

Appendix 1:

Ativa AT 10 Instructions by: Mitenko, Decker and Maisondieu Laforge

Note: DNS = Does Not Calculate

Housekeeping Functions

Note: Loan and Savings Calculations
Automatically round to two decimals.

-Clear Display [CE]

-Store Data in Memory [M+]

-Recall Stored Data in Memory [MRC]

-Subtract Data from Memory [M-]

-Clear All Data from Memory [MRC] [MRC]

-Set Compounding (1 thru 12) [Months/Year]

Future Value of a Present Amount

DNC

Present Value of an Annuity (Loan Pmt.)

You have been given an \$22,000 car loan. The loan is for 48 months at an interest rate of 6% compounded monthly. What is your monthly payment?

22000 [Loan\$]
6 [Interest Rate%]
5 [No. of Years]
12 [Months/Year]
[CPT] [PMT] 425.32

Your monthly payment is \$425.32.

Finding Unknown Interest

DNC

Finding Number of Periods

You received your retirement in a lump sum of \$500,000 and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$35,000 a year beginning at the end of this year. How long will the account last until it is exhausted.

500000 [Loan\$]
7 [Interest Rate%]
10 [No. of Years]
1 [Months/Year]
65000 [Pay\$]
[CPT] [N] 11.00

The account will be no be exhausted in 11.00 years but 11.43 years. Note: Rounds to the nearest whole period (financially incorrect).

Bond Pricing, Semi-annual Payments

DNC

Cash Flow Analysis

DNC

Simple Yield to Maturity

DNC

Loan Amortization

DNC

Note: this calculator will only give annuitized calculations. For example it will calculate a loan payment if the principal is entered, or conversely give a loan principal if the payment is entered. The calculator will also calculate future savings if equal periodic payments are entered.

This calculator will not calculate the present value, future value, number of compounding periods or compounded interest rates for single payments. Further more there is no method for calculating loan amortization or doing cash flow analysis.

Note: In the authors opinion the Ativa AT 10 is not recommended as a college financial calculator at any level of study

Appendix 2:

Primary Financial Instructions

Hp 10 bII

by: Mitenko, Decker and
Maison Dieu Laforge

Housekeeping Functions

-Note: [] denotes the color key. (orange)

- Set Decimals Display for 2 places

[] [DSP] 2

-Clear Display [C]

-Store Memory [] [STO]

then numeric (9 storage places) key 1 thru 9
to store number at desired at that location.

-Recall Memory [RCL]

then numeric (9 storage places) key 1 thru 9
to retrieve stored number at that location.

-Clear Work [] [C ALL]

Note: Calculations performed with payments
per year set to 1. This is done by:

Press 1 then [] then [P/YR]

Note: Always clear work before starting a new
problem!

Future Value of a Present Amount

You have just deposited \$5,000 in to an account
paying 8%, compounded annually. How much
will be in the account at the end of ten years?

10	[N]
8	[I/YR]
5000[+/-]	[PV]
[FV]	10,794.62

At the end of ten years you will have
accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given an \$22,000 car loan. The
loan is for 5 years at an interest rate of 6%
annually, compounded monthly. What is your
monthly payment?

Note: convert both months and interest to an
annual basis. [i.e. 60 months (5 X 12) , 0.5%
per month (6% ÷ 12)].

60	[N]
5	[I/YR]
22000	[PV]
[PMT]	-425.32

Your monthly payment is \$425.32.

Finding Unknown Interest

Exactly 10 years ago you bought a share of the
Terrye Corp at \$25. You now wish to sell your
investment at the current market price of \$75.
What is your average annual rate of return on
this investment?

10	[N]
25 [+/-]	[PV]
75	[FV]
[I/YR]	11.61

You earned an 11.61 % compounded return.

Finding Number of Periods

You received your retirement of \$500,000 in a
lump sum and invest it in an account which
guarantees a 7% annual rate of return. You
wish to make withdrawals of \$65,000 a year
beginning one year from today. How long will
the account last until it is exhausted.

7	[I/Y]
500000 [+/-]	[PV]
65000	[PMT]
[N]	11.43

The account will be exhausted in 11.43 years

Note: Her last withdrawal, made in the 12th
year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_0 or V_B) of a 12%,
semiannual coupon bond, with a remaining term
of 8 years? You want an 8% return (yield).

Assume a par value of \$1,000

16	[N]
4	[I/YR]
60	[PMT]
1000	[FV]
[PV]	-1,233.05

You would be willing to pay up to \$1,233.05 for
the bond. At that price it would produce a 10%
return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following
annual cash flows. The project has a net cash
outlay of \$200,000 and an appropriate discount
rate of 10%. Calculate the NPV and IRR of the
project.

Year 1	\$40,000
Year 2	50,000
Year 3	60,000
Year 4	70,000
Year 5	80,000

Data Entry Information

Enter	display
200000 [+/-] [CFj]	C-FLOW
40000 [CFj]	1 then 40000
50000 [CFj]	2 then 50000
60000 [CFj]	3 then 60000
70000 [CFj]	4 then 70000
80000 [CFj]	5 then 80000

Note: The IRR and NPV below are the ones in
color (ie the bottom half of the CST and PRC
keys.

Enter	Display
[] [IRR/YR]	13.45
Then enter 10	[I/YR]
[] [NPV]	20,249.49

The internal rate of return on this cash flow is
13.45% and the net present value of the cash
flow is \$20,249.49.

MIRR and payback are not available on this
calculator

Simple Yield to Maturity

What is the yield to maturity on an 12% annual
bond with a current selling piece of \$1,116.68?
It matures 5 years from today

5	[N]
1116.68 [+/-]	[PV]
1000	[FV]
120	[PMT]
[I/YR]	9.00

The bonds yield is 9% per year.

Loan Amortization

Prepare an amortization schedule for a one year,
\$2,000 loan at 12% annual interest compounded
monthly.

Step 1: Calculate monthly payments:

Change input to annual basis (i.e. number of
payments = 12, interest rate = 1% per period)

12	[N]
1	[I/YR]
2000	[PV]
[PMT]	-177.70

Step 2: To see the distribution of the first
payment:

Enter	Display
1 [INPUT]	
Then; 1 [] [AMORT]	PER :1-1
=	PRINCIPAL = -157.70
=	INTEREST = -20.00
=	BALANCE = 1,842.30

Month one's payment of 177.70 was broken
down into \$157.70 in principal and \$20.00 in
interest with a balance of \$1,842.30.

To obtain the second month's information

Enter	Display
2 [INPUT]	
Then; 2 [] [AMORT]	PER :2-2
=	PRINCIPAL = -159.28
=	INTEREST = -18.42
=	BALANCE = 1683.03

Month two's payment of 177.70 was broken
down into \$159.28 in principal and \$18.42 in
interest with a balance of \$1,683.02.

Repeat steps for all individual months needed.

To obtain the cumulative first and second
month's information:

Enter	Display
1 [INPUT]	
Then; 2 [] [AMORT]	PER :1-2
=	PRINCIPAL = -316.97
=	INTEREST = -38.42
=	BALANCE = 1,683.03

During months one and two, \$316.97 went
towards principal and \$38.42 went to interest
with a balance of \$1683.02.

Appendix 3:

Primary Financial Instructions

Hp 12C

by: Mitenko, Decker and
Maisondieu Laforge

Housekeeping Functions

- Set Decimals Display for 2 places

[f] 2
-Clear Display [C]
-Store Memory [STO]
then numeric (9 storage places) key 1 thru 9
to store number at desired at that location.
-Recall Memory [RCL]
then numeric (9 storage places) key 1 thru 9
to retrieve stored number at that location.
-Clear Work [f] [CLEAR REG]

Note: [f] denotes the color key (orange)
[g] denotes the color key (blue)

Note: Always clear data before starting a new problem.

Future Value of a Present Amount

You have just deposited \$5,000 in to an account paying 8%, compounded annually. How much will be in the account at the end of ten years?

10	[N]
8	[I]
5000[CHS]	[PV]
[FV]	10,794.62

At the end of ten years you will have accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given a \$22,000 car loan. The loan is for 5 years at an interest rate of 6% annually, compounded monthly. What is your monthly payment?

Note: convert both months and interest to an annual basis. [i.e. 60 months (5 X 12) , 0.5% per month (6% ÷ 12)].

60	[N]
.5	[I]
22000	[PV]
[PMT]	-425.32

Your monthly payment is \$425.32.

Finding Unknown Interest

Exactly 10 years ago you bought a share of the Terrye Corp at \$25. You now wish to sell your investment at the current market price of \$75. What is your average annual rate of return on this investment?

10	[N]
25 [CHS]	[PV]
75	[FV]
[I]	11.61

You earned a 11.61 % compounded return.

Finding Number of Periods

You received your retirement of \$500,000 in a lump sum and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$65,000 a year beginning one year from today. How long will the account last until it is exhausted.

7	[I]
500000 [CHS]	[PV]
65000	[PMT]
[N]	11.43

The account will be exhausted in 11.43 years, but the calculator inaccurately shows 12.00 years.

Note: Her last withdrawal, made in the 12th year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_o or V_B) of a 12%, semiannual coupon bond, with a remaining term of 8 years? You want an 8% return (yield).

Assume a par value of \$1,000

16	[N]
4	[I]
60	[PMT]
1000	[FV]
[PV]	-1,233.05

You would be willing to pay up to \$1,233.05 for the bond. At that price it would produce a 10% return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following annual cash flows. The project has a net cash outlay of \$200,000 and an appropriate discount rate of 10%. Calculate the NPV and IRR of the project.

Year 1	\$40,000
Year 2	50,000
Year 3	60,000
Year 4	70,000
Year 5	80,000

Data Entry Information

Enter
200000 [CHS] [g] [CF₀]
40000 [g] [CF₁]
50000 [g] [CF₂]
60000 [g] [CF₃]
70000 [g] [CF₄]
80000 [g] [CF₅]

Enter Display

[f] [IRR] 13.45
Then enter 10 [I]
[f] [NPV] 20,249.49

The internal rate of return on this cash flow is 13.45% and the net present value of the cash flow is \$20,249.49.

MIRR and payback are not available on this calculator

Simple Yield to Maturity

What is the yield to maturity on an 12% annual bond with a current selling piece of \$1,116.68? It matures 5 years from today

5	[N]
1116.68 [CHS]	[PV]
120	[PMT]
1000	[FV]
[I]	9.00

The bonds yield is 9% per year.

Loan Amortization

Prepare an amortization schedule for a one year, \$2,000 loan at 12% annual interest compounded monthly.

Step 1: Calculate monthly payments:

Change input to annual basis (i.e. number of payments = 12, interest rate = 1% per period).

12	[N]
1	[I]
2000	[PV]
[PMT]	-177.70

Step 2: To see the distribution of the first payment:

Enter	Display
1 [f] [AMORT]	20.00
[x/y]	-157.70
[RCL][PV]	1,842.30

Month one's payment of 177.70 was broken down into \$20.00 in interest and 157.70 in principal with a balance of \$1,842.30. Note that no headers such as interest or principal are provided.

To obtain the second month's information

Enter	Display
1 [f] [AMORT]	18.42
[x/y]	159.28
[RCL] [PV]	1,683.03

Month two's payment of 177.70 was broken down into \$18.42 in interest and \$159.28 in principal with a balance of \$1,683.02.

To obtain the third month's information:

Enter	Display
1 [f] [AMORT]	16.83
[x/y]	160.87
[RCL] [PV]	1,522.16

Month three's payment of 177.70 was broken down into \$16.83 in interest and \$160.87 in principal with a balance of \$1,522.16

Repeat steps for all individual months needed.

Appendix 4:

Primary Financial Instructions

Hp 17bII+

by: Mitenko, Decker and
Maisondieu Laforge

Housekeeping Functions

The hp17bII+ is a menu driven calculator.

When the calculator is first turned on the display presents the following menu: FIN, BUS, SUM, TIME, SOLVE and CURRX.

The upward arrow keys [▲] below the screen enter the functional area that is above that arrow key on the screen.

Note: all the example problems below were solved by entering the FIN menu and then entering the TVM menu.

-Pressing the [EXIT] key will back the user out to the first screen.

-Set Decimals Display for 4 places [DSP]
Press [▲] "fix"

at prompt press 4, then [INPUT]

-Clear Display [CLR]

-Store Memory [STO]

then numeric (9 storage places) key 1 thru 9

to store number at desired at that location.

-Recall Memory [RCL]

then numeric (9 storage places) key 1 thru 9

to retrieve stored number at that location.

-Clear Work [CK] [CLR DATA]

-Clear Memory [STO] 0

then storage number (1-9) to be cleared.

Note: [CK] denotes the color key. (Yellow)

Note: Always clear data before starting a new problem.

Future Value of a Present Amount

You have just deposited \$5000 in to an account paying 8%, compounded annually. How much will be in the account at the end of ten years?

[▲] TVM then 10	[▲] N
8	[▲] I/YR
1,000	[▲] PV
[▲] FV	-10,794.62

At the end of ten years you will have accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given an \$22,000 car loan. The loan is for 5 years at an interest rate of 12% annually, compounded monthly. What is your monthly payment?

Note: convert both months and interest to an annual basis. [i.e. 60 months (5 X 12), 0.5% per month (6% ÷ 12)].

[▲] TVM then 60	[▲] N
.5	[▲] I/YR
22,000	[▲] PV
[▲] PMT	-425.32

Your monthly payment is \$425.32.

Finding Unknown Interest

Exactly 10 years ago you bought a share of the Terrye Corp at \$25. You now wish to sell your investment at the current market price of \$75. What is your average annual rate of return on this investment?

[▲] TVM then 10	[▲] N
25 [+/-]	[▲] PV
75	[▲] FV
[▲] I/YR	11.61

You earned an 11.43 % compounded return.

Finding Number of Periods

You received your retirement of \$500,000 in a lump sum and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$65,000 a year beginning one year from today. How long will the account last until it is exhausted.

[▲] TVM then	
7	[▲] I/Y
500000[+/-]	[▲] PV
65000	[▲] PMT
[▲] [N]	11.43

The account will be exhausted in 11.43 years

Note: Her last withdrawal, made in the 12th year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_0 or V_B) of a 12%, semiannual coupon bond, with a remaining term of 8 years? You want an 8% return (yield).

Assume a par value of \$1,000

[▲] TVM then 16	[▲] N
4	[▲] I/YR
60	[▲] PMT
1000	[▲] FV
[▲] PV	-1,233.05

You would be willing to pay up to \$1,233.05 for the bond. At that price it would produce a 10% return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following annual cash flows. The project has a net cash outlay of \$200,000 and an appropriate discount rate of 10%. Calculate the NPV and IRR of the project

Year 1	\$40,000
Year 2	50,000
Year 3	60,000
Year 4	70,000
Year 5	80,000

Data Entry Information

[▲] CFLO Display should say: FLOW(0)=?

If not then [CK] [CLR DATA], [▲] YES.

Also, [▲] #T twice so that # TIMES

PROMPTING: OFF

Display

FLOW(0)=?	200000 [+/-] [INPUT]
FLOW(1)=?	40000 [INPUT]
FLOW(2)=?	50000 [INPUT]
FLOW(3)=?	60000 [INPUT]
FLOW(4)=?	70000 [INPUT]
FLOW(5)=?	80000 [INPUT]
FLOW(6)=?	[EXIT]

Then enter [▲] CALC, 10 [▲] I%

Enter

[▲] IRR%	IRR% = 13.45
[▲] NPV	NPV = 20,249.49

The internal rate of return on this cash flow is 13.45% and the net present value of the cash flow is \$20,249.49. The MIRR and Payback are not available on this model.

Simple Yield to Maturity

What is the yield to maturity on a 12% bond with a current selling piece of \$1,116.68? It matures 5 years from today.

[▲] TVM then	
5	[▲] N
1116.68 [+/-]	[▲] PV
120	[▲] PMT
1000	[▲] FV
[▲] I%YR	9.00

The bonds yield is 9% per year.

Loan Amortization

Prepare an amortization schedule for a one year, \$2,000 loan at 12% annual interest compounded monthly.

Step 1; Calculate monthly payments:

[▲] TVM

Change input to annual basis (i.e. number of payments = 12, interest rate = 1% per period).

Enter

12 [▲] N	N = 12.00
1 [▲] I/YR	I%/YR = 1.00
2000 [▲] PV	PV = 2000.00
PMT [▲]	PMT = -177.70

OTHER [▲], AMRT [▲]

1 [▲] #P	#P = 1PMTS:1-1
INT [▲]	INTEREST = -20.00
PRIN [▲]	PRINCIPAL = 157.70
BAL [▲]	BALANCE = 1,842.30

This is the first year's information. To obtain the second year's information do [▲] NEXT, and reiterate the process.

Appendix 5:

Primary Financial Instructions Texas Instrument TI-83, 83 Plus and 84 Plus SE* by: Mitenko, Decker and Maisondieu Laforge

The TI-83, 83 Plus and 84 Plus Silver Edition* is a menu driven. Once the calculator is turned on, and the [APPS] key is pressed, the "APPLICATIONS" menu appears on the screen. Pressing [1] on the key pad will then take the user into the financial menu. The correct financial operation must then be chosen by pressing the numeric key pad 0-9 or the alpha keys A thru F to match the desired calculation on the screen. The screen is very easy to read, however the accompanying guidebook is not very helpful for financial problem solving.

Housekeeping Functions

-Set Decimals Display [Mode] Scroll down screen to "FLOAT", move the cursor to the number of decimals and press [ENTER].

Clear Display [CLEAR]

-Store Memory desired #, [STO], [ALPHA] A thru Z (desired location) [ENTER]

-Recall Memory [2ND] [RCL] A thru Z 9 (the location where the data is stored) [ENTER.]

-Clear Memory 0, [STO] [ALPHA] A thru Z (memory to clear) [ENTER]

Note: All the following problems examples are done using the "Finance" menu. Keep P/Y and C/Y =1

Future Value of a Present Amount

You have just deposited \$5,000 in to a bank account paying 8%, compounded annually. How much will be in the account at the end of ten years?

In "Finance" menu, press [1] ("Finance" Solver). Enter requested data pressing [ENTER] after each entry. For example:

Display	Entry
N	10 [↓]
I%	8 [↓]
PV	-5000 [↓]
PMT	0 [↓]
FV	blank

Place the cursor on the FV line and press:

Entry	Display
[ALPHA] [ENTER]	FV = -10,794.62

At the end of ten years you will have accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given a \$22,000 car loan. The loan is for 5 years at an interest rate of 6% compounded monthly. What is your monthly payment?

Note: convert both months and interest to an annual basis. [i.e. 60 months (5 X 12), 0.5% per month (6% ÷ 12)].

In the "Finance" menu, press [1] ("Finance" Solver). Enter requested data pressing [ENTER] after each entry. Enter data as follows:

Display	Entry
N	60 [ENTER]
I%	.5 [ENTER]
PV	22000 [ENTER]
PMT	blank
FV	0

Place the cursor on the "PMT" line and press: [ALPHA] [ENTER] PMT= -425.46
Your monthly payment is \$425.46.

Finding Unknown Interest

Exactly ten years ago you bought a share of the Terrye Corp. at \$25. You now wish to sell your investment at the current market price of \$75. What is your average annual rate of return on this investment?

In "Finance" menu, press [F2] (Compound Interest) Enter the data as follows:

Display	Entry
N	10 [↓]
I%	blank [↓]
PV	-25 [↓]
PMT	0 [↓]
FV	75 [↓]

Place the cursor on the "I%" line and press:

Entry	Display
[ALPHA] [ENTER]	I% = 11.61

The share earned an 11.61% return, compounded annually.

Finding Number of Periods

You received your retirement in a lump sum of \$500,000 and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$65,000 a year beginning at the end of this year. How long will the account last until it is exhausted.

In "Finance" menu, press [F2] (Compound Interest) Enter the data as requested on the screen. Place the cursor on the "N" line and press:

Entry	Display
[ALPHA] [ENTER]	N = 11.43

The account will be exhausted in 11.43 years
Note: The last withdrawal, made in the 12th (i.e. the .43) year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_0 or V_B) of a 12%, semiannual coupon bond, with a remaining term of 8 years? You want an 8% return (yield). Assume a par value of \$1,000.

In "Finance" menu, press [F2] (Compound Interest) Enter the data as follows:

Display	Entry
N	16 [↓]
I%	4 [↓]
PV	blank [↓]
PMT	60 [↓]
FV	1000 [↓]

Place the cursor on the "PMT" line and press:

Entry	Display
[ALPHA] [ENTER]	PV = -1233.05

You would be willing to pay up to \$1,233.05 to purchase this bond. At that price it would produce an 8% return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following annual cash flows. The project has a net cash outlay of \$200,000 and an appropriate discount rate of 10%. Calculate the NPV, IRR and MIRR of the project.

Year 1	\$40,000
Year 2	50,000
Year 3	60,000
Year 4	70,000
Year 5	80,000

Enter Information

In the "Finance" menu press 7 to enter the "npv" function. "npv" should show on the screen. The data entry function is defined as follows: npv (Rate, Initial Outlay, {Cash Flows} {Cash Flow Counts}). Enter data as follows: npv (10, -200000, {40000, 50000, 60000, 70000, 80000}). Then:

Entry	Display
[ENTER]	Below the entered data 20249.49

The NPV for this cash flow is \$20,249.49.

IRR is done in a similar fashion. The data entry function is defined as follows: irr (Initial Outlay, {Cash Flows} {Cash Flow Counts}). Enter data as follows: irr (-200000, {40000, 50000, 60000, 70000, 80000}). Then:

Entry	Display
[ENTER]	Below the entered data 13.45

The IRR for this cash flow is 13.45%

To do the MIRR the user has to obtain the PV and FV of the appropriate cash flows and use the "TVM Solver" function.

Loan Amortization

Prepare an amortization schedule for a one year, \$2,000 loan at 12% annual interest compounded monthly.

First, enter the loan data in the "finance" mode under "TMV-Solver", and solve for Pmt (\$177.69).

To get the first month's amortization numbers.

Note: each function is in the apps/finance menu

Choose	Enter	Display
∑Int (X,X)	1,1)[enter]	20
∑Prn (X,X)	1,1)[enter]	157.70
bal (X)	1) [enter]	1842.30

To get the second month's amortization:

Choose	Enter	Display
∑Int (X,X)	2,2)[enter]	18.42
∑Prn (X,X)	2,2)[enter]	159.28
bal (X)	2) [enter]	1683.02

To get the first and second month's cumulative amortization results

Choose	Enter	Display
∑Int (X,X)	1,2)[enter]	38.42
∑Prn (X,X)	1,2)[enter]	316.97
bal (X)	2) [enter]	1683.02

Appendix 6:

Primary Financial Instructions Texas Instruments BA II Plus Professional by: Mitenko, Decker and Maison Dieu Laforge

Housekeeping Functions

- **Set Decimals Display** [2nd] [FORMAT]
for 2 places 2 [ENTER]
- **Clear Display** [C/CE]
- **Store Memory** [STO]
then numeric (9 storage places) key 1 thru 9
- **Recall Memory** [RCL]
then numeric (9 storage places) key 1 thru 9
- **Clear Work** [2nd] [RESET]
(Reset Defaults) [ENTER]
- **Clear Memory** [2nd] [MEM]
[2nd] [CLR WORK]
- **Set Period Frequency to 1** [2nd] [P/Y]
1 [ENTER]

Note: All calculations are performed with P/Y set to 1.

Note: Clear work or memory before each calculation!

Future Value of a Present Amount

You have just deposited \$5,000 in to a bank account paying 8%, compounded annually. How much will be in the account at the end of ten years?

10 [N]
8 [I/Y]
5000 [+/-] [PV]
[CPT] [FV] 10,794.6

At the end of ten years you will have accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given a \$22,000 car loan. The loan is for 5 years at an interest rate of 6% compounded monthly. What is your monthly payment?

Note: convert both months and interest to an monthly basis. [i.e. 60 months (5 X 12), 0.5% per month (6% ÷ 12)].

60 [N]
.5 [I/Y]
22000 [PV]
[CPT] [PMT] -425.32

Your monthly payment is \$425.32.

Finding Unknown Interest

Exactly ten years ago you bought a share of the Terrye Corp. at \$25. You now wish to sell your investment at the current market price of \$75. What is your average annual rate of return on this investment?

10 [N]
25 [+/-] [PV]
75 [FV]
[CPT] [I/Y] 11.61

You earned an 11.61% compounded return.

Finding Number of Periods

You received your retirement in a lump sum of \$500,000 and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$65,000 a year beginning at the end of this year. How long will the account last until it is exhausted.

7 [I/Y]
500000 [PV]
65000 [+/-] [PMT]
[CPT] [N] 11.43

The account will be exhausted in 11.43 years
Note: The last withdrawal, made in the 12th year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_0 or V_B) of a 12%, semiannual coupon bond, with a remaining term of 8 years? You want an 8% return (yield). Assume a par value of \$1,000.

16 [N]
4 [I]
60.00 [PMT]
1000 [FV]
[CPT] [PV] -1,233.05

You would be willing to pay up to \$1,233.05 to purchase this bond. At that price it would produce an 8% return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following annual cash flows. The project has a net cash outlay of \$200,000 and an appropriate discount rate of 10%. Calculate the NPV, IRR, MIRR AND PBP of the project.

Year 1 \$40,000
Year 2 50,000
Year 3 60,000
Year 4 70,000
Year 5 80,000

Enter Information

[ENTER] noted as [E] must be pushed after each entry!

Enter	Display	Enter
[CF]	CF ₀	200000 [+/-][E]
Press [↓]	CO1	40000[E]
Press [↓][↓]	CO2	50000[E]
Press [↓][↓]	CO3	60000[E]
Press [↓][↓]	CO4	70000[E]
Press [↓][↓]	CO5	80000[E]
[NPV]	I =	10 [E]

To Compute NPV, IRR, MIRR* and PBP*

Key Stroke	Display
[↓][CPT]	NPV = 20,249.49
[↓][↓][PBP]	PB = 3.71
[IRR][CPT]	IRR = 13.45
[↓] 10 [ENTER]	(when RI is displayed)
[↓] (MOD is MIRR) MOD =	12.14

Note: *Available only on BA II Plus Pro calculators only.)

Simple Yield to Maturity

What is the annual yield to maturity on a 12% bond with a current selling price of \$1,116.68? It matures 5 years from today.

5 [N]
1116.68 [+/-] [PV]
120 [PMT]
1000 [FV]
[CPT] [I/Y] 9.00

The yield on the bond is 9% when priced at \$1,116.68.

Loan Amortization

Prepare an amortization schedule for a one year, \$2,000 loan at 12% annual interest compounded monthly.

Step 1; [2nd] [P/Y] 1 [ENTER]

Step 2; Calculate monthly payments:

12 [N]
1 [I]
2000 [+/-] [PV]
[CPT] [PMT] -177.70

Step 3; Calculate amortization tables:

1) Then the [2 ND] key and the [AMORT] key. (This gets you in amortization mode).
2) Then the [2 ND] key and the [CLR WORK] key. (This clears the memory so it can perform amortization).

Step 4; Calculate amortization for month one:

Enter	Display
[↓]	P1 = 1
[↓]	P2 = 1
[↓]	BAL = 1842.30
[↓]	PRN = 157.70
[↓]	INT = 20.00

Month one's payment of 177.70 was broken down into \$157.70 in principal and \$20.00 in interest with a balance of \$1,842.30.

Step 5; Set for second payment:

[↓] @P1 [2] [ENTER]
[↓] @P2 [2] [ENTER]
[↓] BAL = 1683.02
[↓] PRN = 159.28
[↓] INT = 18.42

Month two's payment of 177.70 was broken down into \$159.28 in principal and \$18.42 in interest with a balance of \$1,683.02.

Repeat steps for all the payments needed.

To obtain the cumulative first and second month's information:

[↓] @P1 [1] [ENTER]
[↓] @P2 [2] [ENTER]
[↓] BAL = 1683.02
[↓] PRN = 316.97
[↓] INT = 38.42

During months one and two, \$316.97 went towards principal and \$38.42 went to interest with a balance of \$1,683.02.

Appendix 7:

Primary Financial Instructions

CASIO

fx-9750G PLUS

by: Mitenko, Decker and
Maison Dieu Laforge

The Casio fx 9750G PLUS is a menu driven. When the calculator is turned on, the "Main Menu" appears on the screen. By using the keypad cursor, the selector can be moved to the TVM icon. When the selector has been placed on TVM, the financial menu can be entered by pressing the execute button [EXE]. The correct financial operation must then be chosen by pressing the F 1 thru 6 buttons below the screen.

Housekeeping Functions

-Set Decimals Display [SHIFT] [SETUP]

Scroll down screen to "Display [F1], then press "F" key, number above is decimal places.

-Clear Display [SHIFT] [EXIT]

-Store Memory value (i.e. #), [▶][ALPHA] A thru Z (desired location) [EXE]

-Recall Memory [ALPHA] A thru Z [EXE]

-Clear Memory 0, [▶][ALPHA]

A thru Z (memory to clear) [EXE]

-Set Payments [2nd] [CLR TMV] [2nd] [P/Y]

-Set Period Frequency to 1 [2nd] [P/Y] [↓] 1 [ENTER]

Note: All the following problems examples are done in the TVM menu with P/Y set to 1.

Future Value of a Present Amount

You have just deposited \$5,000 in to a bank account paying 8%, compounded annually. How much will be in the account at the end of ten years?

In TVM menu, press [F2] (Compound Interest) Enter requested data pressing [EXE] after each entry. For example:

Entry	Display
10 [EXE]	N=10

Make sure to enter P/Y (payment periods) as 1. Once all the information is entered chose the desired "F" button, in this case F5.

Entry	Display
[F5]	FV = -10,794.62

At the end of ten years you will have accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given a \$22,000 car loan. The loan is for 5 years at an interest rate of 6% compounded monthly. What is your monthly payment?

Note: convert both months and interest to an annual basis. [i.e. 60 months (5 X 12), 0.5% per month (6% ÷ 12)].

In TVM menu, press [F4] (Amortization). Enter requested data pressing [EXE] after each entry. Enter data as follows:

Entry	Display
60 [EXE]	n = 60.00
.5 [EXE]	I% = 0.50

22000 [EXE] PV = 22000

1 [EXE] P/Y = 1

12 [EXE] C/Y = 12

Note: All other inputs set to 0.

Press button [F4] that corresponds with "PMT" on the bottom of the screen: PMT= -425.46
Your monthly payment is \$425.46.

Finding Unknown Interest

Exactly ten years ago you bought a share of the Terrye Corp. at \$25. You now wish to sell your investment at the current market price of \$75. What is your average annual rate of return on this investment?

In TVM menu, press [F2] (Compound Interest) Enter the data as follows:

Entry	Display
10 [EXE]	N=10
25 [EXE]	PV = -25
75 [EXE]	FV = 75
1 [EXE]	P/Y = 1
1 [EXE]	C/Y = 1

Press button [F2] that corresponds with "I%" on the bottom of the screen: I% = 11.61
You earned an 11.61% compounded return.

10 [EXE]	I% = 10
1 [EXE]	Csh=List 1

Finding Number of Periods

You received your retirement in a lump sum of \$500,000 and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$65,000 a year beginning at the end of this year. How long will the account last until it is exhausted.

In TVM menu, press [F2] (Compound Interest) Enter the data as follows:

Entry	Display
7 [EXE]	I% = 7
500000 [EXE]	PV = 500000
-65000	PMT = -65000
1 [EXE]	P/Y = 1
1 [EXE]	C/Y = 1

Press button [F1] that corresponds with "n" on the bottom of the screen: n = 11.43

The account will be exhausted in 11.43 years
Note: The last withdrawal, made in the 12th (i.e. the .43) year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_0 or V_B) of a 12%, semiannual coupon bond, with a remaining term of 8 years? You want an 8% return (yield). Assume a par value of \$1,000.

In TVM menu, press [F2] (Compound Interest) Enter the data as follows:

Entry	Display
16 [EXE]	n = 16
4 [EXE]	I% = 4
1000 [EXE]	FV = 1000
60 [EXE]	PMT = 60
1 [EXE]	P/Y = 1
1 [EXE]	C/Y = 1

Press button [F3] that corresponds with "PV" on the bottom of the screen.

PV = -1233.05

You would be willing to pay up to \$1,233.05 to purchase this bond. At that price it would produce an 8% return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following annual cash flows. The project has a net cash outlay of \$200,000 and an appropriate discount rate of 10%. Calculate the NPV, IRR AND PBP of the project.

Year 1	\$40,000
Year 2	50,000
Year 3	60,000
Year 4	70,000
Year 5	80,000

Enter Information

In the Main Menu select the **List** icon and press the [EXE]. Under list 1 enter the cash flows. Entry "1" on the screen list is for the cash flow in year 0. Make sure that the cash flows have the correct signs. **Note: make sure to press enter after keying in each cash flow.** Once the data has been entered press [MENU] and select the TVM icon and press [EXE]. Press [F3] (Cash Flow) to enter the cash flow inputs. Enter the data as follows:

10 [EXE]	I% = 10
1 [EXE]	Csh=List 1

Press the buttons [F1], [F2], [F3] or [F4] that corresponds with the information on the bottom of the screen that is desired.

[F1]	NPV = 20,249.49
[F1] [F2]	IRR = 13.45
[F1] [F3]	PBP = 5.00*

This calculator gives the wrong answer for Pay Back Periods!

Loan Amortization

Prepare an amortization schedule for a one year, \$2,000 loan at 12% annual interest compounded monthly.

Press [F4] to get "amortization" function. Enter the requested data. Remember to convert the annual payments and interest rate into a monthly form (i.e. n = 12 and I% = 1). PMT and FV should be entered as 0.

Then press [F4] for the monthly payment.

[F4]	-177.70
------	---------

Then press [F6] to get the monthly amortization schedule. On the "Amortization: End" screen enter:

1 [EXE]	PM1 = 1.00
12 [EXE]	PM2 = 12.00

Note: all the rest of the inputs should have carried over from the previous screen. Press the buttons [F2] and [F3] that corresponds with the information desired.

[F2]	Interest = -20.00
[F1] [F3]	PRN = -157.70

This is the break down for the interest and principal from the first payment. To do the second payment, press [F1] and enter 2 and enter [EXE] in PM1 so that PM1 = 2. Then enter [F2] and [F3] to get the interest and principal breakdown from the second payment. Repeat the sequence for the remaining principal and interest break down.

Appendix 8:

Primary Financial Instructions LeWorld Financial Calculator by: Mitenko, Decker and Maisondieu Laforge

Housekeeping Functions

- **Set Decimals Display** [2nd] [FORMAT]
for 4 places 4 [ENTER]

- **Clear Display** [C/CE]

- **Store Memory - Display value** [STO]
then numeric (9 storage places) key 1 thru 9

- **Recall Memory** [RCL]
then numeric (9 storage places) key 1 thru 9

- **Clear Work** [2nd] [RST]
(Reset Defaults) [ENTER]

- **Clear Memory** [2nd] [MEM]

- **Set Payments** [2nd] [CLR TMV]
[2nd] [P/Y]

- **Set Period Frequency to 1** [2nd] [P/Y]
1 [ENTER] [2nd] [SET]

Then: enter [C/CE] once to resume

Note: Do a reset [2nd] [RST] [ENTER] and set P/Y = 1 (see above) before each problem!

Note: All examples are done with period frequency set to 1 (see above).

Future Value of a Present Amount

You have just deposited \$5,000 in to a bank account paying 8%, compounded annually. How much will be in the account at the end of ten years?

10	[N]
8	[I/Y]
5000	[PV]
[CPT] [FV]	-10,794.6

At the end of ten years you will have accumulated \$10,794.62 in your account.

Present Value of an Annuity

You have been given a \$22,000 car loan. The loan is for 5 years at an interest rate of 6% compounded monthly. What is your monthly payment?

Note: convert both months and interest to an annual basis. [i.e. 60 months (5 X 12), 0.5% per month (6% ÷ 12)].

60	[N]
.5	[I/Y]
22000	[PV]
[CPT] [PMT]	-425.32

Your monthly payment is \$425.32.

Finding Unknown Interest

Exactly ten years ago you bought a share of the Terrye Corp. at \$25. You now wish to sell your investment at the current market price of \$75. What is your average annual rate of return on this investment?

10	[N]
25 [+/-]	[PV]
75	[FV]
[CPT] [I/Y]	11.61

You earned an 11.61% compounded return.

Finding Number of Periods

You received your retirement in a lump sum of \$500,000 and invest it in an account which guarantees a 7% annual rate of return. You wish to make withdrawals of \$65,000 a year beginning at the end of this year. How long will the account last until it is exhausted.

7	[I/Y]
500000	[PV]
65000 [+/-]	[PMT]
[CPT] [N]	11.43

The account will be exhausted in 11.43 years
Note: The last withdrawal, made in the 12th year, will be smaller than \$65,000.

Bond Pricing, Semi-annual Payments

What is the price (P_0 or V_B) of a 12%, semiannual coupon bond, with a remaining term of 8 years? You want an 8% return (yield). Assume a par value of \$1,000.

16	[N]
4	[I]
60.00	[PMT]
1000	[FV]
[CPT] [PV]	-1,233.05

You would be willing to pay up to \$1,233.05 to purchase this bond. At that price it would produce an 8% return (yield) for you.

Cash Flow Analysis

An investment project guarantees the following annual cash flows. The project has a net cash outlay of \$200,000 and an appropriate discount rate of 10%. Calculate the NPV and IRR of the project.

Year 1	\$40,000
Year 2	50,000
Year 3	60,000
Year 4	70,000
Year 5	80,000

Enter Information

[ENTER] must be pushed after each entry!

Press [CF] to Enter Cash flow mode

Move down choices **Enter**
-200,000[+/-][ENTER]

Press [↓] to CO1 40,000[ENTER]
Press [↓][↓] to CO2 50,000[ENTER]
Press [↓][↓] to CO3 60,000[ENTER]
Press [↓][↓] to CO4 70,000[ENTER]
Press [↓][↓] to CO5 80,000[ENTER]
Press [NPV]
[C/CE] to exit data entry section

To Compute NPV and IRR;

Key Stroke	Display
[NPV]10[ENTER] I	= 10.00
[↓] [CPT]	NPV = 20,249.49
[IRR] [CPT]	IRR = 13.45

Note: This model does not compute the payback, or the MIRR.

Simple Yield to Maturity

What is the annual yield to maturity on a 12% bond with a current selling price of \$1,116.68? It matures 5 years from today.

5	[N]
1116.68 [+/-]	[PV]
120	[PMT]
1000	[FV]
[CPT] [I/Y]	9.00

The yield on the bond is 9% when priced at \$1,116.68.

Loan Amortization

Prepare an amortization schedule for a one year, \$2,000 loan at 12% annual interest compounded monthly.

Step 1; [2nd] [P/Y] 1 [ENTER]

Step 2; Calculate monthly payments:

12	[N]
1	[I]
2000	[PV]
[CPT] [PMT]	-177.70

Step 3; Calculate amortization tables:

1) Then the [2nd] key and the [AMORT] key. (This gets you in amortization mode).

2) Then press [↓] twice to get passed P1 = 1 and P2 = 1

Step 4; Display amortization for year one:

Enter	Display
[↓]	BAL = 1842.30
[↓]	PRN = 157.70
[↓]	INT = 20.00

Month one's payment of 177.70 was broken down into \$157.70 in principal and \$20.00 in interest with a balance of \$1,842.30.

Step 5; Set for second payment:

[2 nd][AMORT]]	
[↓] @P1	[2] [ENTER]
[↓] @P2	[2] [ENTER]

Then display amortization for month two;

[↓]	BAL = 1683.02
[↓]	PRN = 159.28
[↓]	INT = 18.42

Month two's payment of 177.70 was broken down into \$159.28 in principal and \$18.42 in interest with a balance of \$1,683.02.

Repeat steps for all the payments needed.

To obtain the cumulative first and second month's information:

[2 nd][AMORT]]	
[↓] @P1	[1] [ENTER]
[↓] @P2	[2] [ENTER]
[↓]	BAL = 1683.02
[↓]	PRN = 316.97
[↓]	INT = 38.42

During months one and two, \$316.97 went towards principal and \$38.42 went to interest with a balance of \$1,683.02.

Appendix 9:

Calculating Beta

by: Mitenko, Decker and
Maisondieu Laforge

Sample Data for Beta Calculation:

Note: Stable calculations require more than 20 data points.

<u>S&P returns</u>	<u>Stock Returns</u>
2%	1%
1%	4%
-2%	-3%
0%	1%

The results of the regression show an intercept of .428, a beta of 1.28 and a correlation of .76.

Ativa AT 10 AT-10 does not calculate beta

Casio fx-9750G Plus

Enter Data:

Choose {list} [EXECUTE]

Use arrows to enter the data as follows:

<u>L1</u>	<u>L2</u>
2%	1%
1%	4%
-2%	-3%
0%	1%

To calculate Intercept and Beta

At the main menu Choose {stat} [EXECUTE]

Press [F2] for calc

Press [F3] for regression $y=ax+b$

Press [F1] for x

Output:

a= 1.28

b= .428

r=.76

note: a is the beta, and b is the intercept. This is the opposite from all other calculators tested.

Hp 10 bII+financial calculator

Clear statistical registry [or] [clΣ]

Entering Variable data

<u>Enter</u>	<u>Display</u>
2 [input] 1 [Σ+]	1
1[input] 4 [Σ+]	2
2[+/-] [input] 3[+/-] [Σ+]	3
0 [input] 1 [Σ+]	4

To calculate Y intercept and Beta

<u>Desired Stat</u>	<u>Enter</u>	<u>Display</u>
Y intercept	0[or][y,m]	.428
Beta	[or][swap]	1.28
Correlation	[or][,r][or][swap]	.76

HP 12c

Entering Variable

Note: the Y data must be entered first.

<u>Data</u>	<u>Enter</u>	<u>f[.]</u>
1[ENTER]	2[. +]	
4[ENTER]	1[. +]	
3[chs][1[ENTER]	2[. +]	
1[ENTER]	0[. +]	

HP 12c continued

To calculate beta

Enter :0 [g][y^,r] (calculates y intercept)

[STO]0 (stores it for beta calculation)

0[g][x^,r]

[RCL]0[CHS][xy][÷]

HP 17 BII+

Enter List one under name x

<u>Enter</u>	<u>Display</u>
[sum] [insr]	
[clr data]	
2[input]	Item [1]
1[input]	Item [2]
-2[input] Item [3]	
0[input]	Item [4]
[exit][name]	
x[input]	Type a Name;

Enter List two under name y

<u>Enter</u>	<u>Display</u>
[get][*new]	
1[input]	Item [1]
4[input]	Item [2]
-3[input] Item [3]	
1[input]	Item [4]
[exit][name]	
y[input]	Type a Name;

Compute Beta and statistics

[calc][more][frst]	
[X]	Select x list
[Y]	Select y list
[m]	1.2778
[b]	.429

LeWorld Business Calculator

Entering Variable Data

<u>Enter</u>	<u>[2nd]</u>	<u>[data]</u>
	<u>Display</u>	<u>Enter</u>
X01	2[ENTER][↓]	
Y01	1[ENTER][↓]	
X02	1[ENTER][↓]	
Y02	4[ENTER][↓]	
X03	2[+/-][ENTER][↓]	
Y03	3[+/-][ENTER][↓]	
X04	0[ENTER][↓]	
Y04	1[ENTER][↓]	

To view statistical results

[2nd] [STAT]

Press [↓] repeatedly to see results

<u>Desired Stat</u>	<u>Display</u>
Y intercept	a = .428
Beta	b = 1.28
Correlation	r = .764

TI BAI Plus Professional

Entering Variable Data

<u>Enter</u>	<u>[2nd]</u>	<u>[data]</u>
	<u>Display</u>	<u>Enter</u>
X01	2[ENTER][↓]	
Y01	1[ENTER][↓]	
X02	1[ENTER][↓]	
Y02	4[ENTER][↓]	
X03	2[+/-][ENTER][↓]	
Y03	3[+/-][ENTER][↓]	
X04	0[ENTER][↓]	
Y04	1[ENTER][↓]	

To view statistical results

[2nd] [STAT]

Press [↓] repeatedly to see results

<u>Desired Stat</u>	<u>Display</u>
Y intercept	a = .428
Beta	b = 1.28
Correlation	r = .764

TI 83, TI 83+ and 84+ SE

Entering Variable Data

Data entry for statistics [STATS][EDIT]

Display shows L1, L2, L3 columns

Use arrows to enter the data as follows:

<u>L1</u>	<u>L2</u>
2%	1%
1%	4%
-2%	-3%
0%	1%

To Calculate Intercept and Beta

[STATS][CALC]

Scroll down to LinReg(a+bx)

Input:

[Enter] to select regression
[2nd][L1] , [2nd][L2][ENTER]

Display:

a = 1.429

b = 1.28