DISPLAY:

USER (OFF)	2.2015	
SHIFT	2.2015	SHIFT
FIX	FIX	
2	{	
-		0.00

FLIGHT DECK USES FOR THE HP-41C
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GREAT CIRCLE, DISTANCE

SITUATION: A. Longitude, Initial (λ_I): $45^{\circ}00'00''$ WEST
 B. Longitude, Final (λ_F): $60^{\circ}00'00''$ EAST
 C. Latitude, Initial (LAT_I): $15^{\circ}00'00''$ NORTH
 D. Latitude, Final (LAT_F): $60^{\circ}00'00''$ NORTH
 E. Numerical Constant #1 for this page (NC_1): 1
 F. Numerical Constant #2 for this page (NC_2): 2
 G. Numerical Constant #3 for this page (NC_3): 60
 H. Numerical Constant #4 for this page (NC_4): 90

FIND: A. Great Circle, Distance (GC;DIST): 5,058.61 NM

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	45.0000	
	45.0000	45.0000	..... (λ_I)(DD.MMSS) (If East, Key-In: CHS)
(ASSIGNED) LN	USER (ON)	45.0000	USER
	{	HMS	"
		45.000	"
		60.0000	..... (λ_F)(DD.MMSS) (If East, Key-In: CHS)
	CHS	-60.0000	
(ASSIGNED) LOG	{	HR	
		-60.00	"
		100.00	"
	COS	-0.26	"
	1	1	..... (NC_1)
	X \times Y	-0.26	"
	-	1.26	"
	2	2	..... (NC_2)
(DIVIDE) +	$\frac{1}{90}$	0.63	
	STO	90	..... (NC_4)
	{	STO $\bar{\beta}_1$	
		90.00	"
		15.0000	..... (LAT_I)(DD.MMSS) (If South, Key-In: CHS)
(ASSIGNED) LOG	{	HR	
		15.00	"
	-	75.00	"
	STO	STO -	"
	β_2	{ STO β_2	
		75.00	"
	SIN	0.97	"
	STO	STO	"
	β_3	{ STO β_3	
		0.97	"
	X	0.61	"
	RCL	RCL	"
	β_1	{ RCL $\bar{\beta}_1$	
		90.00 (NC_4)

(CONT.)

FLIGHT DECK USES FOR THE HP-41C
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GREAT CIRCLE, DISTANCE (CONT.)

<u>MRM(CONT.,) : KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
6ø.øøøø	6ø.øøøø_USER..... (LAT _F)(DD.MMSS)(If South, Key-In: CHs)
(ASSIGNED) LOG	{ HR 6ø.øø	"
USER (OFF)	6ø.øø	
-	3ø.øø	
STO	STO	
ø4	{ STO ø4-	
SIN	ø.øø	
X	ø.øø	
RCL	RCL	
ø2	{ RCL ø2-	
RCL	RCL	
ø4	{ RCL ø4-	
-	3ø.øø	
COS	45.øø	
1	ø.71	
X>Y	1	..... (NC ₁)
-	ø.71	
2	ø.29	
(DIVIDE) +	2	..... (NC ₂)
(ADD) +	ø.15	
2	ø.45	
X	2	..... (NC ₂)
1	ø.øø	..... (NC ₁)
X>Y	ø.øø	
-	ø.1ø	
SHIFT	ø.1ø	SHIFT
COS ⁻¹	84.31	
6ø	6ø (NC ₃)
X	5,ø58.61 (GCIDIST)(NM)

RESET X DISPLAY:

- ø.øø

FLIGHT DECK USES FOR THE HP-41C
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GREAT CIRCLE, TRUE COURSE, INITIAL

SITUATION: A. Great Circle, Distance (GC:DIST): 5,058.61 NM
 B. Latitude, Initial (LAT_I): 15°00'00" NORTH
 C. Latitude, Final (LAT_F): 60°00'00" NORTH
 D. Numerical Constant #1 for this page (NC₁): 1
 E. Numerical Constant #2 for this page (NC₂): 2
 F. Numerical Constant #3 for this page (NC₃): 60
 G. Numerical Constant #4 for this page (NC₄): 90

FIND: A. Great Circle, True Course, Initial (GC:TC_I): 29.04° (DDD.dd)

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	ø.øø	
	1	1	..... (NC ₁)
	ENTER ↑	1.øø	
	9ø	9ø	..... (NC ₄)
	STO	STO	
	øø	{ STO øø	
		9ø.øø	
	6ø.øøøø	6ø.øøøø_	..... (LAT _F)(DD.MMSS)(If South, Key-In: CHS)
(ASSIGNED) LOG	USER (ON)	6ø.øøøø_	USER
		{ HR	
		6ø.øø	"
	-	3ø.øø	"
	COS	ø.ø7	"
	-	ø.13	"
(DIVIDE)	2	2	..... (NC ₂)
	+	ø.ø7	"
	STO	STO	"
	ø2	{ STO ø2-	
		ø.ø7	"
	1	1	..... (NC ₁)
	RCL	RCL	
	ø1	{ RCL ø1-	
		9ø.øø	"
	15.øøøø	15.øøøø_	..... (LAT _I)(DD.MMSS)(If South, Key-In: CHS)
(ASSIGNED) LOG	USER (OFF)	{ HR	
		15.øø	"
	-	75.øø	
	STO	STO	
	ø3	{ STO ø3-	
		75.øø	
	5,058.61	5,058.61_	..... (GC:DIST)(NM)
	ENTER ↑	5,058.61	
	øø	øø	..... (NC ₃)
(DIVIDE)	+	84.31	
	STO	STO	
	ø4	{ STO ø4-	
		84.31	

(CONT.)

GREAT CIRCLE, TRUE COURSE, INITIAL (CONT.)

<u>MPM(CONT.): KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
-	-9.31	
COS	.99	
-	.01	
2	2	..... (NC ₂)
(DIVIDE) +	.01	
RCL	RCL	
.02	{ RCL .02-	
X ₂ Y	{ .07	
-	.01	
RCL	RCL	
.03	{ RCL .03-	
SIN	.97	
RCL	RCL	
.04	{ RCL .04-	
SIN	1.00	
X	.96	
(DIVIDE) +	.06	
2	2	..... (NC ₂)
X	.13	
1	1	..... (NC ₁)
X ₂ Y	.13	
-	.87	
SHIFT	.87	SHIFT
COS ⁻¹	29.04	..... (GC:TC _I)(DD.dd)(If LAT _F is less than than 180° West of LAT _I); Key-In: 360 X ₂ Y
		(If the above does not apply, display now shows: GC:TC _I)

RESET X DISPLAY:

- .00

FLIGHT DECK USES FOR THE HP-41C
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GROUND SPEED

SITUATION: A. Distance Flown (DIST): 1,000 NM
 B. Actual Flight Time (AFT): 2 HRS, 45 MINS, 30 SECS

FIND: A. Ground Speed (GS): 362.*54* KNOTS

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
ON		0.00	
1. <i>000</i>		1.000	..... (DIST)(NM)
ENTER ↑		1.000.00	
2.4530		2.4530	..... (APT)(H.MMSS)
USER (ON)		2.4530	USER
(ASSIGNED) LOG	{	HR	-
		2.76	
USER (OFF)	{	2.76	
(DIVIDE) +		362. <i>54</i>	..... (GS)(KNOTS)

RESET X DISPLAY:

← 0.00

LOAD PLANNING

<u>SITUATION:</u>	A. Operating Weight of Aircraft:	50,000#
	B. Fuel Weight, Minimum, at the starting end of Takeoff Runway:	100,000#
	C. Passengers and Baggage Weight:	75,000#
	D. Mail Weight (Initial amount boarded):	25,000#
	E. Freight Weight:	60,000#
	F. Mail Weight (Boarded at the last minute):	15,000#
	G. Maximum Allowable Takeoff Gross Weight:	350,000#

<u>FIND:</u>	A. Total Gross Weight (Prior to boarding last minute Mail):	310,000#
	B. Weight Available for Additional Payload/Fuel (Prior to boarding last minute Mail):	40,000#
	C. Total Mail Weight (After boarding last minute Mail):	40,000#
	D. Total Gross Weight (After boarding last minute Mail):	325,000#
	E. Weight Available for Additional Payload/Fuel (After boarding last minute Mail):	25,000#

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	SHIFT	0.00	SHIFT
	FIX	FIX	
	0	{ FIX 0	
	350.000	350.000_	..... (Maximum Allowable Takeoff Gross Weight)
	STO	STO	
	00	{ STO 00-	
	50.000	50.000_	..... (Operating Weight of Aircraft)
	STO	STO	
	01	{ STO 01-	
	100.000	100.000_	..... (Fuel Weight, Minimum, at the starting end of Takeoff Runway)
	STO	STO	
	02	{ STO 02-	
	(ADD) +	150.000.	
	75.000	75.000_	..... (Passengers and Baggage Weight)
	STO	STO	
	03	{ STO 03-	
	(ADD) +	225.000.	
	25.000	25.000_	..... (Mail Weight (Initial amount boarded))
	STO	STO	
	04	{ STO 04-	
	(ADD) +	250.000.	
	60.000	60.000_	..... (Freight Weight)
	STO	STO	
	05	{ STO 05-	
	(ADD) +	310.000. (Total Gross Weight (Prior to boarding last minute Mail))

(CONT.)

FLIGHT DECK USES FOR THE HP-41C
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LOAD PLANNING (CONT.)

<u>MRM(CONT.): KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
STO	STO	
96	{ STO <u>96</u> 310,000.	
RCL	RCL	
98	{ RCL <u>98</u> 350,000. (Maximum Allowable Takeoff Gross Weight)	
X _{ZY}	310,000.	
-	40,000. (Weight Available for Additional Payload/Fuel (Prior to boarding last minute Mail))	

FOR LAST MINUTE CHANGES, CONTINUE:

15,000	15,000	..... (Mail Weight (Boarded at the last minute))
ENTER ↑	15,000	
STO	STO --	
(ADD) +	ST+ <u>94</u> 15,000	
X _{ZY}	{ RCL <u>96</u> 310,000. (Total Gross Weight (Prior to boarding last minute Mail))	
(ADD) +	325,000. (Total Gross Weight (After boarding last minute Mail))	
RCL	RCL	
98	{ RCL <u>98</u> 350,000. (Maximum Allowable Takeoff Gross Weight)	
X _{ZY}	325,000. (Total Gross Weight (After boarding last minute Mail))	
-	25,000. (Weight Available for Additional Payload/Fuel (After boarding last minute Mail))	

FOR VERIFICATION OF FINAL WEIGHTS, CONTINUE:

RCL	RCL	
92	{ RCL <u>92</u> 100,000. (Fuel Weight, Minimum, at the starting end of Takeoff Runway)	
RCL	RCL	
93	{ RCL <u>93</u> 75,000. (Passengers and Baggage Weight)	

(CONT.)

LOAD PLANNING (CONT.)

MRM(CONT.): KEY-IN X DISPLAY ANNUNCIATORS, ETC.

RCL	RCL	
ϕ_4	{ RCL ϕ_4^-	
	{ 4 ϕ , $\phi\phi\phi$.	..... (Total Mail Weight)
RCL	RCL	
ϕ_5	{ RCL ϕ_5^-	
	{ 6 ϕ , $\phi\phi\phi$.	..... (Freight Weight)

RESET X DISPLAY:

SHIFT	6 ϕ , $\phi\phi\phi$.	SHIFT
FIX	FIX	
2	{ FIX $\overline{2}$	
-	{ 6 ϕ , $\phi\phi\phi$. $\phi\phi$	
	{ 0. $\phi\phi$	

FLIGHT DECK USES FOR THE HP-41C
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POINT OF EQUAL TIME

SITUATION:	A. Total Distance of Flight to Destination (DIST):	2,383 NM
	B. Ground Speed Out (GSO):	448 KTS
	C. Ground Speed Back (GSB):	339 KTS

FIND:	A. Point of Equal Time, Distance (PET:NM):	1,026.48 NM
	B. Point of Equal Time, Time (PET:H.MMSS):	2 HRS, 17 MINS, 28 SECS

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.:
	ON	0.00	
	2,383	2,383	..... (DIST)
	ENTER ↑	2,383.00	
	339	339	..... (GSB)
	X	807.837.00	
	SHIFT	807.837.00	SHIFT
	LAST X	339.00	
	448	448	..... (GSO)
	STO	STO 00	
	00	{ 448.00	
	(ADD) +	787.00	
	(DIVIDE) +	1,026.48	..... (PET:NM)
	RCL	RCL 00	
	00	{ 448.00	
	(DIVIDE) +	2.29	
	USER (ON)	2.29	USER
	(ASSIGNED) LN	{ HMS	
		{ 2.17	-
	USER (OFF)	2.17	
	SHIFT	2.17	SHIFT
	FIX	FIX	
	4	{ FIX 4	
		2.1728	..... (PET:H.MMSS)

RESET X DISPLAY:

SHIFT	2.1728
FIX	FIX
2	{ FIX 2
←	{ 2.17
	0.00

POINT OF NO RETURN

SITUATION: A. Ground Speed Out (GSO); 448 KTS
 B. Ground Speed Back (GSB); 339 KTS
 C. Fuel on Board (FOB); 4 HRS, 46 MINS

FIND: A. Point of No Return (PNR:H.MMSS); 2 HRS, 3 MINS, 12 SECS
 B. Point of No Return (NM); 919.85 NM

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	4.46	4.46	
(ASSIGNED) LOG	USER (ON)	4.46-	..... (FOB)(H.MM) USER
		{ HR	
		4.77	"
	339	339	..... (GSB)
	X	1.615.90	
	SHIFT	1.615.90	" SHIFT
	LAST X	339.00	"
	448	448	..... (GSO)
	STO	STO	"
	Ø1	{ STO Ø1-	
		448.00	"
(ADD)	+	787.00	"
(DIVIDE)	+	2.05	"
(ASSIGNED) LN		{ HMS	
		2.03	"
	SHIFT	2.03	" SHIFT
	FIX	FIX	"
	4	{ FIX 4	
	SHIFT	2.0312	..... (PNR:H.MMSS)
	FIX	2.0312	" SHIFT
	2	{ FIX 2	
(ASSIGNED) LOG		2.03	"
		{ HR	
		2.05	"
	USER (OFF)	2.05	
	RCL	RCL	
	Ø1	{ RCL Ø1-	
	X	448.00	
		919.85 (PNR:NM)

RESET X DISPLAY:

- 0.00

FLIGHT DECK USES FOR THE HP-41C
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PRESSURE DIFFERENTIAL NAVIGATION: DRIFT ANGLE (DA), IN-FLIGHT READINGS OVERWATER*

<u>SITUATION:</u>	A. Radar Altitude, First Reading (RA_1):	20,100'
	B. Pressure Altitude, First Reading (PA_1):	19,900'
	C. Radar Altitude, Second Reading (RA_2):	20,250'
	D. Pressure Altitude, Second Reading (PA_2):	19,950'
	E. True Air Speed (TAS):	400 KTS
	F. Latitude, First Reading (LAT_1):	30°30' N
	G. Latitude, Second Reading (LAT_2):	29°30' N
	H. Numerical Constant #1 for this page (NC_1):	2
	I. Numerical Constant #2 for this page (NC_2):**	21.49
	J. Time at the First Reading (T_1):	10 HRS, 12 MINS, 00 SECS Z
	K. Time at the Second Reading (T_2):	10 HRS, 48 MINS, 00 SECS Z

<u>FIND:</u>	A. RA_1 Minus PA_1 = (D_1):	200'
	B. RA_2 Minus PA_2 = (D_2):	300'
	C. D_2 Minus D_1 = (D):	100'
	D. Latitude, Average, between readings (LAT AVG):	30°00' N
	E. K Factor (K):	42.98
	F. Lateral Displacement, perpendicular to True Heading (ZN):	10.75 NM LEFT
	G. Actual Flight Time, between readings (APT):	.60 HRS
	H. Crosswind Component, perpendicular to True Heading (Vn):	17.91 KTS
	I. Air Distance Flown between readings (AIR DIST):	240 NM
	J. Drift Angle, Average, between readings (DA):	2.56° LEFT

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	20,100	20,100	..... (RA ₁)
	ENTER ↑	20,100.00	
	19,900	19,900	..... (PA ₁)
	-	200.00	..... (D ₁)
	20,250	20,250	..... (RA ₂)
	ENTER ↑	20,250.00	
	19,950	19,950	..... (PA ₂)
	-	300.00	..... (D ₂)
	X ² Y	200.00	..... (D ₁)
	-	100.00	..... (D)
	400	400	..... (TAS)
	STO	STO	
	#1	{ STO #1 -	
(DIVIDE)	+	400.00	
	21.49	0.25	
	ENTER ↑	21.49	..... (NC ₂)
	30.30	21.49	
	USER (ON)	30.30	..... (LAT ₁)(DD.MM)(NORTH)
(ASSIGNED)	LOG	{ HR	USER
		30.50	"
(ASSIGNED)	LOG	{ 29.30	..... (LAT ₂)(DD.MM)(NORTH)
		29.50	"
	(ADD) +	60.00	"

(CONT.)

PRESSURE DIFFERENTIAL NAVIGATION: DRIFT ANGLE (DA), IN-FLIGHT READINGS O.W. (CONT.)

MRM(CONT.): KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
(DIVIDE) + 2	2	....USER..... (NC)
SIN	30.00	...."..... (LAT AVG)(DD.dd)(NORTH)
(DIVIDE) + X	0.50	" (K)
	42.98	...."..... (ZN)(NM)(Positive = Left Drift, N.Hemis.)
	10.75	(Negative = Right Drift,N.Hemis.) (Drift is reversed in S.Hemis.)
STO #2	STO #2-	"
(ASSIGNED) LOG 10.1200	{ 10.75	"
	{ 10.1200-	...."..... (T ₁)(HH.MMSS)(Z)
(ASSIGNED) LOG 10.4800	{ HR 10.20	"
	{ 10.4800-	...."..... (T ₂)(HH.MMSS)(Z)
USER (OFF) X _{ZY}	{ HR 10.80	"
-	{ 10.80	"
STO #3	{ STO #3-	..... (APT)(H.hh)
(DIVIDE) +	{ 0.60	
	17.91	....(Vn)(KTS)(Positive = Left Drift, N.Hemis.) (Negative = Right Drift,N.Hemis.) (Drift is reversed in S.Hemis.)
RCL #1	RCL #1-	
	{ 400.00	
RCL #3	RCL --	
	{ RCL #3	
X	{ 0.60	
RCL #2	240.00	....(AIR DIST)
	{ RCL #2-	
	{ 10.75	
X _{ZY}	{ 240.00	
(DIVIDE) + SHIFT TAN ⁻¹	{ 0.04	SHIFT
	{ 0.04	....(DA)(D.dd)(Positive=Left Drift, N.Hemis.) (Negative=Right Drift,N.Hemis.) (Drift is reversed in S.Hemis.)
	2.56	

RESET X DISPLAY:

- 0.00

*Per HO 216: To be used only when geostrophic winds prevail between readings.
**Coriolis Constant.

PRESSURE DIFFERENTIAL NAVIGATION: LATERAL DISPLACEMENT (ZN), IN-FLIGHT READINGS, O.W.*

<u>SITUATION:</u>	A. Radar Altitude, First Reading (RA_1):	20,100'
	B. Pressure Altitude, First Reading (PA_1):	19,900'
	C. Radar Altitude, Second Reading (RA_2):	20,250'
	D. Pressure Altitude, Second Reading (PA_2):	19,950'
	E. True Air Speed (TAS):	400 KTS
	F. Latitude, First Reading (LAT_1):	30°30' N
	G. Latitude, Second Reading (LAT_2):	29°30' N
	H. Numerical Constant #1 for this page (NC_1):	2
	I. Numerical Constant #2 for this page (NC_2):**	21.49

<u>FIND:</u>	A. RA_1 Minus $PA_1 = \{D_1\}$:	200'
	B. RA_2 Minus $PA_2 = \{D_2\}$:	300'
	C. D_2 Minus $D_1 = \{D\}$:	100'
	D. Latitude, Average, between readings (LAT AVG):	30°00' N
	E. K Factor (K):	42.98
	F. Lateral Displacement (ZN): (Perpendicular to True Heading)	10.75 NM LEFT

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	20,100	20,100	..... (RA_1)
	ENTER ↑	20,100.00	..... (PA_1)
	19,900	19,900	..... (D_1)
	-	200.00	..... (RA_2)
	20,250	20,250	..... (PA_2)
	ENTER ↑	20,250.00	..... (D_2)
	19,950	19,950	..... (D)
	-	300.00	..... (TAS)
	X ² Y	200.00	
	-	100.00	
	400	400	
(DIVIDE)	+	0.25	
	21.49	21.49	..... (NC_2)
	ENTER ↑	21.49	
	30.30	30.30	..... (LAT_1)(DD.MM)(NORTH)
	USER (ON)	30.30	USER
(ASSIGNED) LOG	{	30.50	"
		29.30	..... (LAT_2)(DD.MM)(NORTH)
(ASSIGNED) LOG	{	29.50	
		29.50	"
USER (OFF)		29.50	
(ADD)	+	60.00	
	2	2	..... (NC_1)
(DIVIDE)	+	30.00	..... (LAT AVG)(DD.dd)(NORTH)
	SIN	0.50	
(DIVIDE)	+	42.98	..... (K)
	X	10.75	..... (ZN)(Positive = Left Drift, N. Hemisphere) (Negative = Right Drift, N. Hemisphere) (Drift is reversed in S. Hemisphere)

RESET X DISPLAY:

- 0.00

*Per HO 216: To be used only when geostrophic winds prevail between readings.

**Coriolis Constant.

RHUMBLINE, COORDINATES OF NEXT WAYPOINT

<u>SITUATION:</u>	A. True Course (TC):	237°
B. Ground Speed (GS):	500 KTS	
C. Flight Time (FT):	2 HRS, 00 MINS, 00 SECS	
D. Latitude, Starting (LAT:START):	30.00° N	
E. Longitude, Starting (λ:START):	140.00° W	
F. Numerical Constant #1 for this page (NC ₁):	2	
G. Numerical Constant #2 for this page (NC ₂):	45	
H. Numerical Constant #3 for this page (NC ₃):	60	
I. Numerical Constant #4 for this page (NC ₄):	180	

<u>FIND:</u>	A. Latitude, Next Waypoint (LAT:NWYP):	20.92° N
	B. Longitude, Next Waypoint (λ:NWYP):	155.51° W

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	ø.øø	
	237	237-	..... (TC)
	STO	STO	
	øø	{ STO øø-	
		237.øø	
	COS	-ø.øø	
	5øø	5øø	..... (GS)
	X	-272.32	
	2.øøøø	2.øøøø	..... (FT)(H.MMSS)
	USER (ON)	2.øøøø-	USER
(ASSIGNED) LOG		HR	
		2.øø	"
	X	-544.64	"
	6ø	6ø	..... (NC ₃)
(DIVIDE)	+	-9.ø8	
	3ø	3ø-	..... (LAT:START)(DD.dd)(If South: Key-In: CMS)
	STO	STO	"
	ø1	{ STO ø1-	
		3ø.øø	"
(ADD)	+	2ø.øø	..... (LAT:NWYP)(DD.dd)(Negative = South)
	2	2	..... (NC ₁)
(DIVIDE)	+	1ø.øø	
	45	45	..... (NC ₂)
(ADD)	+	55.øø	
	TAN	1.45	"
	STO	STO	"
	ø2	{ STO ø2-	
		1.45	"
USER (OFF)		1.45	
	LN	ø.37	
	STO	STO	
	ø3	{ STO ø3-	
		ø.37	
	RCL	RCL	
	ø1	{ RCL ø1-	
		3ø.øø	

(CONT.)

RHUMBLINE, COORDINATES OF NEXT WAYPOINT (CONT.)

<u>MRM (CONT.):</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
(DIVIDE)	2 +	2	..... (NC ₁)
	45	15. 00	
(ADD)	+ 45	45	..... (NC ₂)
TAN		60. 00	
LN		1.73	
-		.55	
STO		.18	
ø4	{ STO ø4		
RCL		-.18	
ø6	{ RCL ø6		
TAN		237. 00	
X		1.54	
STO		-.27	
ø5	{ STO ø5		
18 ø		-.27	
SHIFT		18 ø	..... (NC ₄)
w		18 ø	SHIFT
(DIVIDE)	+ 57.3 ø	3.14	
X		-15.51	
STO		STO	
ø6	{ STO ø6		
14 ø . 00		-15.51	
STO		14 ø . 00	..... (λ:START)(DDD.dd)(If East: Key-In: CHS)
ø6	{ STO ø6		
N_EY		14 ø . 00	
-		-15.51	..... (λ:NWYP)(DDD.dd)(Positive = West) (Negative = East)

RESET X DISPLAY:

- .~~00~~

TAIL WIND FACTOR

SITUATION: A. Distance flown between two fixes (or waypoints), (DF): 200 NM
 B. Actual Flight Time (AFT): 30 MINS
 C. True Air Speed (TAS): 300 KTS

FIND: A. Tail Wind Factor (TW): 100 KTS

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	200	200	
	ENTER ↑	200.00	..... (DF)
	0.30	0.30	..... (AFT)(H.MM)
(ASSIGNED) LOG	USER (ON)	0.30	USER
	{	0.50	"
(DIVIDE) +	USER (OFF)	0.50	
	SHIFT	400.00	SHIFT
	FIX	FIX	
	0	FIX 0	
	{	400.	
	300	300	..... (TAS)
	-	100 {Positive = Tailwind}{(TW) (Negative = Headwind){HW}}

RESET X DISPLAY:

SHIFT	100.	SHIFT
FIX	FIX	
2	FIX 2	
-	100.00	

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TEMPERATURE ALOFT: CRUISE ALTITUDE WITHIN A CLOUD DECK

SITUATION: A. Altitude at Start of Climb (ALT:SOC): 20° ASL*
 B. Altitude at Base of Cloud Deck (ALT:BOCD): 20,000° ASL*
 C. Altitude at Cruise (ALT:CA): 23,000° ASL*
 D. Temperature at Start of Climb (OAT:SOC): 14° C
 E. Lapse Rate, Dry, Static (LRDS): 1.94° C
 F. Lapse Rate, Wet, Static (LRWS): 1.50° C

FIND: A. Temperature Aloft, at Cruise Altitude (OAT:CA): -29° C

* Altitudes are keyed-in as thousands of feet above sea level

MMR:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	14	14	..... (OAT:SOC)
	ENTER ↑	14.00	
	20	20	..... (ALT:BOCD)*
	STO	STO	
	01 {	STO 01-	
		20.00	
	.02	.02	..... (ALT:SOC)*
	-	19.98	
	1.94	1.94	..... (LRDS)
	X	38.78	
	-	-24.76	
	23	23	..... (ALT:CA)*
	RCL	RCL	
	01 {	RCL 01-	
		20.00	
	-	3.00	
	1.50	1.50	..... (LRWS)
	X	4.50	
	SHIFT	4.50	SHIFT
	FIX	FIX	
	0 {	FIX 0	
		5.	
	-	-29. (OAT:CA)

RESET X DISPLAY:

SHIFT	-29.	SHIFT
FIX	FIX	
2 {	FIX 2	
	-29.26	
-	0.00	

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51.

TIME CONVERSION, MK-I

SITUATION: A. Hours, Whole: 11 Hours
B. Minutes, Whole: 35 Minutes
C. Seconds, Whole: 48 Seconds
D. i.e.: 11:35:48

FIND: A. Hours, Whole: 11 Hours
B. Hours, Fraction: .60 Hours
C. i.e.: 11.60 Hours

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	11.3548	11.3548	..... (HH.MMSS)
	USER (ON)	11.3548	USER
(ASSIGNED) LOG	{	HR 11.60 (HH.hh)

RESET X DISPLAY:

USER (OFF)	11.60
~	0.00

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TIME CONVERSION, MK-II

<u>SITUATION:</u>	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	35 Minutes
	C. Seconds, Whole:	48 Seconds
	D. i.e.:	11:35:48
	E. Numerical Constant #1 for this page (NC_1):	.6
	F. Numerical Constant #2 for this page (NC_2):	100

<u>FIND:</u>	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	35 Minutes
	C. Minutes, Fraction:	.80 Minutes
	D. i.e.:	11:35.80

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	11.3548	11.3548	..... (HH.MMSS)
	ENTER ↑	11.35	
	100	100	..... (NC_2)
	X	1.135.48	
	STO	STO	
	00	{ STO 00-	
(ASSIGNED)	USER (ON) ✓X	{ 1,135.48	USER
		{ FRC	
		{ 0.48	"
		{ .6	..... (NC_1)
(DIVIDE)	+	0.50	"
	STO	STO	"
	01	{ STO 01-	"
	RCL	{ 0.80	"
	00	{ RCL 00-	"
(ASSIGNED)	Σ+	{ 1,135.48	"
		{ INT	
		{ 1,135.00	"
	USER (OFF)	1,135.00	
	RCL	RCL	
	01	{ RCL 01-	
(ADD)	+	{ 0.80	
	100	{ 1,135.80	
(DIVIDE)	+	100	..... (NC_2)
	SHIFT	11.36	SHIFT
	FIX	11.36	
	4	{ FIX 4	
		{ 11.3580	..... (HH.MMSS)

RESET X DISPLAY:

SHIFT	11.3580	SHIFT
FIX		
2	{ FIX 2	
-	{ FIX 0	

TIME CONVERSION, MK-III

SITUATION: A. Hours, Whole: 11 Hours
B. Hours, Fraction: .41 Hours
C. i.e.: 11.41 Hours

FIND: A. Hours, Whole: 11 Hours
B. Minutes, Whole: 24 Minutes
C. Seconds, Whole: 36 Seconds
D. i.e.: 11:24:36

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	ø.øø	
	11.41	11.41-	..... (HH.hh)
(ASSIGNED) LN	USER (ON)	11.41-	USER
	{	HMS	
		11.24	..... (HH.MM)
	USER (OFF)	11.24	
	SHIFT	11.24	SHIFT
	FIX	FIX	
4	{	FIX 4	
		11.2436 (HH.MMSS)

RESET X DISPLAY:

SHIFT	11.2436	SHIFT
FIX	FIX	
2	{ FIX 2	
-	{ 11.24	
	{ ø.øø	

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TIME CONVERSION, MK-IV

SITUATION:	A. Hours, Whole:	11 Hours
	B. Hours, Fraction:	.41 Hours
	C. i.e.:	11.41 Hours
	D. Numerical Constant #1 for this page (NC ₁):	100
FIND:	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	24 Minutes
	C. i.e.:	11:24 Seconds are truncated internally

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
	ON	0.00	
	11.41	11.41	..... (HH.hh)
(ASSIGNED)	LN {	11.41	USER
	USER (ON)	HMS	
		11.24	"
	100	100	"
	X	1,124.36	"
(ASSIGNED)	Σ+	{ INT	
		1,124.00	"
	USER (OFF)	1,124.00	
(DIVIDE)	100 +	11.24	..... (NC ₁) (HH.MM)

RESET X DISPLAY:

~ 0.00

TIME CONVERSION, MK-V

<u>SITUATION:</u>	A. Hours, Whole:	11 Hours
	B. Hours, Fraction:	.51 Hours
	C. i.e.:	11.51 Hours
	D. Numerical Constant #1 for this page (NC ₁):	1
	E. Numerical Constant #2 for this page (NC ₂):	100
	F. Numerical Constant #3 for this page (NC ₃):	120
<u>FIND:</u>	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	31 Minutes
	C. i.e.:	11:31

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	11.51	11.51	..... (HH.hh)
	ENTER ↑	11.51	
	1	1	..... (NC ₁)
	ENTER ↑	1.00	
	120	120	..... (NC ₃)
(DIVIDE) +	0.01		
(ADD) +	11.52		
USER (ON)	11.52		USER
(ASSIGNED) LN	{	HMS	
		11.31	"
	100	100	..... (NC ₂)
	X	1,131.00	
(ASSIGNED) Σ+	{	INT	
		1,131.00	"
USER (OFF)	1,131.00		
	100	100	..... (NC ₂)
(DIVIDE) +	11.31		..... (HH.MM)

If this Aero-Function's conversion process produces 30 or more seconds, the minute value will be rounded up, and the seconds then removed internally.

If less than 30 seconds are produced, the minute value is unchanged and the seconds are also removed internally.

RESET X DISPLAY:

- 0.00

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TIME CONVERSION, MK-VI

<u>SITUATION:</u>	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	36 Minutes
	C. Minutes, Fraction:	.75 Minutes
	D. i.e.:	11:36.75
	E. Numerical Constant #1 for this page (NC ₁):	60
	F. Numerical Constant #2 for this page (NC ₂):	100
	G. Numerical Constant #3 for this page (NC ₃):	10,000

<u>FIND:</u>	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	36 Minutes
	C. Seconds, Whole:	45 Seconds
	D. i.e.:	11:36:45

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	11.3675	11.3675_	..... (HH.MMSS)
	STO	STO	
	00	{ STO 00-	
		11.37	
	100	100	..... (NC ₂)
	X	1.136.75	
	USER (ON)	1.136.75	USER
(ASSIGNED) ✓X		{ FRC	
		0.75	"
	USER (OFF)	0.75	
	STO	STO	
	01	{ STO 01-	
		0.75	
	60	60	..... (NC ₁)
	X	45.00	
	10.0000	10.0000	..... (NC ₃)
(DIVIDE) +		4.50 - 03	
	RCL	RCL	
	00	{ RCL 00-	
		11.37	
	SHIFT	11.37	SHIFT
	FIX	FIX	
	4	{ FIX 4	
		11.3675	
	RCL	RCL	
	01	{ RCL 01-	
		0.7500	
(DIVIDE) +		100	..... (NC ₂)
		0.0075	
-		11.3600	
(ADD) +		11.3645	..... (HH.MMSS)

RESET X DISPLAY:

SHIFT	11.3645	SHIFT
FIX		
2	{ FIX 2	
-	11.36	
	0.00	

TIME CONVERSION, MK-VII

<u>SITUATION:</u>	A. Hours, Whole:	11 Hours
	B. Minutes, Whole:	36 Minutes
	C. Minutes, Fraction:	.75 Minutes
	D. i.e.:	11:36.75
	E. Numerical Constant #1 for this page (NC_1):	.6
<u>FIND:</u>	A. Hours, Whole:	11 Hours
	B. Hours, Fraction:	.61 Hours
	C. i.e.:	11.61 Hours

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
	ON	0.00	
	11.3675	11.3675	..... (HH.MMmm)
	STO	STO	
	00	{ STO 00	
		11.37	
	USER (ON)	11.37	USER
(ASSIGNED) ✓		{ FRC	
		0.37	"
		{ 0.37	..... " .. (NC ₁)
(DIVIDE) ÷	.6	.6	"
	+	0.61	
	RCL	RCL	"
	00	{ RCL 00	
		11.37	"
(ASSIGNED) ×	+	{ INT	
		11.00	"
	USER (OFF)	11.00	
(ADD) +		11.61 (HH.hh)

RESET X DISPLAY:

- 0.00

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TRUE COURSE

SITUATION: A. Compass Heading (CH): 004°
 B. Drift Angle (DA): 9° RIGHT
 C. Deviation (DEV): 20° WEST
 D. Variation (VAR): 14° EAST
 E. Numerical Constant for this page (NC₁): 360°

FIND: A. True Course (TC): 007°

MRM:	KEY-IN	X DISPLAY	ANNUNCIATORS, ETC.
ON		0.00	
004		004	..... (CH)
ENTER ↑		4.00	
9		9	..... (DA) (If Right Drift, Key-In: CHS) (If Left Drift, skip next line-- CHS not applicable)
CHS		-9	
-		13.00	
2 0		20	..... (DEV) (If East, Key-In: CHS)
-		-7.00	
14		14	..... (VAR) (If East, Key-In: CHS) (If West, skip next line-- CHS not applicable)
CHS		-14	
-		7.00	..... (TC) (If Negative, Key-In: 360° and +) (If over 360° , Key-In: 360° and -)

RESET X DISPLAY:

- ~~0.00~~

VOR DISTANCE FROM AIRCRAFT, USING TWO VOR STATIONS

<u>SITUATION:</u>	A. Radial from First VOR (RFFV):	170°
	B. Radial from Second VOR (RFSV):	240°
	C. Radial from First VOR to Second VOR (RFFVTSV):	125°
	D. Distance between VORs (DBV):	27 NM

FIND: A. Distance from Aircraft to First VOR (DFAFV): 26.04 NM

<u>MRM:</u>	<u>KEY-IN</u>	<u>X DISPLAY</u>	<u>ANNUNCIATORS, ETC.</u>
ON		0.00	
27		27	.... (DBV)
ENTER ↑		27.00	
240		240	.... (RFSV)
STO		STO	
Ø1	{	Ø1-	
		24Ø.ØØ	
125		125	.... (RFFVTSV)
-		115.ØØ	
SIN		Ø.91	
X		24.47	
RCL		RCL	
Ø1	{	RCL Ø1-	
		24Ø.ØØ	.... (RFSV)
170		170	.... (RFFV)
-		70.ØØ	
SIN		Ø.94	
(DIVIDE) +		26.Ø4	.... (DFAFV)

RESET X DISPLAY:

- 0.00
