Finance for real estate and construction:

This class teaches how to put together a proper financial package, Pro-forma balance sheets, Pro-forma Income Statements, as well as how to run Monte Carlo risk analysis and Sensitivity analysis on the project, finally packaging, presentation and shopping techniques will be presented. Final project is a (brief) class presentation and defense of the project as they would make it to the bank.

outline of finance class

Introduction   - Reevaluate the learning process

- Myers-Briggs learning styles
- Erasing educational shame – Born to Win
- Think and Grow Rich – Napoleon Hill
- "If you can help enough people get what they want, you can get what you want in life" – Zig Ziggler.
- Newspaper Article .

1: review of a finished presentation - detail the elements of a presentation

- Review of HP-12C – mortgages, NPV, IRR,
- Review of statistics

2: review of financial statements

- Review of accounting
- building a pro-forma financial statement

4: information gathering - sources of information

- Dunn and Bradstreet – reference library
- Property Appraisers Office
- Appraisers reports
- Internet searches
- County property appraisers web-site searches
- Building department – building permits
- Chamber of Commerce reports
- State of Florida reports
- Industry publications – Board of Realtors – Home Builders Assoc.
- Magazines
- Fundamental research – do it yourself

5: reviewing a deal – proving a deal is solid

- Building excel models as economic models
- review of sensitivity analysis
- review of deterministic risk and stochastic modeling
- review of Monte-Carlo risk analysis

6: making a project work - "what-if"
- think of a project as a radio that has dials and buttons

- On/Off button is the invest – don't invest decision
- Volume is cost and price of your product
- Station tuning is product; type, quality, location

7: learning the market criteria
- Calculating breakeven analysis
-

8: putting together a presentation
- Elements of a presentation
- Supporting evidence
- Pie – Proof – Information – examples
-

9: techniques for shopping a loan
- Always present your package to your best chance last.
- Choose 3 lenders that you know do not make these loans and try to convince them to review your project. convince them your project is that good. Practice your salesmanship, practice presenting the package – see what works – see what they buy into and what they reject. Look the part –your credibility is based on presentation - or they will reject your argument. (bankers with only the power to say no).

10: Letter of intent to finance with specified terms of the loan
- Lock in a rate with a deposit

11: Students should make a 10-minute or less presentation to the class.

- Put together a presentation on a current project you are working on, or one you have worked on previously.
- Present it to the class, and we will try to shoot holes in your project, if time allows you can fix your project and present it again.

The Myers-Briggs is useful because getting financing is about selling yourself, so you have to understand who you are and how people see you.

Myers Briggs

For our purposes the Myers Briggs will help you figure out how you learn. How you process information. It is important that we learn how to get this information into your head. Everyone learns differently, some people are visual and they use flash cards and memorize pictures in the front of their brain. Some people are auditory and they remember what they hear. Some people learn by doing, these people are great builders, but they have the headrest time passing the contractors exam.

Kersey's personality profiler can be found on line at www. Or you can borrow the book, **Please Understand Me**, by David Kersey from most public libraries.

This is a quick profile that is 90% accurate. It is quick and easy – if you like, do this test and we can talk about it. If you don't want to see what your personality type is, that is fine too. If you want a professional analysis, most colleges offer the formal exam, or go to the University of Florida web site: www.

Here is what I learned about myself. I am an INTP. I am an introverted, intuitive, thinking, perceptive. Only 1:1000 to 1:100 of the people see the world the way I do. I am almost all right brained. I am auditory, so I learn best by listening. I am a top down learner, preferring deductive non-linear logic.

The Myers-Briggs type analysis is based on Carl Jung's system that was designed to understand extroversion Vs. introversion, and sensing Vs. intuitive types. This was to explain his differences with his mentor Sigmund Freud.

Isabel Myers and her daughter regrouped Jung's findings into four groups SJ's, SP's, NF's, and NT's. This made Jung's system

fit into a number of other systems, most notably the classic Hippocratic system from 450 B.C.

SJ's = Melancholic
SP's = Sanguine
NF's = Choleric
NT's = Phlegmatic

Myers- Briggs

	Left			Right	
Extrovert	E 75%		Introvert	I 25%	
Sensing	S 75%			Intuitive	N 25%
Thinking	T 50%			Feeling	F 50%
Judgmental	J 60%		Perceptive	P 40%	

Extroverts tend to be efficient, expedient and focused on the empirical external world view.

Introverts are inwardly focused and bring intensity to a task.

Sensing types tend to be external focused and linear thinkers, and are typically bottom up learners.

Intuitive types are global thinkers and tend to favor deductive logic and top down learning styles.

Thinking types tend to be logical thinkers.
Feeling types tend to be relational and may put logic below harmony.

Judgmental types tend to be structured, organized problem solvers.

Perceptive types tend to be adaptive and oven ended, solving problems at the last minute.

Oranges
SP

Sp's are adaptable, artistic, athletic, do not fight reality, don't get wrought up, are easy going, act with effortless economy, enjoy life, are gifted with tools and machines, are good natured, have no use for theories, notice reality, and are open minded.

Gold
SJ

SJ's are dependable, factual, painstaking, routinized, thorough, conservative, consistent, detailed, hard-working, patient persevering, sensible, and stable.

Green
NT

The NT is abstract, analytic, complex, curious, efficient, exacting, impersonal, independent, ingenious, intellectual, inventive, logical, scientific, theoretical, research oriented.

Blue
NF

The NF is enthusiastic, humane, religious, subjective, sympathetic, insightful, creative, imaginative, a researcher, teacher, preacher, counselor, writer, psychologist, and linguist.

Hewlett Packard photo 2001

HP12-C Computations:

Set decimal places

As for different problems the correct decimal setting is important. On the contractors exam often in order to get the correct answer you will have to look at a number of decimal settings to get the test answer. Typically, the answer can be correct out to 1,2,3 or 4 decimal places. Setting decimal places on the HP12-C is easy, and can be done at any time, before the problem is calculated or during the calculation, or after the calculation. The orange **[f]** key is depressed in conjunction with the number of decimal places you require.

[f] 0
[f] 2
[f] 3
[f] 4
[f] 5

Clearing registers and memory locations

To insure that no stray numbers are left in the memory stack it is always a good idea to clear all the memory locations. **[CLX]** pressed by itself clears the current register, the number in the calculator window. [f] Σ clears the statistical registers; [f] [PRGM] clears the program registers; [f] [FIN] clears the financial registers; [f] [REG] and [f] [PREFIX] clears the memory registers.

Set the interest periods at the beginning or ending of period

Some loans calculate interest from the beginning of the month. The more common practice is to collect interest at the end of the month. The HP12C can be converted to handle interest in either fashion. To use the end period press **[g] 8 (END);** to use the beginning period press **[g][7] (BEG)** before solving for a mortgage calculation or annuity.

Sign conversion – CHS (change sign)

To change from a positive number to a negative, or visa versa press the **[CHS]** key.

Saving answers in memory registers (STO & RCL)

To save information in memory locations use the **[STO]** storage key and the **[RCL]** recall key in conjunction with the number pad from 1 to 9. Actually you can use 9 memory locations under the white keys, 9 under the orange keys, and 9 under the blue keys. For the most part the 9 memory locations available under the white keys should be sufficient.

Calculating points on a mortgage

Points are interest that the bank collects at loan origination. When a bank is acting as a broker for another institution such as Fanny May or Freddie Mac the points equate to the banks payment for processing the loan.

In other cases it is preferable to pay points in order to buy down a mortgage interest rate. Let us say you are negotiating to build a home, and a home buyer can't quite qualify for the mortgage. Your options are to build less house, or it might be more profitable for you to buy down loan to bring the payments into line.
The important element of calculating points on a mortgage is to understand that 1 point equals 5/8 of 1%. The First thing to do is to calculate your constant $1 \div 8 = .125 * 5 =$ .00625, which means each point costs .625%. Then determine how many points you are being charged on the mortgage. The loan is a 15 year fully amortizing loan. The loan amount is $100,000 at 7% with 6 points due at closing. What are the net proceeds of the loan at closing? What are the payments? Your buyer can only have a 30% debt load for housing, (PITI). If you paid 2 more points what would their payment be?

KEY STROKES   DISPLAY READS

[f] 2
6 [ENTER]   6
.01*   6
100 ÷   .06
 [STO] 1
100,000 [ENTER] [RCL] 1 *   6,0000

[STO] 2

Net Proceeds of the Loan:

100,000 [ENTER]
[RCL] 2 -   94,000.00

Mortgage Payments:

$100,000 [PV]   100,000.00
15 [g] [n]   180
7 [g] [i]   .58
[PMT] [CHS]   898.83

What is the minimum they can earn and qualify for this loan?

$898 ÷ 30 x 100 = $2,993.33
$898 x 100 ÷ 30 = $2,993.33

Calculate the effect of buying down the mortgage by 2 points.
7% interest – (.625 * 2 = 1.25%) = 5.75%

5.75 [g] [i]
[PMT]   830.41

Your cost to lower the mortgage payment by $68.42

$100,000 [ENTER]
.02 *   2,000.00
[STO] 1

Net Proceeds of the loan:

$94,000   [RCL] 1 -   92,000.00

Discounting mortgages

You have built a spec house at an out of pocket cost to you of $110,000. You put the house on the market at $205,000 and you have been offered $195,000. A snag happens when the buyers cannot obtain financing. If you will hold the mortgage the buyer will pay 10% down and 10% interest on the loan. You need your money now, but you don't want to let go of this deal. You contact a few sharks that buy mortgages on the secondary market. You present the following situation: I have a first mortgage on a fee simple title, and the mortgagees have a good credit record. I just need to cash out so I can build more houses. The Mortgage banker looks over your deal and offers you 6 percent for your mortgage. How much profit will you make on this house if you make the deal?

KEY STROKES	DISPLAY READS
195,000	
.10 *	19,500.00
[STO] 1	
195,000 [RCL] 1 -	175,500.00
175,500 [PV]	
10 [g] [i]	.83
25 [g] [n]	300
[PMT]	1,594.77
[n] *	478,430.94
175,500 [ENTER]	
[STO] 1	
.96 *	168,480.00
[STO] 2	
[RCL] 1	
[RCL] 2 -	7,020.00
168,480.00 [ENTER]	
110,000 -	58,480.00
19,500 +	77,980.00
110,000 ÷	.71

Amortizing a Loan

You bought a repossessed house from the bank for $39,700, renovated it, and sold it for $67,500. The buyer paid $5,000 cash down payment, and you held a 15 year first mortgage at 8%. Every January you have to fill out a 1099 and send the buyer a statement showing the principal and interest he paid for the year, as well as the outstanding balance on the loan.

KEY STROKES   DISPLAY READS

End of Year 1 (EOY 1)

$62,500 [PV] $62,500
15 [g] [n]   180
8 [g] [i]   .67
[PMT]   597.28

0 [n]
12 [f] [n]   4,918.75 interest
[x=y]   2,248.61 principal
[RCL] [PV]   60,251.39 balance

End of Year 2 (EOY 2)

0 [n]
12 [f] [n]   4,732.11 interest
[x=y]   2,435.25 principal
[RCL] [PV]   57,816.14 balance

Calculating Sales Tax

You have rental property. You must collect and pay sales tax on the rent. The state charges 6% sales tax, and offers you a 2% discount for doing the work to calculate the tax and send it to the state.

KEY STROKES	DISPLAY READS
7,800.42 [ENTER]	7,800.42
[STO] 1	
1.06 ÷	7,358.89
[STO] 2	
[RCL] 1 [ENTER] [RCL] 2 -	441.53
[STO] 3	
1.02 ÷	432.88
[STO] 4	
[RCL] 3 [ENTER] [RCL] 4 -	8.66

Calculating Statistics

You are trying to find the optimal pricing for your steel building products. You have checked the market and have found eight companies who provide the same kind of steel buildings you erect. Their pricing is as follows;

Wilson Brothers	78.50	Lft
Hatfield & Thompson	92.10	Lft
Holiday Builders	102.00	Lft
Simpson Construction	88.50	Lft
Butler Builders	104	Lft
Cartwright Builders	87.95	Lft
Smith & Jones	99.00	Lft
Cadillac Construction	112.50	Lft

[f] Σ to clear the statistical registers
  78.5 Σ+
  92.10 Σ+
102.10 Σ+
  88.50 Σ+
104 Σ+
  87.95 Σ+
  99 Σ+
112.5 Σ+

[g] X   95.57
[STO] 1
[g] s   26.77
[STO] 2
[RCL] 2 [RCL] 1 ÷   28%

Calculating Straight Line Depreciation (SL)

You have a front-end loader which you paid $26,000 for, the IRS requires you to depreciate it over 7 years. The salvage value at the end of 7 years is $5,000.

KEY STROKES	DISPLAY READS
26,000 [PV]	26,000
5,000 [FV]	5,000
7 [n]	7
[f] [SL]	3,000
2 [f] [SL]	3,000
3 [f] [SL]	3,000
4 [f] [SL]	3,000
5 [f] [SL]	3,000
6 [f] [SL]	3,000
7 [f] [SL]	3,000

Calculating Double Declining Balance (DB)

KEY STROKES	DISPLAY READS
26,000 [PV]	26,000
0 [FV]	0
200 [i] or 150[i] or 125[i]	200
7 [n]	7
1 [f] [DB]	7,429
2 [f] [DB]	5,306
3 [f] [DB]	3,790
4 [f] [DB]	2,707
5 [f] [DB]	1,768
6 [f] [DB]	0
7 [f] [DB]	0

Date Functions

You are considering a job that begins on March 1, 2003 and must be completed in 32 days.
03.012003 [ENTER]
32 [g] [DATE]   4, 02,2003   3 (Wednesday)

Calculate NPV - Net Present Value of the cash flows

[f] CLEAR [REG]	
[g] [CF0]	-49,000 [CHS]
[g] [CFj]	6,000
[g] [CFj]	6,000
[g] [CFj]	6,000
[g] [CFj]	6,000
[g] [CFj]	65,000
8 [i] (Investment Hurtle Rate)	
[f] [NPV]	15,111

Calculate IRR – Internal Rate of Return

[f] IRR   15.26%

Using Financial and Business Calculators /

Mridu **Vashist**; George E **Pinches**

1996
English Book 36 p. ; 24 cm.
New York : HarperCollins College Publishers, ISBN: 0673975134 (pbk.)

. discusses the basic functions of three calculators, i.e, Hewlett-Packard HP12C and HP10B, and Texas Instruments TIBAII plus"--P. 1./ Appendix to 5th ed. of "Essentials of financial management / George E. Pinches."

How to use the HP12C /

Robert E **Gallaher**

1985
English Book 57 p. : ill. ; 28 cm.
Chicago, Ill. : Residential Sales Council of the Realtors National Marketing Institute, ISBN: 091365258X (pbk.)

HP-12C Training Guide /

Hewlett-Packard Company.

1982
English Book 1 v. (various pagings) : ill. ; 28 cm.
Corvallis, OR : Hewlett-Packard,

Investment Securities Program Guide Using the HP-12C /

W Scott **Bauman**; Jaroslaw **Komarynsky**; John C **Siska Goytre**

1987
English Book x, 146 p. : ill. ; 23 cm.
[New York, N.Y. : McGraw-Hill], ISBN: 0070041040 (pbk.)

Analyzing Investment Properties /

Andrew W **Tompos**

1999
English Book ix, 131 p. : ill. ; 28 cm.
Upper Saddle River, NJ : Prentice-Hall,

The HP-12C Real Estate Solutions Manual :
an easy-to-use, step-by-step guide for the real estate professional /

Albert **Santi**

1990 **Rev. ed.**
English Book viii, 71 p. ; 21 cm.
Chicago, Ill. : Probus Pub. Co., ISBN: 1557381224 :

Practical Real Estate Financial Analysis :
using the HP-12C calculator : a step-by-step approach /

Elbert B **Greynolds**; Julius S **Aronofsky**

1983
English Book vi, 233 p. : ill. ; 28 cm.
Chicago : Real Estate Education Co., ISBN: 0884623785 (pbk.) : 0884624978 (pbk.)

An easy course in using the HP-12C and other HP financial calculators /

Chris **Coffin**; Ted **Wadman**

1984
English Book 255 p. : ill. ; 28 cm.
Portland, Ore. : Grapevine Publications,

HP - 12C owner's handbook and problem - solving guide.

Hewlett-Packard Company.

1987, ©1982 **Ed. 1.**
English Book 246 p.
Corvallis, OR, U.S.A. : Hewlett Packard Co.,

Suggested keystroke routines for practical real estate applications /

Byrl N **Boyce**

1983
English Book 30, 9 leaves ; 28 cm.
Storrs : Center for Real Estate and Urban Economic Studies, School of Business Administration,
University of Connecticut, ISBN: 0931176166

Practical Real Estate Applications (HP-38E/C and HP-12C calculators) /

Byrl N **Boyce**

1983
English Book 68, 9 leaves ; 28 cm.
Storrs : Center for Real Estate and Urban Economic Studies, School of Business Administration,
University of Connecticut, ISBN: 0931176158

HP-12C training guide /

Hewlett-Packard Company.

1982
English Book 1 v. (various pagings) : ill. ; 28 cm.
Corvallis, OR : Hewlett-Packard,

HP-12C solutions handbook.

Hewlett-Parkard Company.

1982, ©1981 **January 1982.**
English Book 152 p. : charts ; 17 cm.
Corvallis, Or. : Hewlett-Packard,

Professional real estate problem solving using the HP 12C :
a step by step approach /

John A **Tirone**

1997 **2nd ed.**
English Book xi, 302 p. ; 28 cm.
Harper Woods, MI : John A. Tirone, ISBN: 0962423645

Leasing applications for the HP-12C /

Sudhir P **Amembal**; Shawn D **Halladay**; Lynn Leary **Meyers**

1991
English Book xii, 272 p. : ill. ; 28 cm.
Salt Lake City, UT : Amembal, Halladay & Isom, ISBN: 0945988028

HP-12C real estate applications handbook /

Mark H **Goldman**; Stephen D **Messner**

1984, ©1982
English Book 101 p. : ill. ; 17 cm.
Corvallis, OR : Hewlett-Packard,

HP-12C leasing applications handbook /

Terry A **Isom**; Sudhir P **Amembal**

1982
English Book 117 p. : ill. ; 17 cm.
Corvallis, OR : Hewlett-Packard,

ACCOUNTING SUMMARY

We will begin with a review of accounting basics before going into designing pro forma financial statements. Let's review the relationship between assets and liabilities plus net worth in the classic presentation of the Balance Sheet.

Assets:	Debit	Credit		Debit	Credit
Assets					
Cash	xxx				
Accounts Receivable	xxx				
Bad Debt Reserves		xxx			
Fixed Assets		xxx			
Depreciation Reserve		xxx			
			Liabilities		xxx
			Accounts Payable		xxx
			Taxes Payable		xxx
			Notes Payable		xxx
			Net Worth		**xxx**
			Capital Stock		xxx
			Retained Earnings		xxx

Look at the Balance Sheet; it has 3 accounts, Assets on the left side, and Liabilities and Net Worth on the right side of the page. The two sides allow for a debit or credit balance for each account. The left column is called the **debit** side and the right side column is called the **credit** side. Assets usually carry a debit balance, which means there is a positive number located on the left side of the equation. Liabilities and Net Worth usually carry a credit balance. The two sides of the balance sheet must always balance or equal each other. The two sides of the account are like a mirror image of each other.

Debit   Credit   Debit   Credit
  X   =   X
Assets   **=**   **Liabilities + Net Worth**

Anytime the Asset side of the equation increases or decreases the Liabilities or Net Worth side of the equation must also increase or decrease in an equal amount. In double entry bookkeeping, any change will affect a minimum of 2 accounts.
In asset accounts a debit increases the account, and a credit decreases an account. In the Liabilities and Net Worth account a debit decreases the account and a credit increases the account. In this way the double entry accounting system is maintained in balance.

The **Income Statement** is a snap shot of the business on a given day in time. Since a business can make money or lose money the Income Statement is also called a **Profit and Loss Statement** or the **Summary of Operations**. The Income Statement lists income, direct costs, operating expenses and profits.

<div align="center">

Construction Company
Income Statement
For the year 2002

</div>

Eared Income	xxx
Returns and Allowances	xxx
Net Sales	xxx
Cost of Goods Sold	xxx
Gross Profit	**xxx**
Selling Expenses	xxx
Profit before fixed Overhead	xxx
Fixed Overhead	xxx
Net Income	**xxx**

Sources and Uses of Funds Statement also called **The Statement of Cash Flows** summaries the management of cash during a specified period. The Statement of Cash Flows is in many ways the most valuable report you can have.

Statement of Cash Flows

Is a summary of the sources and uses of cash. The Statement of Cash Flows shows changes in long-term assets and liabilities and capital accounts.

It has two sections:

- Fixed or long-term provisions of funds.
- Change in current assets and liabilities.

Sources of Capital

Net profit on a cash basis
Funds received from the sale of capital assets
Funds received in the form of a loan proceeds
Investments of capital by stockholders
Increases in long-term liabilities

Uses or (applications) of Capital

Funds paid for the acquisition of capital assets
Reduction in long-term liabilities
Dividends paid or payments to stockholders
Decreases in long-term liability accounts

The net difference between these two accounts, long term assets, and long term liability and capital accounts result in a net increase or decrease in funds for the period.

Funds Flow Analysis

Sources of Funds

Profit from operations   _____
Depreciation   _____
Decrease in cash   _____
Decrease in receivables   _____
Decrease in Inventories   _____
Decrease in other assets   _____
Increase in payables   _____
Increase in notes   _____
Increase in common stock   _____
Increase in accrued expenses   _____
Increase in deferred taxes   _____
Gain form sale of asset   _____
Other   _____

TOTAL   =======================

Uses of Funds

Increase in accounts receivable   _____

Increase in notes receivable   _____

Increase in inventory   _____

Increase in plant and equipment   _____

Increase in prepaids   _____

Decrease in notes payable   _____

Decrease in secured notes   _____

Dividends   _____

Decrease in mortgage   _____

Increase in Cash   _____

TOTAL   =======================

Look again at the **Balance Sheet**; each of these accounts can be managed. The cash category, called the cash account can and must be monitored to insure that enough cash is available to run the business. It is normal to keep a cash journal to make it easier to do sales tax reports. Charge sales are kept in a separate journal from cash sales so they can be monitored as accounts receivable.

Cash flow problems are common to builders because the construction business requires large investments.

A cash budget should accomplish the following.

- Make cash available for day-to-day operations.
- Plan for the use of excess funds.
- Time operations for seasonal business changes.
- Provide for levels of inventory.
- Prepare for tax liabilities.
- Control the purchase of materials and help prevent over or under buying.
- Help you maintain a good credit rating.

Ratio Test for Cash

The **Current Ratio** compares current assets (cash, receivables and inventories) to current liabilities (current notes payable, accounts payable, accrued taxes).

Current Ratio = Current Assets / Current Liabilities

A good current ratio is 2:1 or higher, which means current assets are double current liabilities. A 1:1 ratio is weak. A negative ratio is cause for concern, not only is the company low on cash, but growth potential is negative as well. It is common to try and obtain more cash to increase the ratio, instead try to reduce your current liabilities. The current ratio is the most popular and widely used test for cash position.

The **Quick Ratio** compares current assets (not including inventories) to current liabilities. An acceptable ratio rate is 1:1 or better. This quick ratio is also called the **Acid Test** because it tests the ability of a company to pay its current debts from its current cash and near cash assets. The acid test is a more consistent test as inventories are variable.

Quick Ratio = (Current Assets – Inventories) / Current Liabilities

Ratio analysis: Using the Balance Sheet and Income Statement it is possible to do analysis on a business. Ratios are a quick and easy way to understand how well a business is performing. Also, one can obtain a SIC – Standard Industrial Classification for a comparable class of industry and compare this companies ratios with the industry standard. The analysis takes the form of ratio analysis. Certain accounts in the Balance Statement or Income Statement are divided by other accounts to obtain ratios.

Balance Sheet Ratios:

Current Ratio = current assets / current liabilities.
Quick Assets Ratio (acid test) = Current Assets-Inventories / Current Liabilities.
Owner's Investment vs. Creditors Investment = Capital / Current Liabilities.
Ability to Meet Obligations = Working Capital / Funded Debt.
Working Capital = Current Assets – Current Liabilities.
Owner Financing vs. Debt Financing = Net Worth / Assets.

Income Statement Account Ratios:

Percentage of Gross Profit = Gross Profit / Sales.
Expense Control Ratio = Operating Expenses / Sales Volume.
Margin of Profit = Net Income / Sales.

Combined Ratios:

Trend in Charge Sales = Sales / Accounts Receivable.
Real Turnover = Cost of Sales / Inventory at Cost.
Day's of Inventory Available = Total Working Days Per Year / Turnover.
True Investment Yield = Net Income / Net Worth.

SUMMARY OF DISCRIPTIVE STATISTICS

This is a rudimentary summary of statistics that should be enough to help you use statistics to define your construction market and to explain your market to potential lenders and investors. I obtained this approach for "playing with the numbers" from a two week seminar taught by the two fathers of **Decision Analysis** at Stanford - SRI / Strategic Decisions Group. The objective is to use statistics to define the parameters of your decision making process.

1: A set or list of numbers can be drawn from a total population or from a sampling. The important question to ask is this sample **relevant** and is it **significant**? Relevant means, have you used the proper group of numbers, significant means your sample is large enough to be truly representative of the total population.

In construction most of the data is drawn from published sources such as the building department building permits, property appraisers department reports, or the printed advertising of competitors.

2: Once you have collected a significant sampling of numbers; one runs descriptive statistics on the data set to identify central tendency. The way this is done is through running tests on the **mean** or arithmetic average of the sample; $\mu = \Sigma x / n$ **OR** $X = \Sigma x / n$. One may also use other measurements of central tendency such the **mode** or **median** in defining a distribution.

The mean can be used to measure:

The 1st moment of the mean is **Variance**
The 2nd moment of the mean is **Standard Deviation**
The 3rd moment of the mean is **Skewness**
The 4th moment of the mean is **Kurtosis**

Variance is used in computing the Standard Deviation. The **Standard Deviation** defines the width of the distribution or the base of the curve. **Chebyshev's Theorem** observes that two standard deviations to each side of the mean encompass 75% of the probable values for a distribution. 3 standard deviations covers about 99% of the probable values for the distribution (his theorem predicted 89%).

1%	5%	36%	50%	67%	95%	99%

Skewness defines any tendency for the data to be skewed to the left or right side of the curve. A negative skew creates a tail on the left side of the curve while a positive number creates a tail on the right side of the curve. **Kurtosis** defines the height of the curve. Combined the **four moments of the mean** can be used to define a frequency histogram or probability curve for a population or sample data.

These four measurements of central tendency can be used to define the parameters of a curve. The curve can be thought of as a pictorial representation of the distribution of the data. The shape of the curve helps one understand the nature of the data set. Each curve shape defines a different type of distribution. A curve can define a normal distribution, triangular distributions, uniform distribution, binomial distribution, as well as 27 other "common" distributions.

The **Standard Deviation** can be defined as the square root of the variance.

$$S^2 = \frac{\Sigma(x-\mu)^2}{n-1}$$

The –1 is used to compensate for the under estimate of σ^2 by a sample variance S^2.

Co-Efficient of Variation: If your standard deviation is greater than 10% of the **mean** then your data has a great deal of variation. It could indicate that the data set encompassed more than one population. In business it usually indicates that there is a great deal of variation in the industry or market, which means the cash flows from the business venture will be difficult to predict and will therefore carry a greater risk. The contractor or developer should proceed carefully when the Co-Efficient of Variation exceeds 10%.

Standard Deviation / Mean = Coefficient of Variation.
Example: 23.00 / 82.00 = 28%

RISK ATTITUDE

In business everyone has a **risk attitude**, some companies are **risk preferring** and they usually require a much higher rate of return on investments to offset these risks. Some companies are **risk neutral**, and they require the level of risk normal for the industry, therefore their rate of return tends to mirror the industry average (as presented in the SIC Standard Industrial Category as published by Dunn & Bradstreet. Some companies are **risk adverse**; they typically earn a level of return below the industry average. At different times it is natural that a company will assume various risk attitudes. It is important to match the desired risk attitude with a REALISTIC rate of return for that risk attitude. It is highly improbable that one would be risk adverse and at the same time maximize return on investment.

How to use Statistics in Real Estate and Construction.

1: Go to the building department and set down with the stack of building permits for the last year for your type of construction. You need to copy down the following information on a note pad: the construction price on the permit and the number of square feet constructed, who the contractor was, and the type of construction (AAA, block with wood joists, or wood frame), the location. Weather you are building commercial, residential, or remodeling the building department will have numbers for your section of the industry.

2: First determine the number of building starts per month and see how much seasonality exists within the market. Determine the average number of building starts per month. You can also note who drew the permit to determine who is your competition, and their share of the market, as well as their pricing structure.

3: Divide the number of your jobs per month by the number of monthly starts from the building department permits and determine your market share.

4: Calculate the mean and standard deviation for all the building starts (per square foot) also calculate the mean and standard deviation for the total number of square feet built per job. Calculate the mean and standard deviation for the total price of construction.

5: Since you have the mean and standard deviation of the prices actually paid per square foot for construction of your type you can build a probability table for the data.
Let us use the example that renovation is running on average $82.00 a square foot with a standard deviation of $23 dollars.

Odds the price will be lower than stated:

1%	5%	36%	50%	67%	95%	99%
$13	$36	$59	$82	$105	$128	$151

Odds you will get the contract if you bid the price above:

$13	$36	$59	$82	$105	$128	$151
99%	95%	67%	50%	37%	5%	1%

You can determine your pricing structure by how certain you want to be that you will get the job. If you want 1:1 odds of getting the job, bid $82 dollars per square foot. If you want 2:1 odds that you will get the job bid $59 a square foot.
You can also use this approach to determine pricing for your construction services. If you are bidding only 10 jobs a month and you need to land 5 to stay in business, then you price your services according to how certain you want to be that you will get that job. In good times, when you are bidding 20 or 30 jobs a month, you only need to land 20% of the contracts to stay in business, so you can bid between one and two standard deviations above the mean. This is a great example of the uses of supply and demand in pricing.

Financial Presentation using Descriptive Statistics

In this example, sampling theory and descriptive statistics are used to help define the foundation for a model that accurately reflects real world inflows and outflows of cash. The following example shows the application of descriptive statistics in real estate analysis.

$6 Million Apartment Complex Project

Project Summary

According to the Greater Cocoa Beach area Chamber of Commerce, which represents (Cocoa, Rockledge, Cape Canaveral, Merritt Island, Cocoa Beach) rental rates were stated as follows:

2 bedroom Apartment

"$450 per month average up to $600 per month for waterfront."

3 bedroom Apartment

"$500 per month average up to $650 for waterfront."

Summary of data:

Occupancy rates in the Cocoa Area per sample complexes;

Average:	94.0%
Standard Deviation:	4.9%

The chances of occupancy rates being GREATER than indicated:

90%	84.89%
70%	89.10%
50% (average)	94.00%
10%	103.11% (excess demand)

This project has a high probability of meeting the Freddie Mac occupancy

requirement of 85%. If older units constructed before 1970 are eliminated, and only

like kind developments in the Brevard area are compared, then statistics simulate the

Chamber of Commerce rental rate structure of $450 to $650 per month.

Rental Rates in up-scale apartment complexes in Brevard County:

Average:	$448.40
Standard Deviation:	$ 51.43

The chances that tenants could find accommodations for LESS than indicated:

10%	$352.74
30%	$397.00
50% (average)	$448.40
90%	$544.06*

According to the Committee of One Hundred Report, 81% of the people living in

Central Brevard can afford the rent on the Linda Lakes project of $535 per month.

This amount is based on a housing cost not in excess of 38% of gross income.

A potential customer base in Central Brevard for such apartment dwellings as The

Lakes can be extrapolated as follows:

Total population in area	121,448
Percentage qualifying (81%)	98,372
Average % renting 34.8%	34,234
Natural base (10% from above)	3,423*
Household size (avg. 2.41)	1,421

This analysis suggests a saturation level of 1,421 dwellings of the up-scale

type units The Lakes proposes to construct in Central Brevard. The Lakes pro-forma

goal of achieving 95% occupancy rate is likely, however The Lakes is only likely to

attract 10% of the potential customers looking for rental housing in Central Brevard.

In order to achieve their goals, The Lakes is faced with three options;

Do nothing - do not build the complex.

Pursue a market differentiation strategy by providing amenities which place them

clearly ahead of the competition. The amenities proposed in the project might

include;

- Nature trails or par 3 chip and putt golf course.

- Stocked fishing lakes with fountains.

- Fitness trails.

- Tennis courts, indoor swimming pool, air conditioned racket ball courts,

Jacuzzi (s)

- Outstanding natural landscaping.

- Satellite Dish TV.

- Exceptional designed kitchens to appeal to gourmets.

- Vaulted ceilings.

Unfortunately, the majority of these options are maintenance intensive, unlike

a river view which is available in a number of up-scale rental complexes in the Cocoa

market. By providing amenities to entice buyers, The Lakes may well avoid the

necessity of competing on price. For this project each 1% decrease in price is worth

$34,545 annually to the complex.

Figure 1: Pro-forma Balance Sheet

The Lakes
Pro-forma Balance Sheet
End Of Year 1

Current Assets	
Cash	91,383
Cash Reserve	25,000
Letter of Credit	110,000
Renovation Fund @ 5%	12,600
Total Current Assets	238,983
Long Term Assets	
Real Estate	6,359,000
Less depreciation	
<84,463>	
Long term notes (leases)	NA
Equipment	NA
Total Fixed Assets	6,274,537
Current Liabilities	
Accounts payable	0
Salaries Payable	0
Taxes Payable	10,091
Total Current Liabilities	10,091
Long Term Debt	
Mortgages	5,490,879
Total Long Term Debts	5,490,879
Net Worth	1,022,641

PROJECT FINANCED BY FREDIE MAC @ 10.25% FIXED RATE -

Without reverting to computers and Monte Carlo risk analysis a simple probabilistic Best Case - Worst Case scenario can be drafted. This type risk analysis is commonly used in limited situations in which one assigns the probability of an event occurring, and then projects the cash flows based on these conditions. Figure 2 shows a best case scenario which assumes a 100% occupancy rate at every probability level.

Figure 2: Best Case –pro-forma balance sheet

			Best Case (from occupancy data)		
% Chance	Event occ rate	Gross Sales		Factor	Total $$$$$
10%	100%	959,760		1.0*.10	95,976
30%	100%	959,760		1.0*.30	287,928
50%	100%	959,760		1.0*.50	479,880
10%	100%	959,760		1.0*.10	95,976

Sub Total					959,760
Other Income					25,200
Expenses					
Interest					578,295
COGS @ 27%					238,923
Principal - repayment					27,627

Net Income					140,115

The following two figures are Average Case and Worse Case. Average Case varies the occupancy rate to arrive at an average "probable" occupancy rate. Figure 4 is the Worst Case analysis, it varies not only the occupancy rate across the probability spectrum, but also suggests that the project will not meet their pricing goals (rental rate).

Figure 3: Average Case pro-forma balance sheet

		Average Case			
% Chance	Event occ rate	Gross Sales	Factor	Total $$$$$	
10%	85%	959,760	.85*.10	81,580	
30%	89%	959,760	.89*.30	256,256	
50%	94%	959,760	.94*.50	451,087	
10%	100%	959,760	1.0*.10	95,976	

Sub Total				884,899	
Other Income				25,200	
Expenses					
Interest				578,295	
COGS @ 27%				238,923	
Principal - repayment				27,627	

Net Income				65,254	

Figure 4: Worst Case pro-forma balance sheet

% Chance $$$$$	Event occ rate	Event	units rent	Factor	Total
10%	85%	352	144	.85*.10*(144*352)	51,708
30%	89%	397	144	.89*.30*(144*397)	183,168
50%	94%	448	144	.94*.50*(144*448)	363,852
10%	100%	544	144	1.0*.10*(144*544)	94,008

Worst Case

Sub Total	692,736
Other Income	25,200
Expenses	
Interest	578,295
COGS @ 27%	238,923
Principal - repayment	27,627

Net Income	<27,025>

INFORMATION PACKET

FOR

HARBOR FEDERAL S&L

BEASLEY'S INVESTMENTS
320 N. Atlantic Ave. #2B
Cocoa Beach, Fl. 32931
305-783-3789 / 305 725-7106
October, 1987

Presented by: Beasley's Investment Properties
Presented to: Harbor Federal S& L
Prepared by: John Beasley's Construction

INTRODUCTION

This outline is **<u>NOT</u>** intended to be a loan request, but rather a presentation of pertinent information to determine a potential basis for negotiating a long term loan secured by real property.

<u>This packet is intended to exchange information with the lending institution.</u>

- General questions of interest concerning services provided by this bank.

- An introduction to Beasley's Investment Properties and the principal management of the company.

- A general concept of the terms and covenants on the loan we are endeavoring to secure.

- An outline of the uses of the proceeds of the loan.

- An overview of company pro-forma cash flows for 1987-1988.

- Break Even / fixed expense pro-forma's with various debt load calculations.

- Overview of Risk Analysis for the company.

- Background information on the Atlantic Center and related efforts to assess risk.

- Historical lenders and management ratio analysis.

Does or will your bank provide the following services?

	YES	NO
Generally handle real estate companies or REITS?	[ ]	[ ]
Does a branch of this bank specialize in Real Estate	[ ]	[ ]
Preparation of Letters of Credit	[ ]	[ ]
Lines of Credit (LOC) to $_____	[ ]	[ ]
Loans against Receivables of _____%	[ ]	[ ]
Credit Reference Checks? Fee Charged $_____	[ ]	[ ]
Money Market securities sales and purchases?	[ ]	[ ]
Provide helpful ideas for cash management?	[ ]	[ ]
Checking or NOW accounts with competitive terms	[ ]	[ ]
Does this bank desire quarterly statements?	[ ]	[ ]
Does this bank prefer annual statements?	[ ]	[ ]
Does this bank desire quarterly briefings?	[ ]	[ ]
Does this bank prefer annual briefings?	[ ]	[ ]
Could the bank provide us with a current 10K report?	[ ]	[ ]

Management

Ballard Beasley (Senior)

In 1942 Ballard Beasley became a golf professional by winning the Chattanooga Open. He served in World Ware II with the Marine Corp. In 1946 he studied agronomy at the University of Tennessee , Knoxville under the GI bill. In 1947 he began designing and building golf courses, as well as serving as general manager to the Great Southern Country Club. During 1957-59 he played on the PGA Tour, where he became friends with many of the "legends of golf," such as Arnold Palmer, Sam Snead, and Tommy Bolt, as well as movie stars and industrialists.

In 1959 he was offered a position by Jack Harkins (one of Bob Hopes partners in the Donald Duck soft drink company). Jack Harkins offered Mr. Beasley the rights to market First Flight (Pro-Golf, Arnold Palmer) golf equipment in Florida and Georgia. This proved to be quite lucrative and by 1962 Mr. Beasley had saved sufficient funds to purchase Ridge Manor Golf and County Club, 30 miles south-west of Tampa, Florida. Between 1962 and 1968 Mr. Beasley designed and built another nine holes on the golf course, developed tracks of land, and purchased the community center, medical center, Ridge Manor Apartment Complex, and Ridge Manor Plaza which housed the post office, commercial office space, and an upscale French restaurant. In 1968 Mr. Beasley sold out to a northern concern and once again went out on the PGA tour for two years.

In 1970 Mr. Beasley moved to Titusville Florida, semi-retired and began purchasing commercial real estate. He now owns seven commercial properties. During 1974-76 he helped Roy Cox restructure Royal Oak Country Club by serving as the general manager, golf pro, and greens supervisor. He is presently the golf director at La Cita County Club, Titusville.

Mary Beasley

Mary and Ballard Beasley have been married since 1946 and jointly shared in the management of their many ventures. Mrs. Beasley was a fine golfer in her own right, winning the Mississippi State Championship, prior to an auto accident which caused a back injury. Mrs. Beasley has handled the accounting, and employee relations, as well as acting as purchasing agent and orchestrating political functions.

John Beasley

John Beasley graduated from the University of Central Florida in 1978, and began working in renovation and management of commercial real estate. In 1980 he obtained a realtors license and specialized in commercial real estate management. In 1983 he purchased Aries / Jonathan's Restaurant in Melbourne. John Beasley, together with his wife Lynn, managed 39 employees and had an operating income of $500,000 annually. In 1985 Melbourne became a test market for franchises and the market became saturated with restaurants, growing in number from 72 to 141 in one years time. This effectively evaporated the traditionally low EBIT of 8% profit margin. Faced with long term capital expenditures, and no guarantee of a return, they decided to close the restaurant. In 1985 John Beasley began the Executive MBA program at Rollins College (Crummer School of Business) and has completed the first year of the program. Between 1985-1987 John Beasley has taken computer programming courses and attended seminars on Interactive Financial Planning, business simulation modeling, Monte Carlo risk analysis, and optimal problem solving (linear programming).

Presently, John Beasley owns Marketing Research Solutions. Since 1985 John Beasley has been the manager for Beasley's Investment Properties and has assisted in shaping financial decision making. He is presently pursuing a mortgage brokers license.

DESIRED TERMS OF THE LOAN

Loan Amount:

$500,000

Term:

15 year fixed rate mortgage.

Interest Rate:

9%

Security on Loan:
Atlantic Center office building and adjacent lots facing A-1-A, known as lots 2,3,4,5,6 approximately 360 front feet, with approximately 14,000 square feet of improvements. Value approximately $750,000.

Covenants on the Loan

1: The mortgagor shall look to the assigned properties and no other assets for the security on the loan.
2: The mortgagor shall impose no penalty for prepayment of the loan and the loan shall be assumable, upon agreed terms.
3: The loan shall be made to Ballard and or Mary Beasley, dba Beasley's Investment Properties.

Pro-Forma Expenses

Atlantic Center renovation	99,000
Atlantic Center debt repayment	90,000
North Parking Lot debt repayment	<u>45,000</u>
Total Atlantic Center uses of funds	$234,000

Other Uses of Funds

Purchase of land (Hibiscus, Melbourne)	105,000
Renovation to Hibiscus and new parking	<u>55,000</u>
Total uses of funds for Hibiscus	$160,000
Total allocated uses of funds	<u>$394,000</u>

The following projected cash flows are based on a five percent inflation rate, which will result in cost of living increases incorporated into the leases. Additionally, we anticipate leasing four more units between the forth quarter of 1987 and the first quarter of 1988.

Pro-Forma Cash Flows

	1987	**1988**
Atlantic Center	$64,000	$86,000
Hibiscus Restaurant	31,200	32,916
Hibiscus parking lot	0	6,000
Pompano Plaza	64,200	79,800
Hopkins Plaza	21,600	21,600
Harrison Plaza	27,800	33,600
7000 Plaza	21,600	24,000
Duplex	2,400	4,800
Total Income:	$232,800	$288,716

The following break-even analysis includes actual fixed expenses, as well as expenses we deem necessary to maintain a healthy business operation.

Break-Even / Fixed Expenses

	1987	**1988**
Debt Service	$47,340	$83,506
Property Tax	15,000	18,000
99 year land lease (McNab)	8,000	8,000
Maintenance	64,200	79,800
Insurance	12,300	9,225
Management	50,000	50,000
Total Expenses	$232,800	$288,716
	=======	=======

1. We project a 12% increase in property taxes due to renovations.
2. Our insurance agent informs us that quality renovations should reduce our rates by 25%
3. McNab Plaza is built on land with a 99 year lease. 73 years remain at a fixed annual cost of $4,360.00 per year plus property taxes.

The following are cash flow projections for 1989-1990, which take into account the completion of all renovation projects, higher rental occupancy rates and cost of living increases on existing leases.

Pro-Forma Cash Flows 1989-1990

Atlantic Center	$108,000
Hibiscus Restaurant	32,760
Hibiscus parking lot	6,300
Pompano Plaza	83,800
Hopkins Plaza	28,800
Harrison Plaza	33,600
7000 Plaza	32,400
Duplex	12,000
Total Projected Income:	$337,660

The pro-forma statements presented previously may be considered as realistic goals, or as optimistic scenarios. It becomes a question of projecting the perceived risk inherent in a real estate venture at a given time.

Perhaps, I should state Beasley's Investment Properties strategic plan for penetrating this market niche. Previously, Ballard Beasley was primarily interested in equity growth, thus the 5% to 9% debt to equity ratio. We presently perceive that our marketing objectives are to provide tenants with high quality office and store front locations at the market mean rental rate. This policy will place us some thirty three to forty seven percent below the price leaders in the market, while still substantially improving our cash flow position and bottom line profitability. Being the price leader in the market will allow us to maintain higher than average occupancy rates as well as good tenant relations. The down side to this approach to doing business is the under evaluation of the property values in favor of increased occupancy rates. This reveals that our management style is risk adverse. This would only present a detriment to our cash flows if we intended to sell the properties. This point can be demonstrated by showing the percentage rental increase necessary to recoup a six month vacancy on a given location. This problem is solved using capital budgeting techniques.

Risk

We all know that no one can control the business market, therefore a great amount of research has gone into defining the boundaries of risk that are present in a business venture. The following section details some of these approaches as applied to the Atlantic Center and Beasley's Investment Properties.

The Local Economy

The geographical area of Central Florida itself is a good hedge against risk. The population is slated to double every seven or ten years, which will undoubtedly drive property values up. Furthermore, Disney World attracts record numbers of tourists during economic down turns, to wit, 1978-80 Disney set their highest attendance records to that date. Between 1978-80 we saw the worst recession since 1973, yet the local economy of Brevard flourished.

A major factor in the economic stability of Brevard County is the space program. To a large degree Americas' technology is driven by funding for the space program, thus any down turn in the U.S. economy or loss of technological superiority over other natins must be met with additional funding of the space program.

We are fortunate to have businesses and NASA programs which tend to shield the Central Florida area from drastic economic down turns, such as are experienced in other states during recessions.

Rental Rates

In late 1985 early 1986 we did a study on the rental rates for office and small retail space along A-1-A, stretching from Cape Canaveral to Indian Harbor Beach, and collected data on 36 locations. The results of the pricing structure for office / small retail space at that time was as follows;

Chances of rental rates being Greater than indicated:

1%	$12.00 per sq. ft.
5%	$10.50 per sq. ft.
37%	$ 9.00 per sq. ft.
50%	$ 7.50 per sq. ft.
67%	$ 6.00 per sq. ft.
95%	$ 4.50 per sq. ft.
99%	$ 3.00 per sq. ft.

Early in 1986 we determined that it would be financially beneficial to renovate the Atlantic Center. Shortly after that management decision was made the Space Shuttle crashed. Unsure of the impact the Shuttle disaster would have on the economy, we decided to test the assumption that we could achieve higher rental rates and maintain high occupancy rates. To this end, we began using available cash flow to renovate selected units in the building and do rudimentary window dressing to the exterior of the building. To effect on renovated units was as follows;

	Previous	Present
Unit 5A	$350.00	$400.00
Unit 4B	$250.00	$400.00
Unit 6B	$250.00	$350.00

This resulted in an increased rental rate between 14% and 60% per unit. This convinced us that remodeling was a viable and profitable option, however, because of certain business and tax considerations, it was not advisable to make long term capital improvements out of cash flows. Therefore, before taking on any additional debt, we found it necessary to weigh the costs and benefits, as well as the risks.

A new office complex, The Galleria, has been built in Cocoa Beach during the past year and is leasing for $14.00 per square foot.

Capital Budgeting

Option 1: Do nothing.

Second floor cash flows for ten years:	$291,900
Ground floor cash flows for ten years:	$543,024
Total cash flows:	$834,924

Option 2: Renovate.

Second floor cash flows for ten years:	$543,024
Ground floor cash flows for ten years:	$633,852
Total cash flows:	$1,176,876

Less:

Renovation Costs:	$<85,000>
Land allocated to parking:	$<60,000>
	$<145,000>
Cash Flows after rehab expenses:	$1,031,876
Less Option 1 cash flows:	$<834,924>
Net improvement over Option 1:	$196,952

Based on our present pricing policy and our projected pricing policy after renovations, we conservatively see a $196,952 dollar improvement in cash flows over the "do nothing" option, based on a ten year window. This analysis does not take into consideration the net present value of the cash flows, the possibility that the "do nothing" option might result in lowered occupancy and rental rates, nor does it explore the potential for rental rates doubling or tripling over the next ten years.

Current occupancy rate is 89%.

Lenders and Management Ratios

	1986
DEBT TO EQUITY RATIO	13.82: 1
WORKING CAPITAL RATIO	2.46: 1
ACID TEST I	4.49: 1
ACID TEST II (Cash plus 1 month's receivables)	6.33: 1
NET WORTH / TOTAL ASSETS	92% F&CL
FIXED ASSETS / NET SALES	21.66%

Descriptive Statistics Methodology

Summary statistical analysis was run on two data sets, rental rates and occupancy rates. This included calculating χ, i.e. the mean of a sample, standard deviation, kurtosis, skewness, and coefficient of variation.

- χ is the mean of a sample, rather than the mean of a total population. The mean is the arithmetic average of two or more observations divided by that number of observations.

- Standard Deviation : "the standard deviation is the square root of the variance. The variance is a measure of how widely dispersed the values are in a distribution, and thus is an indication of the "risk" of the distribution. It is calculated as the average of the squared deviations about the mean. The variance gives disproportionate weight to "outliners", values that are far away from the mean. The variance is the square of the standard deviation" (@Risk, G-5). The standard deviation is also called the second moment of the mean.

- Skewness is "a measure of the shape of a distribution. Skewness indicates the degree of asymmetry in a distribution. Skewed distributions have more values to one side of the peak or most likely value - one tail is much longer than the other. The higher the Skewness value, the more skewed the distribution" (@Risk, G-4). Skewness is also called the third moment of the mean.

- Kurtosis is "a measure of the shape of a distribution. Kurtosis indicates how flat or peaked the distribution is. The higher the kurtosis value, the more peaked the distribution" (@Risk, G-2). Kurtosis is also referred to as the forth moment of the mean.

- Coefficient of Variation (CV) "The ratio of the standard deviation to the mean" (Marshall, vii).

Sensitivity Analysis Methodology

Sensitivity Analysis is a systematic "what if" analysis using probabilities rather than simple numeric or percentage swings for each variable. This method takes uncertainty into consideration, both the uncertainty in the project as well as the uncertainty of the business analyst.

Sensitivity is a three step process;

- Review each variable, or value, to determine three numbers: the lowest you think it would go (a 10 percent or less change the value would ever be any lower), the highest you think it could go (a 10 percent or less change it would eve be any higher), and the value you think is most likely. Optimally, one would obtain the 10th, 50th, and 90th percentile points in a probability distribution and use these as parameters for the sensitivity analysis.

- Substitute the three numbers derived in step 1 for each variable in the spreadsheet and note how these changes modify the final result.

- List in order of magnitude the "swings" in the final result caused by these changes.

For the sake of this example we will review a model of a multi-use marina and condo project. The project requires an initial investment of $12.1 million (exclusive of loan costs), and the capital plan calls for $3 million in equity and $9.1 million in debt as presented by the developers. The projected net profit of

$2.2 million represents a 23.3 percent annual return on equity. When one looks at the project more closely using sensitivity analysis, a different picture emerges.

The process is as follows, the real estate developer was asked to provide his "current state of information" on the project. The developers greatest concerns were with the potential profitability of the restaurant ($200,000) and the strip shopping plaza ($200,000). He was convinced that the marina and the condos were a solid investment. After entering his financial variables into a spreadsheet the developer was asked to assign the 10th, 50th, and 90th percentile for the variables (condo sales, sales of restaurant, condo land, etc.). In this example I used IFPS - Interactive Financial Planning Systems which is a sophisticated business modeling language.

Figure 5: Spreadsheet for Sensitivity Analysis

IFPS Model
spreadsheet

columns 1
\
\Condo Community With Marina
\

\Database	Database
Site	428,375
Marina	1,721,940
Plant	310,000
Fees	175,000
Contingency	125,000
Restaurant	200,000
Retail	200,000
Condoland	1,600,000
Condoconst	5,264,000
Center	87,500
Marinaconst	2,000,000
Loan Costs 10%	1,011,181

\

Total Expenses = SUM(Site..Loan Costs)	13,122,181

\

\income Database	
Condosales	14,476,000
Restsale	250,000
Slips_rent	506,400
Fuel	120,000

\

Total Income =Sum(Condosales.fuel)	15,352,400

\

NCF=Total Income - Total Expenses	2,229,403

NPV= NPV (NCF, 8%,3,3000000)

What the program Sensitivity does is analyze the model at the 10th, 50th and 90th percentile and creates a plot or "tornado diagram" and a list of the results. The "tornado diagram" begins with the variable that causes the greatest

relative change in the NPV of the cash flows and lists in descending order variables with less effect on variation in net cash flows.

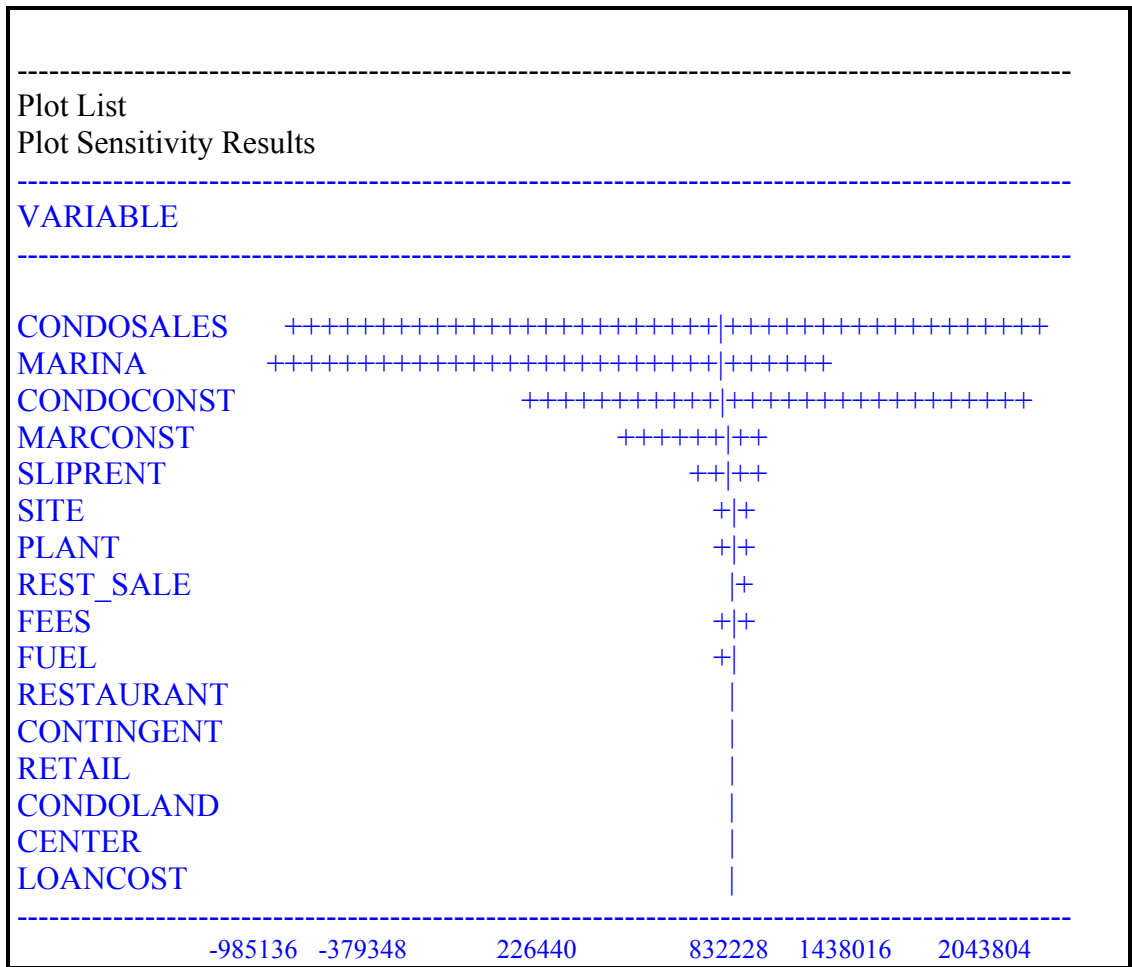Figure 6: Tornado Diagram of Sensitivity Analysis

```
------------------------------------------------------------------------------------------
Plot List
Plot Sensitivity Results
------------------------------------------------------------------------------------------
VARIABLE
------------------------------------------------------------------------------------------

CONDOSALES     +++++++++++++++++++++++++++++|++++++++++++++++++++++
MARINA         ++++++++++++++++++++++++++++++|++++++
CONDOCONST                     +++++++++++++|+++++++++++++++++++++
MARCONST                           ++++++|++
SLIPRENT                             ++|++
SITE                                  +|+
PLANT                                 +|+
REST_SALE                              |+
FEES                                  +|+
FUEL                                  +|
RESTAURANT                             |
CONTINGENT                             |
RETAIL                                 |
CONDOLAND                              |
CENTER                                 |
LOANCOST                               |
------------------------------------------------------------------------------------------
         -985136   -379348        226440         832228   1438016     2043804
```

Figure 7: Plot of Sensitivity results

PLOT LIST						
Plot Sensitivity reuslts						
VARIABLE	SEN	LOW	HIGH	LOW	HIGH	SWING
	TYPE	VALUE	VALUE	RESULT	RESULT	
CONDOSALES	V	11844000	14467000	-579196	2043804	2623000
MARINA	A	-344388	1721940	1081192	-985136	2066328
CONDOCONST	V	4211200	5922000	1789604	78804	1710800
MARCONST	A	-100000	500000	836804	236804	600000
SLIPSRENT	V	253200	506400	610204	863404	253200
SITE	A	-85675	85675	822479	651129	171350
PLANT	A	-62000	62000	798804	674804	124000
RESTSALE	V	200000	275000	686804	761804	75000
FEES	A	-35000	35000	771804	701804	70000
FUEL	V	50000	120000	716804	786804	70000
RESTAURANT	A	-10000	30000	746804	706804	40000
CONTINGENCY	A	-12500	12500	749304	724304	25000
RETAIL	A	-10000	10000	746804	726804	20000
CONDOLAND	A	-5000	5000	741804	731804	10000
CENTER	A	5000	5000	731804	731804	5000
LOANCOST	V	1000000	1110000	736804	736804	0

In the 2 hours and forty five minutes it took to interview the real estate developer, lay out the Sensitivity model, and review the results Sensitivity revealed that the greatest uncertainty surrounds the top four data points - condo sales, sale of the marina, marina construction costs, and condo construction costs. These four items resulted in a swing of $7 million dollars. Statisticians tell us that a sum of the squares analysis would revel that these four points account for 99 percent of the uncertainty in the marina model. According to business conventions, 80 to 90 percent of the uncertainty in a business venture is represented by 10 to 20 percent of the variables, which is often refereed to as the "80-20 rule". The most remarkable feature of sensitivity analysis is that it quickly reveals in a quantitative format, the primary elements in a business venture which management must control. This was an actual

business venture, and you may recall that the items that were most troubling to the real estate developer were the $200,000 restaurant and the $200,000 mini-plaza which ranked 11th and 13th respectively in magnitude as potential threats to the viability of this project .

Monte Carlo Risk Analysis

The next step in the business modeling process is to account for the uncertainty in a deterministic spreadsheet model. This is commonly done by building a stochastic model using Stanford method decision analysis (DA), Harvard method DA being substantially similar, yet significantly more theoretical in its application, and therefore deemed to be less effective as a practical business tool. A second approach, and the one more commonly used in identifying the economic effects of uncertainty is Monte Carlo Risk Analysis.

"Monte Carlo sampling refers to the traditional technique for using random or pseudo-random numbers to sample from a probability distribution. The term "Monte Carlo" was introduced during World War II as a code name for simulation of problems associated with development of the atomic bomb. Today, Monte Carlo techniques are applied to a wide variety of complex problems involving random behavior. A wide variety of algorithms are available for generating random Monte Carlo samples from different types of input probability distributions" (@Risk Owners Manual, P: F-6).

In building a Monte Carlo model, the first objective is to design a deterministic spreadsheet that accurately models or "mirrors" the situation under

analysis. Each element that directly impacts the income stream should be taken into

account in the model. Figure 8 provides a sample of a deterministic model.

Figure 8: deterministic spreadsheet model				
Excel model: Build (without Risk) Cash Flow Analysis Database				
(per sq. ft.)				(range names)
Land costs:			$ 10	land
Building costs:			$ 32	bcost
Totals:	$ 42			sqtotal
Total Sq Ft Land:			$ 200,000	
Total Sq Ft bldg:			$ 13,000	sqland
				sqbldg
Avg. rental rate:			$ 10	rate
Avg. occ rate:			$ 1	occ
Deposits forward:			$ 7,822	dep
Misc Income:			$ -	misin
Loan to value ratio:			75%	ltv
Interest Rate:			10%	intrate
Amort.in months:			360	period
Percents - calcualted expenses as a ratio of gross income.				
Property tax:			4%	ptax
Insurance:			1%	ins
Maintenance:			5%	maint
Management:			5%	man
Misc. exp			1%	misexp
Build: Model				
Income Statement - P& L				
Gross Rental Revenue @ Avg. occupancy		$ 93,860		
Misc income		$ -		
Deposits (caried forward)		$ 7,822		
Total Income:	$ 101,682			
Liabilities				
Loan expense			$ 46,200	
Property tax			$ 18,480	
Insurance			$ 4,620	
Management			$ 4,693	
Maintenance			$ 4,693	
Misc. exp			$ 469	
Total:		$ 79,155		
Net Cash Flow:			$ 22,527	

- Using this deterministic model as the basis for our analysis, we then introduce probabilities into the equation by trying to determine the amount and characterize the nature of the variation that could effect each variable. The potential variability can be characterized by the use of specific data distributions. Distributions may assume any shape, and include the classic bell shaped curve of the normal distribution, as well as uniform, triangular, Poisson and 27 other distributions less common to business. These are some of the most common distributions for business modeling;

- Uniform (minimum,maximum) - Used for a quantity that varies uniformly between two values, or when only a range is known.

- Triangular (minimum,most likely, maximum) a rough modeling tool for use when actual data is absent.

- Normal(μ,σ) A Normal distribution has the characteristics of a population (height, weight); size of quantities that are the sum of other quantities (because of the central limit theorem).

- Poisson(λ) Number of individual events that occur in a given unit of time, such as number of customers arriving in a queue, number of accidents on a road, number of imperfections per yard of carpet .

Figure 9: stochastic spreadsheet model				
Excel model: Build Cash Flow Analysis Database				
(per sq. ft.)				(range names)
Land costs:			=RiskUniform(8,11)	land
Building costs:			=RiskTriang(28,34,40	bcost
Totals:	$	42		sqtotal
Total Sq Ft Land:			26000	
Total Sq Ft bldg:			13000	sqland
				sqbldg
Total land cost			$ 104,000	
Total bldg cost			$ 884,000	
Total project cost			$ 988,000	
Avg. rental rate:			=RiskNormal(8.5,1.5)	rate
Avg. occ rate:			=RiskNormal(0.75,0.1	occ
Deposits forward:			$ 7,822	dep
Misc Income:			$ -	misin
Loan to value ratio:			75%	ltv
Interest Rate:			=RiskUniform(0.05,0.1	intrate
Amort.in months:			360	period
Mortgage Amt:			($74,100.00)	
Depreciation			$27,255.17	
Percents - calcualted expenses as a ratio of gross income.				
Property tax:			4%	ptax
Insurance:			1%	ins
Maintenance:			5%	maint
Management:			5%	man
Misc. exp			1%	misexp
Build: Model				
Income Statement - P& L				
Gross Rental Revenue @ Avg. occupancy			$ 82,875	
Misc income			$ -	
Deposits (caried forward)			$ 7,822	
Total Income:		$ 90,697		
IBIT		$ 76,222		
Liabilities				
Loan expense			$74,100.00	
Property tax			$ 18,480	
Insurance			$ 4,620	
Management			$ 4,693	
Maintenance			$ 4,693	
Misc. exp			$ 469	
Total:		$ 107,055		
Net Cash Flow:			($16,358)	

Figure 10 : summary statistics

@Risk printout of summary statistics:			
NPV			
Expected/Mean Result =			($8,461)
Maximum Result =			$58,239
Minimum Result =			($61,020)
Range of Possible Results =			$119,158
Probability of Positive Result =			28.80%
Probability of Negative Result =			71.20%
Standard Deviaton =			$16,123
Skewness =			0.21270107
Kurtosis =			3.202024
Variance =			2.60E+08
ERRs Calculated =			0
Values Filtered =			0
Simulatons Executed =			1
Iterations =			2000
Probabilities for NPV			
Probability of Result > 0.00	=28.8% (chance of a profit)		
>=	$7,000	16.75%	
>=	$14,000	8.70%	
>=	$21,000	3.80%	
>=	$28,000	1.50%	
>=	$35,000	0.75%	
>=	$42,000	0.25%	
>=	$49,000	0.15%	
>=	$56,000	0.05%	
>=	$63,000	0%	
Probability of Result <= 0.00	= 71.2% (chance of loss!)		
<=	($7,000)	54.30%	
<=	($14,000)	37.65%	
<=	($21,000)	22.25%	
<=	($28,000)	11.30%	
<=	($35,000)	4.25%	
<=	($42,000)	1.25%	
<=	($49,000)	0.30%	
<=	($56,000)	0.10%	
<=	($63,000)	0%	

Figure 10 shows the stochastic version of the spreadsheet model Build. This model will be run 2000 times, and summary statistics will be performed on the results, the output is a probability distribution.

The deterministic Excel spreadsheet in Figure 8 projected a 25 percent ROI and a Cash on Cash return of 15 percent. Monte Carlo risk analysis revealed that the odds of receiving this ROI were negligible, 9:1 against such an event occurring. There was a 71 percent chance that a negative cash flow would be realized.

In conclusion, we have seen how descriptive statistics, sensitivity analysis, and Monte Carlo risk analysis can reveal the extent of financial exposure that is present in a business project, based on the business persons "current state of information." The final question is to determine the value of buying additional information. This allows an analyst to determine the practicality of solving a given business problem. This is done by assessing the value of "perfect information." Perfect information would insure the maximum potential income. For this pro-forma office project perfect information is worth the maximum potential return presented in Figure 9, which is $58,138.62 annually for the life of the project. Commercial real estate projects are usually capitalized over a 10 year period. If we use a 10 year holding period for this investment, and a hurtle rate of 15% then the information to solve this problem would have a maximum NPV of $291,757 dollars to the investors. This depreciated cash flow is called a uniform present value (UPV) worth factor. The UPV is used in determining the value of "perfect information" and is used to adjust

the cash flows from various competing projects so their value can be compared on an

equal basis.

MBA Marketing Analysis Pad

Critical Issue:

Identify / Define the Problem:

Objectives: (Profitability – Sales Growth – Market Share – Risk Diversification – Innovation)

Company Mission: (Source & Focus for 10 to 20 years)

Strategic Plan: (Build – Maintain – Harvest – Divest)

Goals:

Portfolio Plans: (Vertical – Horizontal – Conglomerate – other)

Business Seen As? (? – Star – Cash Cow – Dog)

Marketing Strategy: (Develop – Change – New Product)

Product:

Price:

Place:

Promotion:

Customer:

Cost:

Financial health: (Survival Mode?)

Life Cycle: (Birth – Growth – Maturity – Decline)

Success Criteria for This Business?

Success Criteria for This Industry?

Who are Big Winners or Losers?

Why?(Clarify: Fact – Opinion – Industry Data – Generalization)

<u>GROWTH SHARE MATRIX</u>

STAR	?
CASH COW	DOGS

22%
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0

10X   1X   0 .1X
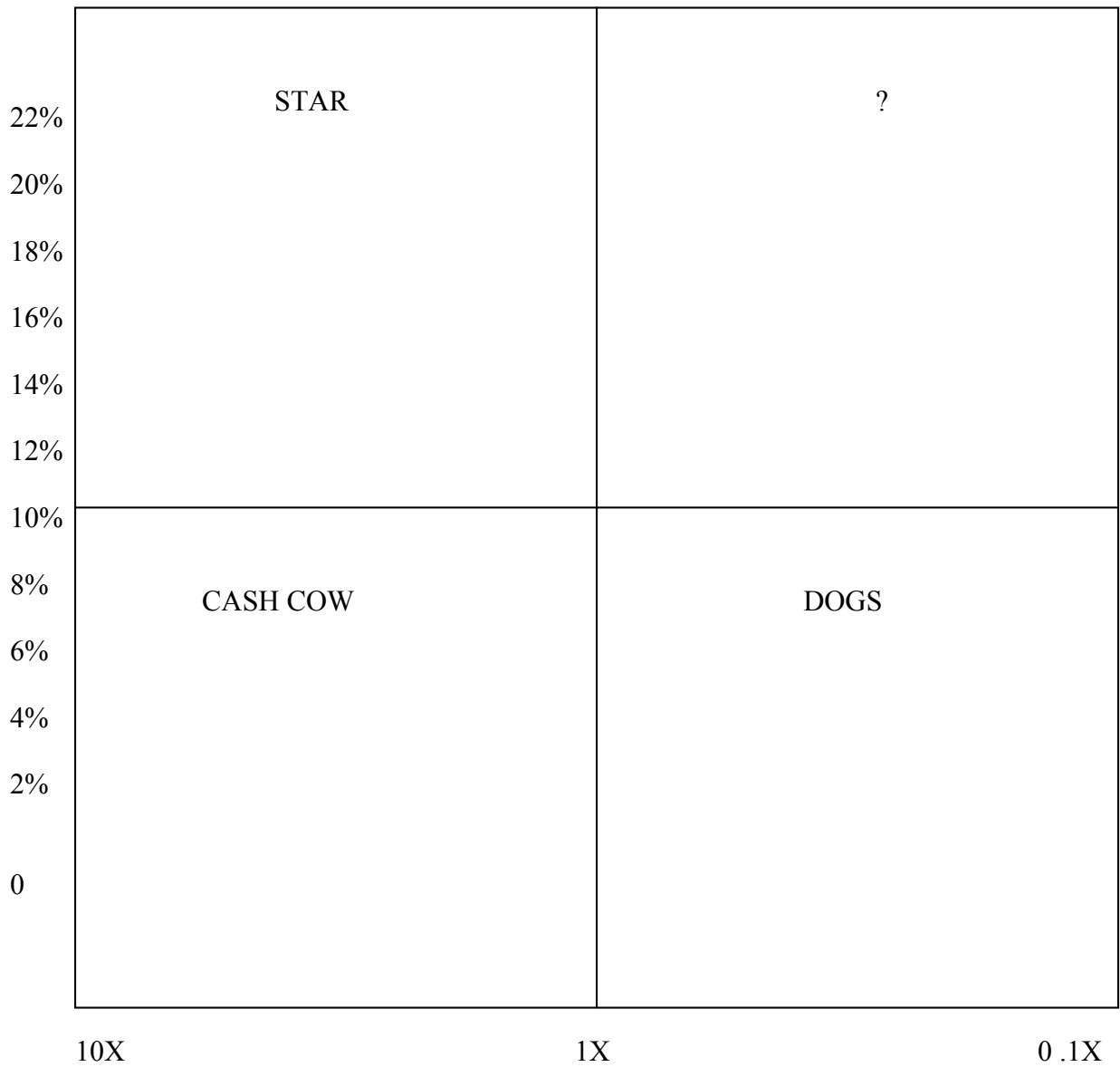
COMPETITIVE EVALUATION MATRIX

SBU'S PRODUCT COMPATISION			
MARKET SHARE %			
DISTRIBUTION METHODS			
ADVERTIZING			
CUSTOMER			
COST			
PRICE			

- What is the revenue – cost structure of the organization – product?

Relevant costs and benefits analysis: (linear programming)
(critical concept in decision making includes differential benefits) must have two choices:
- **Identification of Cost** – Benefits that change or differ for any number of competing alternative decisions.
- **Costs and Benefits** that stay the same across any number of alternatives are irrelevant; thus excluded, from analysis.
- **Relevant Costs** can be fixed or variable, if for some reason these costs will differ – very for future alternative decisions.
- **Net Incremental Benefits** = Total IB – IC

Liquidity Test: Assets _____ Liabilities _____
Current Liabilities ÷ Current Assets = _____% Acceptable = EQ 2:1
Liquidity Crisis = LE 1:1; Not Utilizing Resources = GE 5:1
Liquidity Ratio or Acid Test: Cash = _____, Short Term Liabilities = _____
(Cash + Accounts Receivable ÷ Current Liabilities) = _____%
Acceptable is GE 1:1; Cash Crisis LT 1:1.

Working Capital: Current Assets _____ – Current Liabilities _____ = WC
Is Value GE inflation? WC _____% I _____% Does growth of WC cover growth of
Operation? (Yes / No) WC_____%G_____%

Turnover Ratios: (how fast bills are paid and inventory turns over)
Accounts Payable ÷ Cost of Goods Sold X 360 = _____ days cash on hand.
Accounts Receivable ÷ Net Sales X 360 _____ customer days to pay.

Refer to Industry – Business Norms in D&B Reports – Ratios

Cash Ratios: How many days of cash a company has left
Cash _____ ÷ Net Sales _____ X 360 = _____ days till $0.00 cash.
Debt To Equity Ratio: GE 5:1 or 20% debt.
_____ Long Term Liabilities ÷ _____ Owners Equity = D/E Ratio _____%

Assets To Sales Ratio: (how many assets in dollars needed to generate an extra dollar of sales)
Total Assets ÷ Net Sales = $_____ dollars of assets required to produce $1.00 of sales.
(**Note**: high fixed costs, more than 1:1, high variable costs less than 1:1).

Dynamic Picture, change of ratio over time.
Total Fixed Assets _____ ÷ Total Assets _____ = _____
Net Worth _____ ÷ Debt _____ = _____
Net Worth ÷ _____ Total Assets = _____
Total Assets ÷ _____ Net Sales = _____

Fixed Assets _____ ÷ _____ Net Sales = _____%
Operating Profit _____ ÷ _____ Net Worth = _____%

Net Profit _____ ÷ _____ Net Worth = _____ %

Return on Investment (ROI) = After Tax Income _____ ÷ _____ Owners

Equity = _____% Return

Payback: (number years required to recoup your investment)

Net Investment _____ ÷ Net Annual Return = _____ Years to Recoup Investment.

Net Present Value (NPV) Initial Investment + Cash Flow 1 ÷ (1 + desired yield) Cash Flow 2 ÷ (1+ desired Yield) Cash Flow 2 (calculate NPV with HP 12 C) **Not acceptable unless NPV = 0 or positive**.

Internal Rate of Return (IRR) (use to compare several investment alternatives) (calculate on HP 12C)

Investment 1: (e.g. Money Market – Risk Free) $_____ Yield: $_____

Investment 2: (e.g. Tax Free Bonds) $_____ Yield: $ _____

Investment 3: (e.g. Principal Consideration) $_____ Yield $_____

Risk Factor _____

Investment 4: (Other _____) $_____ Yield $_____

Risk Factor _____

Investment 5: (Other _____) $_____ Yield $ _____

Risk Factor _____

Drafting Profit & Loss Pro-Forma Analysis:

- Determine past expense loads (% of sales) alternative D&B.
- Project expenses at past levels or relative to expected sales.
- Determine total expenses, tax rates, after tax profits.

Drafting Balance Sheet Pro-Forma Analysis:

- Estimate sales forecast.
- Apply past ratio levels to forecast future needs.

Drafting Cash Flow Pro-Forma Analysis:

- Time period of cash flows WK-MO-YR.
- Calculate cash inflows plus cash balance.
- Calculate cash outflows.
- Determine net cash flows.
- Project into future periods if necessary.

Cost – Revenue Analysis:

- Relevant costs equal incremental – differential costs.
- Contribution analysis.

- Breakeven analysis.

Contribution Analysis:

- Total Sales – variable costs equal contribution to fixed costs and profit.

Unit Contribution:

- Total contribution divided by total unit output.

Breakeven Analysis:
(How many units you must produce – market so total revenue equals costs).
BEV = Fixed Cost ÷ Contribution Per Unit
BEV = Fixed Cost ÷ (Sales Price – Variable Cost)
Variable Costs as a % of Sales:
Total Sales = $_____ - (variable costs) $ _____%
Fixed Cost (%) equals cost per product sold: $_____%

Breakeven Volume:

- Compare to Forecasted Sales _____% $_____
- Total Market Size _____% $_____
- Realistic Share of Market _____% $_____
- Available Capacity _____ Needed _____
- Breakeven $ _____ Projected $ _____
(if forecasted sales are LE 50%?)

Breakeven Sales Price (BESP)
BESP = Fixed Costs ÷ Units of Capacity (Volume) + Unit Variable Costs.

Operating Leverage:
(Double Edged) This Case (**Positive – Negative**)
(Ideal usage is for leveraging or increasing resources).
Positive: Total profits increase at a faster rate than sales volume once breakeven is reached.
(e.g. high fixed cost equal higher leverage and losses increase faster than for a business with low fixed – high variable).

Goals:
High Fixed: Concentrate on Marketing – sales – high volume.
High Variable: Same plus internal review & control.
Capacity Analysis:
(For manufacturing companies)
(Batch – Unit – Continuous Production)

Diagram the problem (PERT – CPM – Process Flow – Decision Analysis Tree)

Industry & Market Analysis:
(Must relate to a particular company and its problems and opportunities, can be used to analyzed – draft a **Mission Statement**)

- Reference Point:
- Direct Competition:
- Potential Competitors:
- What is the "relevant" definition of the industry for **this** company?
- Adjust for Time:
- Companies in the Market:
- What characteristics do they have relative to this company?

(Consider: Number – Relative Size – Traditions – Cost Structures – Market Growth)

- How many suppliers service this industry – business?

1:
2:
3:
4:
5:
6:

- List their characteristics:

1:
2:
3:
4:
5:
6:

- Posture toward this company:

1:
2:
3:
4:
5:
6:

- How many buyers? (public – wholesalers – suppliers – end users – government – military)
- (List their characteristics:

1:
2:
3:
4:
5:
6:

- Their attitude toward this company and why? (Marketing survey)
- Who are the end users?
- Distributors – any bargaining power available?
- Customer Needs – Wants

1:
2:
3:
4:
5:
6:

- Customer future needs and wants?

1:
2:
3:
4:
5:
6:

Value Added Analysis:

(Sales – Raw materials costs) ÷ number of product sold.
(Profitability is limited within some range by the amount of value it can add to a product or service).

- Forward or backward integration recommended:
- (low value added easy entry into business by suppliers – buyers).
- Market size growth: _____% (Annually – Monthly – Other).
- Present Size: _____

EOY 1:
EOY 2:
EOY 3:
EOY 4:
EOY 5:

Issuing New Stock: (Effects of)

Existing shares of stock _____ plus new stock issued _____
Equals _____ shares: Value of stock (Total) $_____ divided by
total new shares equals _____ **Diluted Value**.

- Prudent to make this move at this time:
- Alternatives: (Borrow Money – Liquidate Assets – Inventory – Other)

Recommendations:

Build – Hold – Harvest – Divest:
Business could be? (? – Star – Cash Cow – Dog).

Options and Alternatives (Objectives and Constraints)

1:
2:
3:
4:
5:
6:

Recommended Course or Action:

Actions and Results Expected: