

**Keystrokes**

Hewlett-Packard HP-12C calculator keystroke sequences and solutions for problems 1 through 21:

**Problem 1**

	<i>Keystrokes</i>			<i>Display</i>
1.	2,000	CHS	PV	-2,000.00
2.	20	n		20.00
3.	6	i		6.00
4.		FV		\$6,414.27

**Problem 2**

	<i>Keystrokes</i>			<i>Display</i>
1.	5,000	FV		5,000.00
2.	10	n		10.00
3.	4	i		4.00
4.		PV		-\$3,377.82

**Problem 3**

	<i>Keystrokes</i>			<i>Display</i>
1.	8	i		8.00
2.	1	CHS	PV	1.00
3.	2	FV		2.00
4.		n		10.00 years

Due to a rounding error, the calculator solution to problem three is ten years. The precise answer is somewhere between nine and ten years; however, the calculator is programmed to round the periods up since interest would not be credited until the end of each compounding period.

**Problem 4**

	<i>Keystrokes</i>			<i>Display</i>
1.	1,000	CHS	PV	-1,000.00
2.	7	ENTER		7.00
3.	2	÷	i	3.50
4.	4	ENTER		4.00
5.	2	x	n	8.00
6.		FV		1,316.81
7.		STO	1	1,316.81
8.	0	FV		0.00
9.	4	n		4.00
10.	7	i		7.00
11.		FV		1,310.80
12.		RCL	1	- \$6.01

**Problem 5**

	<i>Keystrokes</i>			<i>Display</i>
1.	250,000	FV		250,000.00
2.	4	n		4.00
3.	12	i		12.00
4.		PV		-\$158,879.00

**Problem 6**

	<i>Keystrokes</i>			<i>Display</i>
1.	30	CHS	PV	30.00
2.	70	FV		70.00
3.	15	n		15.00
4.		i		5.81%

**Problem 7**

	<i>Keystrokes</i>		<i>Display</i>
1.	700	PMT	700.00
2.	9	n	9.00
3.	10	i	10.00
4.		PV	-\$4,031.32

**Problem 8**

	<i>Keystrokes</i>		<i>Display</i>
1.	9.5	g i	0.79
2.	20	g n	240.00
3.	40,000	PV	40,000.00
4.		PMT	-\$372.85

**Problem 9**

	<i>Keystrokes</i>		<i>Display</i>
1.	60	PMT	60.00
2.	10	n	10.00
3.	9	i	9.00
4.		PV	-385.06
5.		STO 1	-385.06
6.	0	PMT	0.00
7.	1,000	FV	1,000.00
8.		PV	-422.41
9.		RCL 1 +	-\$807.47

**Problem 10**

	<i>Keystrokes</i>		<i>Display</i>
1.	10	g i	0.83
2.	30	g n	360.00
3.	50,000	CHS PV	-50,000.00
4.		PMT	-\$438.79

**Problem 11**

	<i>Keystrokes</i>		<i>Display</i>	
1.	10	g	i	0.83
2.	30	g	n	360.00
3.	50,000	CHS	PV	-50,000.00
4.		PMT		438.79
5.	5	g	n	60.00
6.		FV		48,287.16
7.		STO	1	48,287.16
8.	0	FV		0.00
9.	25	g	n	300.00
10.	8.75	g	i	0.73
11.		PV		-53,370.94
12.		RCL	1 +	-\$5,083.78

**Problem 12**

	<i>Keystrokes</i>		<i>Display</i>	
1.	50,000	CHS	PV	-50,000.00
2.	7	g	i	0.58
3.	30	g	n	360.00
4.		PMT		332.65
5.		RCL	PV	-50,000.00
6.	4	%	-	-48,000.00
7.		PV		-48,000.00
8.		i		0.62
9.		g	n	7.41 %

**Problem 13**

	<i>Keystrokes</i>			<i>Display</i>
1.	50,000	PV		50,000.00
2.	7	g	i	0.58
3.	30	g	n	360.00
4.		PMT		-332.65
5.	5	g	n	60.00
6.		FV		-47,065.79
7.		CHS	STO 1	47,065.79
8.	0	FV		0.00
9.	30	g	n	360.00
10.	48,000	PV		48,000.00
11.		i		0.62
12.	5	g	n	60.00
13.		FV		-45,375.34
14.		RCL	1 PV	47,065.79
15.		i		0.66
16.		g	n	7.89 %

**Problem 14**

	<i>Keystrokes</i>			<i>Display</i>
1.	50,000	CHS	PV	-50,000.00
2.	30	g	n	360.00
3.	10	g	i	0.83
4.		PMT		438.79
5.	5	g	n	60.00
6.		FV		48,287.16
7.	0.5	x		24,143.58
8.	0.1	x		2,414.36
9.		RCL	FV +	50,701.52
10.		FV		50,701.52
11.		i		0.90
12.		g	n	10.74 %

**Problem 15**

	<i>Keystrokes</i>		<i>Display</i>	
1.	30,000	CHS	PV	-30,000.00
2.	5	g	i	0.42
3.	20	g	n	240.00
4.		PMT		197.99
5.		STO	1	197.99
6.	15	g	n	180.00
7.		FV		10,491.46
8.	1,000	+		11,491.46
9.		CHS	PV	-11,491.46
10.	0	FV		0.00
11.	8	g	i	0.67
12.	5	g	n	60.00
13.		PMT		233.01
14.		RCL	1 -	35.00
		<i>(to amortize the incremental \$1,000 loaned)</i>		
15.		PMT		35.02
16.	1,000	CHS	PV	-1,000.00
17.		i		2.86
18.		g	n	34.26 % <i>(yield on incremental \$1,000 loaned)</i>

**Problem 16**

	<i>Keystrokes</i>		<i>Display</i>	
1.	22,000	CHS PV		-22,000.00
2.	6	g i		0.50
3.	10	g n		120.00
4.		PMT		244.25
5.	9	g i		0.75
6.		PV		-19,281.12
7.		STO 1		-19,281.12
8.	22,000	+		2,718.88
				<i>(present value loss from selling price)</i>
9.	20,000	ENTER		20,000.00
10.		RCL 1 +		\$718.88
				<i>(loss from book value)</i>

You can also use the following approach to calculate the loss per monthly payment and the present value loss:

	<i>Keystrokes</i>		<i>Display</i>	
1.	22,000	CHS PV		-22,000.00
2.	10	g n		120.00
3.	9	g i		0.75
4.		PMT		278.69
5.		STO 1		278.69
6.	6	g i		0.50
7.		PMT		244.25
8.		RCL 1 -		-34.44
				<i>(loss per monthly payment.)</i>
9.		PMT		-34.44
10.	9	g i		0.75
11.		PV		\$2,718.88
				<i>(present value loss)</i>

**Problem 17**

	<i>Keystrokes</i>			<i>Display</i>
1.	22,000	CHS	PV	-22,000.00
2.	10	g	n	120.00
3.	6	g	i	0.50
4.		PMT		244.25
5.	4	g	n	48.00
6.		FV		14,737.63
7.		CHS	PV	-14,737.63
8.	0	FV		0.00
9.	8	g	i	0.67
10.	6	g	n	72.00
11.		PMT		\$258.40

The institution should receive monthly payments of \$244.25 for four years and \$258.40 for six years. The monthly financing concession amounts to \$34.44 for four years (\$278.69 - \$244.25) and \$20.29 for six years (\$278.69 - \$258.40). To discount the payments received at a sub-market rate:

	<i>Keystrokes</i>			<i>Display</i>
1.	4.44	PMT		34.44
2.	4	g	n	48.00
3.	9	g	i	0.75
4.		PV		-1,383.96
5.		STO	1	-1,383.96
6.	20.29	PMT		20.29
7.	6	g	n	72.00
8.		PV		-1,125.63
		<i>(present value at beginning of year 5)</i>		
9.		CHS	FV	1,125.63
10.	0	PMT		0.00
11.	4	g	n	48.00
12.		PV		-786.38
13.		RCL	1 +	-\$2,170.34



**Problem 18****Step 1 - Discount Cash Inflows:**

	<i>Keystrokes</i>		<i>Display</i>	
1.	10,000,000	FV		10,000,000.00
2.	10	g	i	0.83
3.	3	g	n	36.00
4.		PV		-7,417,397.04
5.		STO	9	-\$7,417,397.04

**Step 2 - Discount Cash Outflows (using the cash flow function):**

	<i>Keystrokes</i>		<i>Display</i>	
6.	f	FIN		
		<i>(to clear the Financial registers.)</i>		
7.	45,000	g	CFj	45,000.00
8.	12	g	Nj	12.00
9.	30,000	g	CFj	30,000.00
10.	12	g	Nj	12.00
11.	16,000	g	CFj	16,000.00
12.	12	g	Nj	12.00
13.	10	g	i	0.83
14.	f	NPV		\$969,869.36

**Step 3 - Determine Net Present Value of the property:**

	<i>Keystrokes</i>		<i>Display</i>	
15.	RCL	9 +		-\$6,447,527.67
				<i>(Net Present Value)</i>

**Step 4 - Compare Net Present Value of property to outstanding balance of the loan:**

	<i>Keystrokes</i>		<i>Display</i>	
16.	7,000,000	+		\$552,472.33
				<i>(valuation allowance should be established)</i>

**Problem 19**

Step 1 - Determine cash flows:

The cash flows as previously determined in this section are \$27,500/month in year one, \$51,000/month in year two, and a capitalized cash flow of \$6,175,000 after year two.

Step 2 - Discount cash flows:

	<i>Keystrokes</i>		<i>Display</i>	
1.	27,500	g	CFj	27,500.00
2.	12	g	Nj	12.00
3.	51,000	g	CFj	51,000.00
4.	11	g	Nj	11.00
5.	6,175,000	ENTER		6,175,000.00
6.	51,000	+		6,226,000.00
7.		g	CFj	6,226,000.00
8.	10	g	i	0.83
9.		f	NPV	\$5,897,766.58

*(Present Value)*

Step 3 - Compare Book Value to the Present Value:

	<i>Keystrokes</i>		<i>Display</i>	
10.	6,750,000	-		-\$852,233.42

*(valuation allowance should be established)*

**Problem 20**

Step 1 - Determine the cash flows:

	<i>Keystrokes</i>			<i>Display</i>
1.	1,000,000	PV		1,000,000.00
2.	25	g	n	300.00
3.	7.5	g	i	0.63
4.		PMT		-\$7,389.91

Pay-off balance after 10 years:

5.	10	g	n	120.00
6.		FV		-797,175.11
7.		STO	1	-\$797,175.11

Step 2 - Discount the cash flows at the current market rate:

	<i>Keystrokes</i>			<i>Display</i>
8.	0	FV		0.00
9.	9	g	i	0.75
10.		PV		583,372.14
11.		STO	2	583,372.14
12.		RCL	1 FV	-797,175.11
13.	0	PMT		0.00
14.		PV		325,197.47
15.		RCL	2 +	\$908,569.61

*(market value of loan portfolio)*

**Problem 21****Before-Taxes:**

	<i>Keystrokes</i>		<i>Display</i>
1.	1,000,000	PV	1,000,000.00
2.	117,454	CHS PMT	117,454.00
3.	20	n	20.00
4.		i	10.00%

**After-Taxes:**

	<i>Keystrokes</i>		<i>Display</i>	
1.	117,454	ENTER	117,454.00	
2.	40,000	–	77,454.00	
3.	0.25	x	19,363.50	
4.	117,454	–	-98,090.50	
5.		PMT	-98,090.50	
6.	1,000,000	PV	1,000,000.00	
7.	20	n	20.00	
8.		i	7.50 %	<i>(after-tax cost of leasing)</i>

**Sale/Partial Leaseback After-Taxes:**

	<i>Keystrokes</i>		<i>Display</i>	
1.	27,454	ENTER	27,454.00	
2.	90,000	+	117,454.00	
3.		STO 1	117,454.00	
4.	27,454	ENTER	27,454.00	
5.	40,000	–	-12,546.00	
6.	90,000	+	77,454.00	
7.	0.25	x	19,363.50	
8.		RCL 1 –	-98,090.50	
9.		PMT	-98,090.50	
10.	1,000,000	PV	1,000,000.00	
11.	20	n	20.00	
12.		i	7.50 %	<i>(after-tax cost of sale-partial leaseback)</i>