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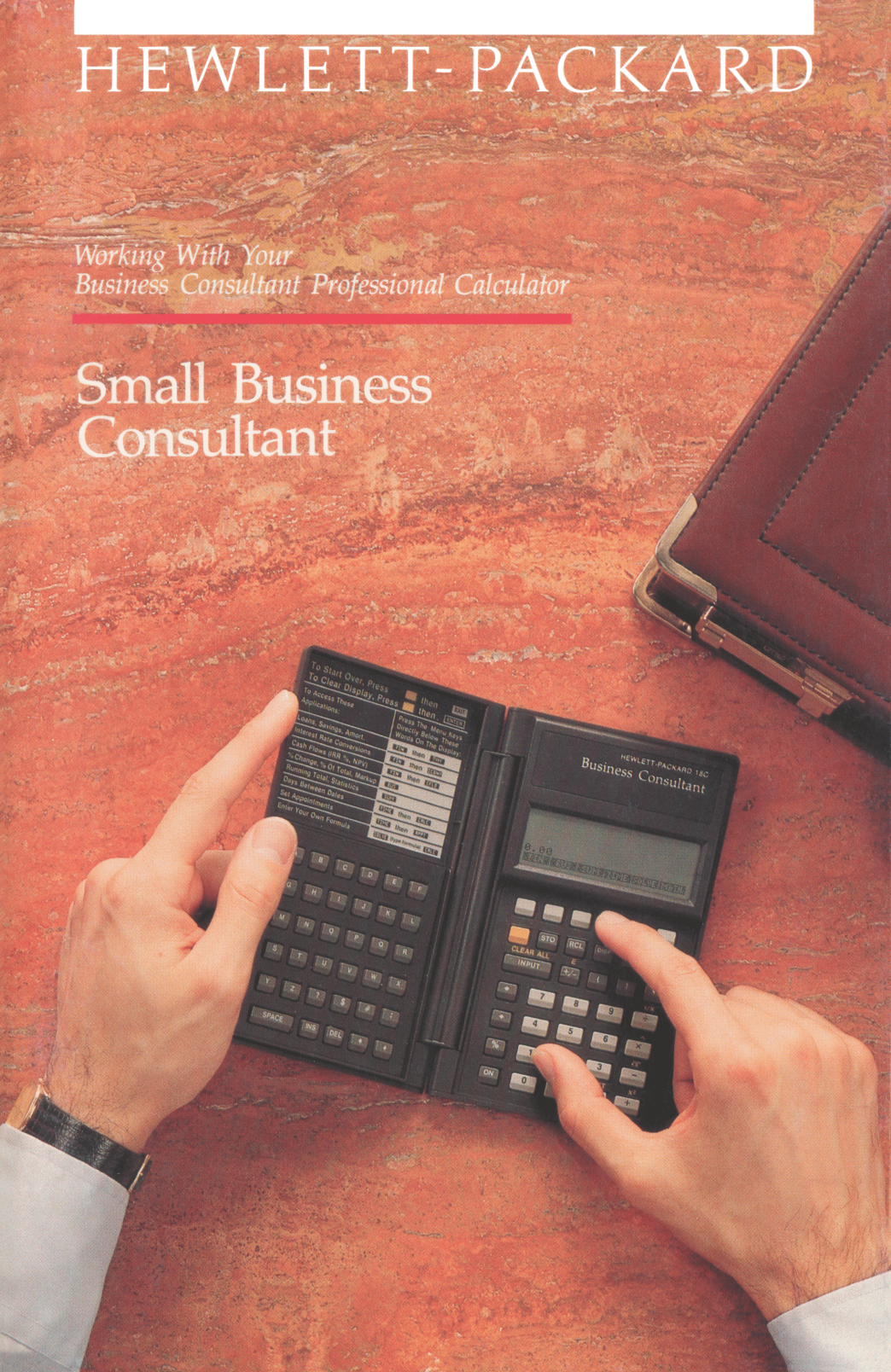
Working With Your
Business Consultant Professional Calculator

Small Business Consultant



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Professional Calculator

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Welcome...

... to the Consultant applications series! This series is designed to help you get the most from your Business Consultant professional calculator.

The purpose of the *Small Business Consultant* is to help you solve the specialized problems your industry or profession demands. We've worked with professionals in your field to provide a sample of analysis concepts that are useful and relevant. Included are keystrokes and routines to help you figure quotes and charges, forecast sales, make investment decisions and calculate depreciation and leasing expenses. The *Small Business Consultant* is designed to serve both as a reference and a starting point for using the Business Consultant to develop your own unique analyses.

Before you use the solutions in this book, you should be familiar with certain concepts from the owner's manual:

- Chapter 1: the basics of your calculator—how to move from menu to menu, identify and move to the MAIN menu, and use the menu keys to do calculations.
- Chapter 9: entering and using formulas.

The examples in this book show two decimal places. If your display is set to something other than two, the answers in your display will not match exactly what is in this book. Refer to your owner's manual for more information about changing the number of decimal places.

For more information about the topics in the *Small Business Consultant*, refer to a basic textbook on the subject. Specific sources on the more specialized topics are included at the end of those topics.

Contents

When Entering Formulas...

When entering formulas into your Business Consultant, follow the instructions in chapter 9 of your owner's manual. Here are hints to help you in common error situations:

1. If the calculator displays INVALID FORMULA when you press CALC, the calculator doesn't understand something in the formula. When the formula returns to the screen, the cursor is positioned where your calculator detected the error. Check the formula in the screen against the formula in the book. Make sure the parentheses match and that the operators are where they should be.
2. If the calculator accepts the formula but your answer doesn't match the example, check the values stored in the menu key variables by recalling them (press RCL, then the menu key). If the values are correct, return to the SOLVE menu and check the formula. (Press EXIT to return to the SOLVE menu and press EDIT to view and edit the formula.) Check the formula against the one in this book for accuracy. When you find an error, edit the formula and press CALC to display the custom menu again.
3. If the calculator displays INSUFFICIENT MEMORY when you press INPUT or CALC, you must free portions of memory before continuing. Refer to pages 188 and 189 of the owner's manual for additional information.

The formulas in the *Small Business Consultant* use variable names that are intended to remind you of what to store. Feel free to change them to something more meaningful to you.

Markup Calculations

Markup calculations are used by retailers and wholesalers to determine the selling price of an item. Your Business Consultant includes a built-in menu for calculating markup as a percent of cost and markup as a percent of price.

1. From the MAIN menu, press BUS to display the BUS menu.
2. Press MU%C to display the MU%C (markup on cost) menu, or MU%P to display the MU%P (markup on price) menu.
3. Store each of the values you know by keying in the number and pressing the appropriate menu key.
4. Press the menu key for the value you want to calculate.

Example 1: Calculate selling price and markup as a percent of cost, given cost and markup as a percent of price. Part 1. An item costs $160. The reseller's required markup as a percent of selling price is 20%. What is the selling price?

Start from the MAIN menu.

Keys:	Display:	Description:
BUS MU%P		Displays MU%P menu.
160 COST	COST=160.00	Stores your cost.
20 M%P	MARKUP%P=20.00	Stores markup as a percent of price.
PRICE	PRICE=200.00	Calculates selling price.

Part 2. What is the markup as a percent of the cost?

EXIT MU%C		Displays MU%C menu.
M%C	MARKUP%C=25.00	Calculates markup as a percent of cost.

Example 2: Calculate cost and markup as a percent of price, given selling price and markup as a percent of cost. Part 1. An item sells for $21.00. The markup as a percent of cost is 50%. What is its cost?

Start from the MAIN menu.

Keys:	Display:	Description:
BUS MU%C		Displays MU%C menu.
21 PRICE	PRICE=21.00	Stores selling price.
50 M%C	MARKUP%C=50.00	Stores markup as a percent of cost.
COST	COST=14.00	Calculates your cost.

Part 2. What is the markup if expressed as a percent of price?

EXIT MU%P		Displays MU%P menu.
M%P	MARKUP%P=33.33	Calculates markup as a percent of price.

Example 3: Calculate cost and markup on cost, given selling price and markup on price. Part 1. An item sells for $38, with a markup on price of 30%. What is the markup on cost?

Start from the MAIN menu.

Keys:	Display:	Description:
BUS MU%P		Displays MU%P menu.
38 PRICE	PRICE=38.00	Stores selling price.
30 M%P	MARKUP%P=30.00	Stores markup on price.
COST	COST=26.60	Calculates your cost.
EXIT MU%C		Displays MU%C menu.
M%C	MARKUP%C=42.86	Calculates markup on cost.

Part 2. If the markup on cost is raised to 50%, what is the new selling price?

50 M%C	MARKUP%C=50.00	Stores new markup on cost.
PRICE	PRICE=39.90	Calculates new selling price.

Setting a Sales Price

One method of setting a unit sales price is to determine the unit cost of production then multiply by the desired rate of return. For this method to be accurate, you must identify all costs associated with the product.

Entering and Using the PRICE Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the PRICE formula as follows:

   PRICE=COST÷UNITS×(1+%RTN÷100)
3. Press CALC to verify the formula and display the custom menu.
4. Store three of the following variables:
   - Price per unit in PRICE.
   - Total costs in COST.
   - Number of units produced in UNITS.
   - Desired percent rate of return in %RTN.
5. Press the menu key to calculate the unknown variable.

Example: Part 1. To produce 2,000 units, your cost is $40,000. You want a 20% rate of return. What price should you charge?

Start from the PRICE custom menu.

Keys:	Display:	Description:
40000 COST	COST=40,000.00	Stores total production costs.
2000 UNITS	UNITS=2,000.00	Stores number of units.
20 %RTN	%RTN=20.00	Stores rate of return.
PRICE	PRICE=24.00	Calculates price.

Part 2. You know that on this particular product, you can only charge $22.50. At that price, what is your rate of return?

22.5 PRICE	PRICE=22.50	Stores price.
%RTN	%RTN=12.50	Calculates percent rate of return.

Forecasting Using Simple Moving Average

Moving averages are often useful to forecast sales, production rates, or expenses. In a moving average, a specified number of data points are averaged. When there is a new piece of input data, the oldest piece of data is discarded to make room for the most recent data. This replacement scheme makes the moving average a valuable tool in following trends. The fewer the number of data points, the more trend sensitive the averages become. With a large number of data points, the average behaves more like a regular average, responding slowly to new input.

1. From the MAIN menu, press SUM to display the SUM menu.
2. Press CLEAR ALL YES to clear the list. (If you don't want to delete the list, name the old list and get a new one.)
3. Enter your data.
4. Press CALC, then MEAN to calculate the average.
5. When you have a new data point, move the pointer to the oldest item. Enter the new item and press INPUT. The oldest item is replaced by the new one.

Example. You want to calculate a 3 month moving average for the units sold each month. Volumes for the first six months were:

January	440	April	367
February	536	May	404
March	290	June	320

Start from the MAIN menu.

Keys:	Display:	Description:
SUM *		Displays SUM menu.
[orange] CLEAR ALL YES		Clears the list.
440 INPUT 536 INPUT 290 INPUT	TOTAL=1,266.00	Enters sales for the first three months.
CALC MEAN	MEAN=422.00	Calculates average for first three months.
EXIT		
[orange] ↑		Moves pointer to top of list.
367 INPUT	TOTAL=1,193.00	Enters month four and deletes oldest item.
CALC MEAN	MEAN=397.67	Calculates average for months two, three, and four.
EXIT		
404 INPUT	TOTAL=1,061.00	Enters month five and deletes oldest item.
CALC MEAN	MEAN=353.67	Calculates average for months three, four, and five.
EXIT		
320 INPUT	TOTAL=1,091.00	Enters month six and deletes oldest item.
CALC MEAN	MEAN=363.67	Calculates average for months four, five, and six.

* If you want to preserve the current list, skip the next step (pressing [orange] CLEAR ALL), name the list, then press GET *NEW.

Forecasting Based on History

One method of forecasting sales, manufacturing rates or expenses is to look at historical trends. Once you have historical data, the data are fit to a curve with time on the x-axis, and the quantity you are forecasting on the y-axis. Linear curve fit is appropriate if you have a fairly constant growth rate; exponential curve fit is appropriate with compound growth, such as might occur for sales of a new product.

1. From the MAIN menu, press SUM to display the SUM menu.
2. Press ■ CLEAR ALL YES to clear the list. (If you don't want to delete the list, name the old list and get a new one.)
3. Enter your time data. Press INPUT after each item.
4. Name your list.
5. Press GET *NEW to get a new list. Enter your historical data as in step 3.
6. Name your list.
7. Press CALC, MORE, then FRCST.
8. Select the list containing your x-values.
9. Select the model (LIN for linear, EXP for exponential).
10. Key in the x-value and press XLIST.
11. Press YLIST to forecast the y-value.

Example 1: Forecasting using linear curve fit. You want to determine the sales forecasts for the next two years using a linear curve fit. The following data represents your sales for the past nine years.

Year	Sales ($)
1	10,000
2	11,210
3	13,060
4	16,075
5	20,590
6	21,000
7	24,065
8	28,072
9	32,519

Start from the MAIN menu.

Keys:	Display:	Description:
SUM *		Displays SUM menu.
CLEAR ALL YES		Clears the list.
1 INPUT 2 INPUT 3 INPUT 4 INPUT 5 INPUT 6 INPUT 7 INPUT 8 INPUT 9 INPUT	TOTAL=45.00	Enters time values.
NAME YEARS INPUT		Names the list.
GET *NEW		Displays a new list.
10000 INPUT 11210 INPUT 13060 INPUT 16075 INPUT 20590 INPUT 21000 INPUT 24065 INPUT 28072 INPUT 32519 INPUT	TOTAL=176,591.00	Enters sales data.
NAME SALES INPUT		Names the list.
CALC MORE FRCST		Selects FRCST menu.

* If you want to preserve the current list, skip the next step (pressing CLEAR ALL), name the list, then press GET *NEW.

YEARS		Selects list YEARS as the x-variable.
LIN		Selects linear model.
10 XLIST	XLIST=10.00	Stores year 10 as the x-value.
YLIST	YLIST=33,587.64	Calculates a y-value—sales forecast for year 10.
11 XLIST	XLIST=11.00	Stores year 11 as the x-value.
YLIST	YLIST=36,380.92	Calculates a y-value—sales forecast for year 11.

Example 2: Forecasting using exponential curve fit. The production history for your new product is shown below for the first six months after introduction.

Month	Production Rate
June	317
July	525
August	483
September	566
October	727
November	909

Part 1. Using the exponential model, predict the production rate for December.

Start from the MAIN menu.

Keys:	Display:	Description:
SUM *		Displays SUM menu.
CLEAR ALL YES		Clears the list.
1 INPUT 2 INPUT 3 INPUT 4 INPUT 5 INPUT 6 INPUT	TOTAL=21.00	Enters month numbers.
NAME MONTHS INPUT		Names the list.
GET *NEW		Displays a new list.
317 INPUT 525 INPUT 483 INPUT 566 INPUT 727 INPUT 909 INPUT	TOTAL=3,527.00	Enters monthly production rates.
NAME RATE INPUT		Names the list.
CALC MORE FRCST		Displays FRCST menu.
MONT		Selects list MONTH as the x-variable.
EXP		Selects exponential model.
7 XLIST	XLIST=7.00	Stores month 7 as the x-value.
YLIST	YLIST=1,057.79	Calculates a y-value—projected production rate for December, the seventh month.

* If you want to preserve the current list, skip the next step (pressing CLEAR ALL), name the list, then press GET *NEW.

Part 2. Calculate the continuous compound growth rate.

B [×] 100		Calculates estimate of the
[=]	18.29	monthly compound growth rate.

Revising Your Forecast to Reflect Current Market Conditions

Most sales forecasts are based on certain assumptions about, and incomplete knowledge of, your market and competition. After the forecasts are made, internal and external changes make your original assumptions and your forecast incomplete. Examples of these changes in the market that were not reflected in the original forecast are a price drop (yours or your competitors), advertising or promotional campaign, rebate offer, introduction of a new product by a competitor, or a change in distribution of your product. The formula below helps you revise your forecast, based on the perceived impact of the market changes.

Entering and Using the NEWFCST Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the NEWFCST formula as follows:*

   `NEWFCST=BASE+((A%+B%+C%)÷100)×BASE`
3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Original forecast in BASE.
   - Expected change in sales caused by each change in the market in A%, B%, and C%.*
5. Press NEWF to calculate the new forecast.

* This formula can be modified to fit the number of changes for your current market condition. If you have two factors, omit `+C%`; if you have five factors, change the part in parentheses to `(A%+B%+C%+D%+E%)`.

Example. The forecast for your product for next month is 2,000 units. Three market changes are happening next month that are not reflected in your current forecast: you are reducing the price on the product and expect a 20% increase in sales; you are taking advantage of a special advertising opportunity with your local media and expect a 5% increase in sales; you've learned that a competitor is introducing a new product and expect a 15% cut into your sales. Calculate the new forecast for the month.

Start from the NEWFCST custom menu.

Keys:	**Display:**	**Description:**
2000 BASE	BASE=2,000.00	Stores original forecast.
20 A%	A%=20.00	Stores sales increase expected due to price drop.
5 B%	B%=5.00	Stores sales increase expected due to advertising.
15 +/- C%	C%=-15.00	Stores sales decrease due to new competition.
NEWF	NEWFCST=2,200.00	Calculates new forecast for the month.

Estimating Inventory Availability

Availability estimates tell you approximately how long your inventory will last, based on forecast rates or usage rates. The formula below can be applied to finished goods or production parts. This formula calculates availability in weeks, based on inventory on hand and usage per month.

Entering and Using the AVAIL Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the AVAIL formula as follows:*

   AVAIL=(INVEN÷USAGE)×4.33
3. Press CALC to verify the formula and display the custom menu.
4. Store two of the following variables:
   - Availability in weeks in AVAIL.
   - Inventory on hand in INVE.
   - Forecast or usage per month in USAGE.
5. Press the menu key to calculate the unknown variable.

* This formula assumes 4.33 weeks per month. It can be easily altered to fit other situations. For example, if you omit ×4.33, the formula calculates availability in months.

Example: Part 1. You have 800 units available at the end of the month. The forecast for next month is 1,200 units. How long will your supply last?

Start from the AVAIL custom menu.

Keys:	Display:	Description:
800 INVE	INVEN=800.00	Stores current inventory.
1200 USAGE	USAGE=1,200.00	Stores forecast.
AVAIL	AVAIL=2.89	Calculates weeks of availability.

Part 2. You like to keep 7 weeks of supply on hand. What should your inventory be?

7 AVAIL	AVAIL=7.00	Stores weeks of availability.
INVE	INVEN=1,939.95	Calculates inventory needed.

Stockturn or Inventory Turnover Rate

The stockturn or inventory turnover rate is a measure of the number of times the average inventory is sold in a year. The stockturn rate is important because it shows how rapidly the firm's inventory is moving. The data needed to compute the stockturn rate are beginning and ending inventory in cost dollars and the cost of the goods sold, or, the beginning and ending inventory in retail dollars and the retail dollars sold.

Entering and Using the STURN Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the STURN formula as follows:

   STURN=$SOLD÷((BEGINV+ENDINV)÷2)
3. Press CALC to verify the formula and display the custom menu.
4. Enter three of the following variables; remember that all dollar values must be either cost dollars or retail dollars, depending on your business:
   - Stockturn rate in STURN.
   - Dollars sold in $SOL.
   - Beginning inventory in dollars in BEGI.
   - Ending inventory in dollars in ENDI.
5. Press the menu key to solve for the unknown variable.

Example: Part 1. Last year the cost of the goods that were sold was $30,000, beginning inventory was $8,000, and ending inventory was $7,000. Calculate the stockturn rate.

Start from the STURN custom menu.

Keys:	Display:	Description:
30000 $SOL	$SOLD=30,000.00	Stores dollars sold.
8000 BEGI	BEGINV=8,000.00	Stores beginning inventory.
7000 ENDI	ENDINV=7,000.00	Stores ending inventory.
STURN	STURN=4.00	Calculates stockturn rate for the year.

Part 2. Suppose the company prefers inventory with a limited shelf life to turn every two months (6 times a year). How would this change your ending inventory?

6 STURN	STURN=6.00	Stores desired stockturn rate.
ENDI	ENDINV=2,000.00	Calculates ending inventory.

Economic Ordering Quantity

The economic ordering quantity is the optimum quantity to order each time an order is placed. It is based on the cost of placing and receiving an order, annual sales, carrying costs (including warehousing costs, interest on funds tied up in inventory, insurance, and obsolescence), and the purchase price of the goods.

The equation below assumes that usage is at a constant rate and that delivery lead times are constant.

Entering and Using the EOQ Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the EOQ formula as follows:

   `EOQ=SQRT(2×FIXCO×#UNITS÷(CARY%÷100×PRICE))`
3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Fixed costs of placing and receiving an order in FIXCO.
   - Annual unit sales in #UNI.
   - Carrying costs as a percentage of inventory value in CARY%.
   - Purchase price per unit of inventory in PRICE.
5. Press EOQ to calculate the economic ordering quantity.

Example. Your annual sales are 10,000 units. Purchase price per unit is $4.73. Carrying cost is 20% of inventory value and the cost of placing and receiving an order is $35. What is the economic ordering quantity?

Start from the EOQ custom menu.

Keys:	Display:	Description:
35 FIXCO	FIXCO=35.00	Stores fixed cost of placing an order.
10000 #UNI	#UNITS=10,000.00	Stores annual sales in units.
20 CARY%	CARY%=20.00	Stores carrying cost.
4.73 PRICE	PRICE=4.73	Stores price per unit.
EOQ	EOQ=860.21	Calculates economic ordering quantity.

Planning Advertising Expenditures

The advertising-sales ratio helps determine how much money to spend for advertising, based on projected sales. To use the formula below, you need to know the forecast unit sales, revenues per unit, and the percent of sales to be spent on advertising.

Although this calculation is simple to do on any calculator, using SOLVE makes it easy to try what-if situations, and analyze how a change in advertising dollars or revenues will change advertising as a percent of sales.

Entering and Using the AD$ Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the AD$ formula as follows:

   AD$=#UNITS×$REV×AD%÷100
3. Press CALC to verify the formula and display the custom menu.
4. Store three of the following variables:
   - Advertising cost in AD$
   - Number of units forecast to be sold in #UNI.
   - Dollars of revenue per unit (price less discount) in $REV.
   - Percent of sales that makes up the advertising budget in AD%
5. Press the menu key to calculate the unknown variable.

Example: Part 1. You expect to sell 2,000 units next month. The unit revenue is $15. The normal advertising budget is 5% of projected sales. How much can you spend on advertising next month?

Start from the AD$ custom menu.

Keys:	Display:	Description:
2000 #UNI	#UNITS=2,000.00	Stores sales forecast.
15 $REV	$REV=15.00	Stores unit revenue.
5 AD%	AD%=5.00	Stores advertising percent.
AD$	AD$=1,500.00	Calculates advertising dollars for the month.

Part 2. You just learned about a special advertising opportunity that costs $2,000. What percentage of your revenue must you devote to advertising to take advantage of this opportunity?

2000 AD$	AD$=2,000.00	Stores advertising dollars.
AD%	AD%=6.67	Calculates advertising as a percent of revenue.

Cost of Failing to Take a Cash Discount

A cash discount gives a buyer a reduction in price if payment is made within a specified time period. For example: "2/10, net 30" means that the buyer can deduct 2 percent if payment is made within 10 days after the date of billing. If payment is not made within 10 days, the full amount must be paid by the 30th day.

The formula below calculates the cost of failing to take the cash discount. The cost is calculated as an annual interest rate charged for delaying payment.

Entering and Using the COST% Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the COST% formula as follows:

   ```
   COST%=DISC%÷(100-DISC%)×360
   ÷(TOTDA-DISCDA)×100
   ```

3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Discount percent if the payment is made early in DISC%.
   - Total number of days until the bill must be paid in TOTDA.
   - Number of days for which discount is available in DISCD.
5. Press COST% to calculate the cost of failing to take the discount.

Example 1. You receive a bill with the credit terms 2/10, net 30. What is the cost of not taking the cash discount?

Start from the COST% custom menu.

Keys:	Display:	Description:
2 DISC%	DISC%=2.00	Stores discount rate.
30 TOTDA	TOTDA=30.00	Stores total days.
10 DISCD	DISCDA=10.00	Stores number of days discount is available.
COST%	COST%=36.73	Calculates annual interest rate for not taking the cash discount.

Example 2. Another bill has credit terms 3/10, net 180. What is the cost of not taking this discount?

Keys:	Display:	Description:
3 DISC%	DISC%=3.00	Stores discount rate.
180 TOTDA	TOTDA=180.00	Stores total days.
10 DISCD	DISCDA=10.00	Stores number of days discount is available.
COST%	COST%=6.55	Calculates annual interest rate for not taking the cash discount.

Simple Payback Period

The simple payback period method determines the length of time (in years) required for a business to recover its entire investment in a capital expenditure. Capital expenditures are purchases of assets such as machinery or equipment that have lives of one year or more.

The shorter the payback period, the better—the sooner the investment is recovered, the sooner the funds can be used for another project. For a capital expenditure to be considered profitable, its life must exceed the length of the payback period.

Entering and Using the PAYBK Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the PAYBK formula as follows:

   PAYBK=INVEST÷INFLOW
3. Press CALC to verify the formula and display the custom menu.
4. Store two of the following variables:
   - Length of time in years required to recover investment in PAYBK.
   - Investment in capital expenditure in INVES.
   - Annual cash inflow for the life of the purchase in INFLO.
5. Press the menu key to calculate the unknown variable.

Example: Part 1. You are considering a new machine costing $100,000. The annual cash inflow for the life of the machine is $15,000. What is the payback period?

Start from the PAYBK custom menu.

Keys:	Display:	Description:
100000 INVES	INVEST= 100,000.00	Stores investment.
15000 INFLO	INFLOW=15,000.00	Stores yearly inflow.
PAYBK	PAYBK=6.67	Calculates payback period in years.

Part 2. Your company desires a payback period of 5 years. What must the investment be to meet this goal?

5 PAYBK	PAYBK=5.00	Stores required payback period.
INVES	INVEST=75,000.00	Calculates investment.

Using NPV and IRR to Make Investment Decisions

Net present value (NPV) and internal rate of return (IRR) are used to determine if an investment meets a minimum rate of return and what rate of return can be expected. The built-in CFLO menu makes it easy to calculate these two values.

The method below helps the decision-making process when choosing between two mutually exclusive options—such as deciding between two pieces of equipment. This method looks at the period by period difference between the two investments, then uses these differences as cash flows. The investment becomes the difference between option A and option B. If the net present value is positive at the desired rate of return, then the more expensive option is the better one; otherwise, the less expensive option is better.

When the differences result in a conventional series of cash flows (one sign change), you can also look at the IRR% to determine which is the better investment. (Refer to the footnote in table 5-2 on page 87 of the owner's manual for the definition of "conventional series of cash flows.") If the IRR% is higher than your required percent, the investment in the more expensive machine is a good investment. If the differences are not a conventional series of cash flows, you can still use NPV to analyze the investment.

1. From the MAIN menu, press FIN then CFLO to display the CFLO menu.
2. Press CLEAR ALL YES to clear the list. (If you don't want to delete the list, name the old list and get a new list.)
3. Calculate the difference between the cash flows for the two options for each period. Enter the net cash flows and number of periods into the cash flow number list.
4. Press CALC to display the cash flow CALC menu.
5. To calculate the net present value, enter the periodic interest rate as a percent in I%, then press NPV.
6. To calculate the internal rate of return, press IRR%.

Example. You want to compare two equipment options. The table below summarizes the initial flows, the cash flows over the five year life of the machines, and the difference between the two options.

	A	B	A−B
Initial Investment	$−35,000	$−25,000	$−10,000
Cost in year 1	−200	−1,300	1,100
Cost in year 2	−200	−1,400	1,200
Cost in year 3	−200	−2,500	2,300
Cost in year 4	−800	−2,500	1,700
Cost in year 5	15,000	7,000	8,000

Calculate the IRR% and NPV to determine which machine should be purchased. (Note that this is a conventional series of cash flows.) The required rate of return is 10%.

Start from the MAIN menu.

Keys:	Display:	Description:
FIN CFLO *		Displays CFLO menu.
CLEAR ALL YES		Clears the list.
10000 +/- INPUT		Enters initial cash flow.
1100 INPUT INPUT 1200 INPUT INPUT 2300 INPUT INPUT 1700 INPUT INPUT 8000 INPUT INPUT		Enters cash flows.
CALC		Displays CALC menu.
10 I%	I%=10.00	Stores required return on investment.
NPV	NPV=-151.75	Calculates net present value.
IRR%	IRR%=9.56	Calculates internal rate of return.

Option B is the better choice because NPV is negative and IRR% is 9.56%, less than the 10% required rate of return.

* If you want to preserve the current list, skip the next step (pressing CLEAR ALL), name the list, then press GET *NEW.

Return on Investment

Another way of evaluating a new investment is through a simple return on investment (ROI) analysis. Return on investment (ROI) is the ratio of net profit after taxes to the assets used to make the net profit.

Although this calculation is simple to do on any calculator, using SOLVE makes it easy to try what-if situations, and analyze what you can do to meet a minimum return on investment.

Entering and Using the ROI% Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the ROI% formula as follows:

   ROI%=$REV×PROF%÷$INV
3. Press CALC to verify the formula and display the custom menu.
4. Store three of the following variables:
   - Return on investment as a percent in ROI%.
   - Total revenues in $REV.
   - Net profit as a percent of revenues in PROF%.
   - Capital investment in the project or business in $INV.
5. Press the menu key to calculate the unknown variable.

Example: Part 1. A new department in your store requires $4,800 in new assets. The anticipated revenues the first year are $10,000. Your net profit goal is 10%. Assuming the net profit goal is met, calculate the return on investment.

Start from the ROI% custom menu.

Keys:	Display:	Description:
10000 $REV	$REV=10,000.00	Stores total anticipated revenues.
10 PROF%	PROF%=10.00	Stores net profit percent.
4800 $INV	$INV=4,800.00	Stores investment.
ROI%	ROI%=20.83	Calculates percent return on investment.

Part 2. The department's sales are actually $7,500 in the first year. Calculate the ROI%.

7500 $REV	$REV=7,500.00	Stores actual revenues.
ROI%	ROI%=15.63	Calculates percent return on investment.

Part 3. At the level of revenues in part 2, what total investment can you sustain to achieve an ROI% of 18%.

18 ROI%	ROI%=18.00	Stores required ROI%.
$INV	$INV=4,166.67	Calculates investment to reach this goal.

Part 4. Suppose you realize a 5% net profit on revenues of $7,500. Your investments are $4,800, as in part 1. Calculate the ROI%.

5 PROF%	PROF%=5.00	Stores net profit.
4800 $INV	$INV=4,800.00	Stores investment.
ROI%	ROI%=7.81	Calculates return on investment.

Break-Even Analysis

Break-even analysis is a technique for analyzing the relationships among fixed costs, variable costs, and income. Until the break-even point is reached (total costs equal total income), you operate at a loss. After the break-even point, each unit sold makes a profit. The variables in the formula below are fixed costs, variable costs per unit, sales price per unit, number of units sold, and gross profit.

Entering and Using the PROFIT Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the PROFIT formula as follows:

   `PROFIT=#SOLD×(PRICE-VARCO)-FIXCO`
3. Press CALC to verify the formula and display the custom menu.
4. Store four of the following variables:
   - Gross profit in PROFI.
   - Number of units sold in #SOL.
   - Selling price per unit in PRICE.
   - Variable costs per unit in VARCO.
   - Fixed costs in FIXCO.
5. Press the menu key to calculate the unknown variable.

Example: Part 1. Your product sells for $13. The fixed costs are $12,000. Variable costs are $6.75 per unit. Calculate the number of units that must be sold to break even (profit equals zero).

Start from the PROFIT custom menu.

Keys:	Display:	Description:
0 PROFI	PROFIT=0.00	Stores break-even profit of zero.
13 PRICE	PRICE=13.00	Stores price per unit.
6.75 VARCO	VARCO=6.75	Stores variable costs per unit.
12000 FIXCO	FIXCO=12,000.00	Stores fixed costs.
#SOL	#SOLD=1,920.00	Calculates number that must be sold to break even.

Part 2. Calculate the gross profit if 2,500 units are sold.

2500 #SOL	#SOLD=2,500.00	Stores number sold.
PROFI	PROFIT=3,625.00	Calculates gross profit.

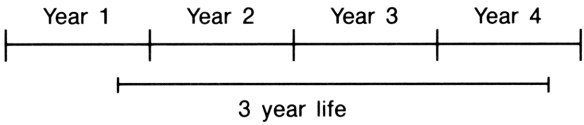
Part 3. You want a gross profit of $4,500 at the sales volume in part 2 (2,500 units). What should the selling price be?

4500 PROFI	PROFIT=4,500.00	Stores required gross profit.
PRICE	PRICE=13.35	Calculates required selling price.

Depreciation Calculations

Four methods of depreciation are included in this section: straight-line, sum-of-the-years-digits, declining-balance, and Accelerated Cost Recovery System.

Note for straight-line, sum-of-the-years-digits and declining-balance depreciation: If the number of months in the first calendar year is less than 12, the amount of depreciation in the first year and last year will be less than a full year's depreciation. The actual number of years that depreciation will occur is equal to the life plus one. For example, a drill has a life of three years and is purchased three months before year end. The following time diagram shows that depreciation will occur over four calendar years.



Straight-Line Depreciation

Entering and Using the SL Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the SL formula as follows:

   `SL=(BOOK-SALV)÷LIFE×#MO÷12`
3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Starting book value in BOOK.
   - Salvage value in SALV.
   - Useful life expectancy in LIFE.
   - Number of months in the year that you depreciate the asset in #MO.
5. Press SL to calculate the yearly straight-line depreciation on the asset.

Example 1: Part 1. On September 1, your company purchased a machine for $10,000. Its useful life is five years and the salvage value is $500. Calculate the depreciation for the first year.

Start from the SL custom menu.

Keys:	Display:	Description:
10000 BOOK	BOOK=10,000.00	Stores book value.
500 SALV	SALV=500.00	Stores salvage value.
5 LIFE	LIFE=5.00	Stores useful life.
4 #MO	#MO=4.00	Stores number of months in the year that asset is depreciated.
SL	SL=633.33	Calculates straight-line depreciation for year one.

Part 2. Calculate the depreciation for years two, three, four, and five.

12 #MO	#MO=12.00	Stores number of months in the year that asset is depreciated.
SL	SL=1,900.00	Calculates straight-line depreciation for years two, three, four, and five.

Part 3. Calculate the depreciation for year six. The remaining depreciable life is eight months.

8 #MO	#MO=8.00	Stores number of months in the year that asset is depreciated.
SL	SL=1,266.67	Calculates depreciation for eight months of year six.

Sum-of-the-Years-Digits Depreciation

Entering and Using the SOYD Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the SOYD formula as follows:

   ```
   SOYD=IF(YR#=1:#MO:12×(LIFE-#MO÷12-YR#+2)÷
   LIFE)×(BOOK-SALV)÷(5×LIFE+LIFE+6)
   ```

3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Year number in YR#.
   - Number of months in the year that you depreciate the asset in #MO.
   - Useful life expectancy in LIFE.
   - Starting book value in BOOK.
   - Salvage value in SALV.
5. Press SOYD to calculate the depreciation for the period.

Example 2. On January 1, you purchased an asset for $25,000, with a useful life of five years and a $1,500 salvage value. Calculate the depreciation for each year.

Start from the SOYD custom menu.

Keys:	Display:	Description:
1 YR#	YR#=1.00	Stores year number.
12 #MO	#MO=12.00	Stores number of months in the year that asset is depreciated.
5 LIFE	LIFE=5.00	Stores useful life.
25000 BOOK	BOOK=25,000.00	Stores book value.
1500 SALV	SALV=1,500.00	Stores salvage value.
SOYD	SOYD=7,833.33	Calculates depreciation for year one.
2 YR#	YR#=2.00	Stores year number.
SOYD	SOYD=6,266.67	Calculates depreciation for year two.
3 YR#	YR#=3.00	Stores year number.
SOYD	SOYD=4,700.00	Calculates depreciation for year three.
4 YR#	YR#=4.00	Stores year number.
SOYD	SOYD=3,133.33	Calculates depreciation for year four.
5 YR#	YR#=5.00	Stores year number.
SOYD	SOYD=1,566.67	Calculates depreciation for year five.

Declining-Balance Depreciation

Entering and Using the DB Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the DB formula as follows:

   DB=BOOK×(FACT%÷(100×LIFE))×#MO÷12
3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Book value in BOOK.
   - Declining-balance factor as a percent in FACT%.
   - Useful life expectancy in LIFE.
   - Number of months in the year that you depreciate the asset in #MO.
5. Press DB to calculate depreciation.
6. For subsequent years, subtract depreciation from remaining book value and store the new remaining book value by pressing STO − BOOK. Repeat step 5 to calculate depreciation for the next year.

Example 3. Use the information in example 2 to calculate the depreciation for each year using declining balance. Use 200% as the declining-balance factor.

Start from the DB custom menu.

Keys:	Display:	Description:
25000 BOOK	BOOK=25,000.00	Stores book value.
200 FACT%	FACT%=200.00	Stores declining-balance factor.
5 LIFE	LIFE=5.00	Stores useful life.
12 #MO	#MO=12.00	Stores number of months in the year that asset is depreciated.
DB	DB=10,000.00	Calculates depreciation for year one.
STO − BOOK	DB=10,000.00	Calculates and stores remaining book value.
DB	DB=6,000.00	Calculates depreciation for year two.
STO − BOOK	DB=6,000.00	Calculates and stores remaining book value.
DB	DB=3,600.00	Calculates depreciation for year three.
STO − BOOK	DB=3,600.00	Calculates and stores remaining book value.
DB	DB=2,160.00	Calculates depreciation for year four.
STO − BOOK	DB=2,160.00	Calculates and stores remaining book value.
DB	DB=1,296.00	Calculates depreciation for year five.

Accelerated Cost Recovery System

No formula exists for determining ACRS percentage. Tables must be used to find the appropriate recovery percentage. (Refer to Internal Revenue Service Publication 534 on Depreciation for the ACRS tables.) The percentage varies with the life of the investment and when the investment was made. The formula below determines the depreciation amount based on your input of the recovery percentage.

The cost recovery deduction is equal to the original book value times the percentage from the appropriate table. The book value need not be reduced by the salvage value.

Entering and Using the ACRS Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the ACRS formula as follows:

   ACRS=RCOV%÷100×BOOK
3. Press CALC to verify the formula and display the custom menu.
4. Store the following variables:
   - Recovery percentage from the table in RCOV%.
   - Starting book value in BOOK.
5. Press ACRS to calculate depreciation for the year.

Example 4. A piece of equipment was purchased for $13,950 in 1986. Find the depreciation for each year of the equipment's five-year life if the recovery percentages for years one through five are 20%, 32%, 24%, 16%, 8%.

Start from the ACRS custom menu.

Keys:	Display:	Description:
13950 BOOK	BOOK=13,950.00	Stores book value.
20 RCOV%	RCOV%=20.00	Stores recovery percent for year one.
ACRS	ACRS=2,790.00	Calculates depreciation for year one.
32 RCOV%	RCOV%=32.00	Stores recovery percent for year two.
ACRS	ACRS=4,464.00	Calculates depreciation for year two.
24 RCOV%	RCOV%=24.00	Stores recovery percent for year three.
ACRS	ACRS=3,348.00	Calculates depreciation for year three.
16 RCOV%	RCOV%=16.00	Stores recovery percent for year four.
ACRS	ACRS=2,232.00	Calculates depreciation for year four.
8 RCOV%	RCOV%=8.00	Stores recovery percent for year five.
ACRS	ACRS=1,116.00	Calculates depreciation for year five.

Leasing Calculations

Advance Payments

Situations may exist where one or more payments are made in advance (leasing is a good example). These agreements call for the extra payments to be made when the transaction is closed. A residual value (salvage value) can exist at the end of the normal term.

The following formula calculates the monthly payment amount (PMT) and the annual yield (I%YR) when one or more payments are made in advance. The formula can be modified to accommodate other than monthly payments by changing the constant 12 to the number of payments per year. In that case, PMT, N, and #ADV would apply to the periodic payment. Remember to use the cash flow sign convention (money paid out is negative, money received is positive).

Entering and Using the ADVPMT Formula:

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in the ADVPMT formula as follows:

   ```
   ADVPMT:PMT=(-PV-FV×(SPPV(I%YR÷12:N)))÷
   (USPV(I%YR÷12:N-#ADV)+#ADV)
   ```

3. Press CALC to verify the formula and display the custom menu.
4. Store five of the following variables:
   - Monthly payment amount in PMT.
   - Loan amount in PV.
   - Amount of the balloon payment in FV.
   - Annual interest rate as a percent in I%YR.
   - Total number of monthly payments in N.
   - Number of monthly payments made in advance in #ADV.
5. Press the menu key to calculate the unknown variable.

Example 1: Part 1. Equipment worth $750 is leased for 12 months. The equipment is assumed to have no salvage value at the end of the lease. The lessee has agreed to make three payments at the time of closing. What monthly payment is necessary to yield the lessor 10% annually?

Start from the ADVPMT custom menu.

Keys:	Display:	Description:
750 [+/-] PV	PV=-750.00	Stores known values.
12 N	N=12.00	
0 FV	FV=0.00	
3 #ADV	#ADV=3.00	
10 I%YR	I%YR=10.00	
PMT	PMT=64.45	Calculates monthly payment.

Part 2. What is the payment amount if the yearly interest rate is 15%?

15 I%YR	I%YR=15.00	Stores new interest rate.
PMT	PMT=65.43	Calculates monthly payment to achieve 15% yield.

Example 2. A lease has been written to run for 60 months. The leased equipment has a value of $25,000 and a monthly payment of $600. The lessee has agreed to make 3 payments at the time of closing ($1,800). What is the annual yield to the lessor?

Start from the ADVPMT custom menu.

Keys:	Display:	Description:
60 N	N=60.00	Stores known values.
3 #ADV	#ADV=3.00	
600 PMT	PMT=600.00	
25000 +/-		
PV	PV=-25,000.00	
0 FV	FV=0.00	
I%YR	I%YR=17.33*	Calculates percent annual yield.

Example 3. Equipment worth $5,000 is leased for 36 months at $145 per month. The lessee has agreed to pay the first and last payments in advance. At the end of the lease, the equipment can be purchased for $1,500. What is the annual yield to the lessor if the equipment is purchased?

Start from the ADVPMT custom menu.

Keys:	Display:	Description:
5000 +/- PV	PV=-5,000.00	Stores known values.
36 N	N=36.00	
145 PMT	PMT=145.00	
2 #ADV	#ADV=2.00	
1500 FV	FV=1,500.00	
I%YR	I%YR=18.10*	Calculates annual yield to lessor.

* The solver searches for a numerical solution and displays intermediate estimates.

Skipped Payments

Sometimes a loan (or lease) can be negotiated in which a specific number of monthly payments are going to be skipped each year. Seasonality is usually the reason for such an agreement. For example, because of heavy rainfall, a bulldozer cannot be operated in Oregon during December, January, and February, and the lessee wishes to make payments only when his machinery is being used. He makes nine payments per year, but the interest continues to compound during the months in which a payment is not made.

The following procedure calculates the monthly payment amount necessary to amortize the loan in the specified amount of time. The only restriction is that the term of the loan must be an integer number of years.

1. From the MAIN menu, press FIN, then CFLO to display the cash flow menu.
2. Using a cash flow of $1.00 for each payment that is made during the first 12 months, and $0 for each payment that is skipped, calculate the NFV, at the discount rate, of the cash flows in year 1. (This is an equivalent annual cash flow that occurs at the end of the first year.) Store the result in register 0.
3. Display the interest conversion menu (ICONV) and calculate the effective annual interest rate.
4. Display the TVM menu, store the effective interest rate in I%YR, store 1 in #P/Y, and set End mode.
5. Store the total number of years in N, the value from register 0 in PMT, and 0 in FV.
6. Press PV to calculate the present value of the annualized payments.
7. Key in the loan amount and press ÷ RCL PV = to calculate the monthly payment amount.

Reference:

Greynolds, Aronofsky, Frame, *Financial Analysis Using Calculators*, McGraw-Hill, 1980.

Example 4. A bulldozer worth $100,000 is purchased in September. The first payment is due one month later, and payments continue for 5 years. Because of the weather, the machinery will not be used during the winter months, and the purchaser does not wish to make payments during January, February, and March (months 4 thru 6). If the current interest rate is 14%, what monthly payment is necessary to amortize the loan?

Start from the MAIN menu.

Keys:	Display:	Description:
FIN CFLO *		Displays the CFLO menu.
CLEAR ALL YES		Clears the list.
0 INPUT		Stores 0 as initial cash flow.
1 INPUT 3 INPUT		Stores first group of cash flows.
0 INPUT 3 INPUT		Stores second group of cash flows.
1 INPUT 6 INPUT		Stores third group of cash flows.
CALC		Displays CALC menu.
14 ÷ 12 I%	I%=1.17	Stores monthly discount rate.
NFV	NFV=9.55	Calculates net future value of cash flows in first year.
STO 0		Stores NFV in register 0.
EXIT EXIT ICONV		Displays ICONV menu.
EFFCT		Displays EFFCT menu.

* If you want to preserve the current list, skip the next step (pressing CLEAR ALL), name the list, then press GET *NEW.

14 NOM% 12 P	NOM%=14.00 P=12.00	Stores known values.
EFF%	EFF%=14.93	Calculates effective annual interest rate.
EXIT EXIT TVM		Displays TVM menu.
STO I%YR	I%YR=14.93	Stores annual interest rate.
OTHER 1 #P/Y END EXIT		Stores 1 payment per year and sets End mode.
5 N RCL 0 PMT 0 FV	N=5.00 PMT=9.55 FV=0.00	Stores known values.
PV	PV=-32.05	Calculates present value of $1 cash flows.
100000 ÷ RCL PV =	-3,119.89	Calculates monthly payment amount.

Figuring Quotes and Charges

In many businesses, the price you charge a customer depends on several factors, such as the quantity purchased by the customer, delivery charge, labor rate, discount rate, cost of materials used to fill the order, profits and so on. The Business Consultant makes it easy to give your customer price quotes on the spot, and change those quotes quickly based on comments from the customer. If the price is too high, for example, the customer can select lower cost materials, or reduce labor costs by cutting back his requirements. You can store the new material cost or labor hours and quote the new price. Or you may want to tell a customer how a quantity discount changes his unit or total price.

A variety of sample formulas are listed on pages 58 to 62. Because there are many ways to figure quotes, your exact method may not be there. If that's the case, you'll have to write your own formula.

To develop your formula, list all the elements you use to make a quote and how each element relates to the other elements (do you add or subtract it? multiply or divide?). Use the table of elements on page 57, the sample formulas on pages 58 to 62 and the examples on pages 62 to 68 to figure out how to turn your elements into a formula to keep in your Business Consultant.

Formula Elements

Element	How It's Figured	Formula for the Element
Total labor, based on a unit price	Labor units × rate per unit	+#UNITS×RATE
Labor as a flat rate	+ labor rate	+LABOR
Total material, based on a unit price	Material units × price per unit	+MAT×PRICE
Material as a flat rate	+ parts	+PARTS
Other miscellaneous charges	+ other	+OTHER
Mileage	Miles × rate per mile	+MILES×R/MI
Profit or overhead	1 + profit% ÷ 100	×(1+PROF%÷100)
Discount	1 − discount% ÷ 100	×(1-DISC%÷100)
Interest	If bill is not paid in a certain time (D days), add interest	×(1+IF(#DAYS>D:1:0)×INT%÷100÷365×(#DAYS-D))*
Credit terms	If bill is paid within a certain time (D days), subtract discount rate	×(1-IF(#DAYS<D:1:0)×DISC%÷100)†

* To key in the > character, press [Z].

† To key in the < character, press [Y].

Sample Formulas

- Quote based on:
  Retail price/yd × yards
  + flat labor rate
  + other materials and suplies

  Formula: `QUOTE=PRICE×#YDS+LABOR+OTHER`

  material — labor — other charges

  where QUOTE = quote
  PRICE = price per unit of material
  #YDS = number of yards
  LABOR = labor as a flat rate
  OTHER = other charges

- Quote based on:
  Cost per yard × yards
  + labor per yard × yards
  + additional materials (other)
  + profit and overhead
  − discount rate for special customers

  Formula: `QUOTE=((COST+LABOR)×#YDS+OTHER)×(1+PROF%÷100)×(1-DISC%÷100)`

  material — labor — other — profit — discount

  where QUOTE = quote
  COST = cost per unit
  LABOR = labor per unit
  #YDS = number of yards
  OTHER = other charges
  PROF% = profit percent
  DISC% = trade discount

- Quote based on:
  Rate per hour × number of hours
  + cost of parts
  + mileage × rate per mile

  Formula:* CHARGE=R/HR×HRS+PARTS+MILES×R/MI

  labor material mileage

  where CHARGE = total charge
  R/HR = rate per hour
  HRS = number of hours
  PARTS = total parts cost
  MILES = miles traveled
  R/MI = rate per mile

- Quote based on:

  Hours with consultant × consultant's hourly rate
  + hours of staff's time × staff's hourly rate
  + other costs (xeroxing, forms etc)
  + overhead percent

  Formula: QUOTE=(CHRS×CRATE+STHR×STRATE+COSTS)×(1+OHD%÷100)

  labor labor other

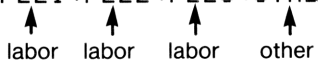
  overhead

  where: QUOTE = quote
  CHRS = hours of the consultant's time
  CRATE = consultant's hourly rate
  STHR = hours of the staff's time
  STRATE = staff hourly rate
  COSTS = other costs
  OHD% = overhead percent

* To key in the / character, press [W].

- Quote based on:
  Fee for job 1
  + fee for job 2
  + fee for job 3
  + other charges

  Formula: QUOTE=FEE1+FEE2+FEE3+OTHER

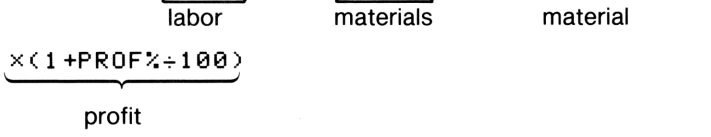
  

  where: QUOTE = quote
  FEE1 = fee for job 1
  FEE2 = fee for job 2
  FEE3 = fee for job 3
  OTHER = any miscellaneous charges

- Quote based on:
  Daily rate × #days
  + equipment rental × #days
  + materials per day × cost per unit × #days
  + profit percent

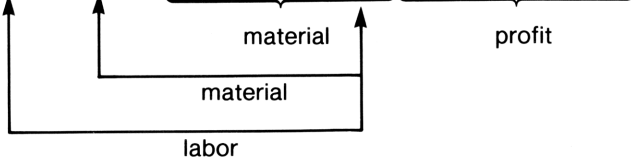
  Formula:

  QUOTE=(RATE×DAYS+EQUIP×DAYS+MAT×COST×DAYS)×(1+PROF%÷100)

  By factoring terms, the formula becomes:

  QUOTE=(RATE+EQUIP+MAT×COST)×DAYS×(1+PROF%÷100)

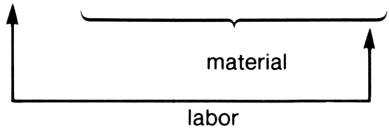
  

  where: QUOTE = quote
  RATE = daily rate
  EQUIP = equipment rental charge
  MAT = units of material used each day
  COST = unit cost of the material used each day
  DAYS = number of days to do the job
  PROF% = profit percent

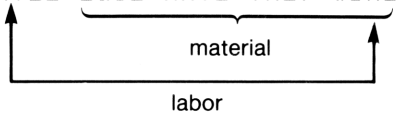
- If you have different rates for different parts of a job, or several types of materials are used, you can include each as a variable:

  Quote based on:
  Rate for phase 1 × days for phase 1
  + rate for phase 2 × days for phase 2
  + equipment rental for phase 1 × days for phase 1
  + equipment rental for phase 2 × days for phase 2
  + materials used daily for phase 1 × cost per unit × days for phase 1
  + materials used daily for phase 2 × cost per unit × days for phase 2

  Formula: `QUOTE=(RATE1+EQU1+MAT1×$M1)×#DA1`

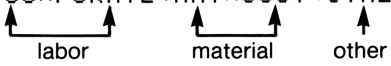
  `+(RATE2+EQU2+MAT2×$M2)×#DA2`

  where: QUOTE = quote
  RATE1 = daily rate charged for phase 1
  EQU1 = daily rate charged for equipment for phase 1
  MAT1 = quantity of material used in phase 1
  $M1 = cost per unit of material used in phase 1
  #DA1 = number of days to complete phase 1
  RATE2 = daily rate charged for phase 2
  EQU2 = daily rate charged for equipment for phase 2
  MAT2 = quantity of material used in phase 2
  $M2 = cost per unit of material used in phase 2
  #DA2 = number of days to complete phase 2

- Quote based on:
  Number of pages × page rate
  + materials × cost of materials
  + other

  Formula: `QUOTE=#PGS×PGRATE+MAT×COST+OTHER`

  where: QUOTE = quote
  #PGS = number of pages to write
  PGRATE = rate charged per page
  MAT = materials used
  COST = cost per unit of materials
  OTHER = other charges

Entering and Using Your Formula

1. From the MAIN menu, press SOLVE to display the SOLVE menu.
2. Type in your formula.
3. Press CALC to verify the formula and display the custom menu.
4. Store the values you know.
5. Press the menu key to calculate the unknown variable.

Examples

Example 1. A wallcovering company figures its quotes as follows:

Number of rolls × cost per roll
+ number of hours × rate per hour
+ profit

The formula is:
`QUOTE=((ROLLS×COST)+(HOURS×RATE))×(1+PROF%÷100)`

Follow the steps above to enter and use the formula.

Store five of the following six variables:

- Quote in QUOTE.
- Number of rolls in ROLLS.
- Cost per roll in COST.
- Number of hours to install the wallpaper in HOURS.
- Labor rate per hour in RATE.
- Profit percent in PROF%.

Press the menu key to calculate the unknown variable.

Part 1. You have been asked to bid on a job that requires 50 rolls of wallpaper for which you charge $22 per roll. Your labor charge is $20 per hour, and the job will take 18 hours. Your profit percent is 20%. Calculate the quote for this job.

Keys:	**Display:**	**Description:**
50 ROLLS	ROLLS=50.00	Stores number of rolls.
22 COST	COST=22.00	Stores cost per roll.
18 HOURS	HOURS=18.00	Stores number of hours.
20 RATE	RATE=20.00	Stores hourly rate.
20 PROF%	PROF%=20.00	Stores profit percent.
QUOTE	QUOTE=1,752.00	Calculates quote.

Part 2. Your customer can afford only $1,600 on wallpaper. Calculate the maximum wallpaper price.

1600 QUOTE	QUOTE=1,600.00	Stores quote.
COST	COST=19.47	Calculates maximum cost.

Example 2. An upholsterer figures his quotes as follows:

Retail price per yard × yards
+ labor cost per yard × yards
+ number of units of foam × unit price of foam
+ supplies
+ maintenance on the furniture

The formula is:
QUOTE=(PRICE+LABOR)×#YDS+FOAM×$FOAM+SUPP+MNT

Follow the steps on page 62 to enter and use the formula.

Store seven of the following eight variables:

- Quote in QUOTE.
- Price per yard in PRICE.
- Labor cost per yard in LABOR.
- Number of yards in #YDS.
- Number of units of foam in FOAM.
- Unit price of foam in $FOA.
- Cost of additional supplies in SUPP.
- Cost of maintenance on the furniture in MNT.

Press the menu key to calculate the unknown variable.

Part 1. A customer wants a couch recovered. Eight yards of fabric are needed, at a retail price of $22.50. Labor cost is $26.50 per yard. Six units of foam are needed, at $28.50 per unit. Other supplies, such as staples, are $10. No additional maintenance is needed. Calculate the quote to recover this couch.

Keys:	Display:	Description:
22.5 PRICE	PRICE=22.50	Stores price per yard.
26.5 LABOR	LABOR=26.50	Stores labor price per yard.
8 #YDS	#YDS=8.00	Stores number of yards.
6 FOAM	FOAM=6.00	Stores units of foam.
MORE		
28.5 $FOA	$FOAM=28.50	Stores unit price of foam.
10 SUPP	SUPP=10.00	Stores cost of supplies.
0 MNT	MNT=0.00	Stores maintenance cost.
MORE		
QUOTE	QUOTE=573.00	Calculates quote.

Part 2. In doing the job, you discover that the couch requires $25 of maintenance. Calculate the new charge for recovering the couch.

MORE		
25 MNT	MNT=25.00	Stores cost of maintenance.
MORE		
QUOTE	QUOTE=598.00	Calculates new quote.

Example 3. You are a service person and figure quotes as follows:

Hours × rate per hour
+ cost of parts
+ mileage: if 25 miles or less, miles × rate per mile;
if greater than 25 miles, miles × rate per mile + time to drive × rate per hour

The formula is: `CHARGE=#HRS×R/HR+PARTS+MILES×R/MI+IF(MILES>25:1:0)×TIME×R/HR`

Follow the steps on page 62 to enter and use the formula.*

Store six of the following seven variables:

- Charge in CHARG.
- Number of hours in #HRS.
- Labor rate per hour in R/HR.
- Cost of parts in PARTS.
- Number of miles in MILE.
- Rate per mile in R/MI.
- Hours to drive in TIME.

Press the menu key to calculate the unknown variable.

The hourly rate to service equipment at a customer's site is $120 per hour. A repair job takes 1.5 hours. Parts are $150. The customer's site is 37 miles away and it will take 45 minutes to drive there. The rate per mile is 20¢. Calculate the charge.

Keys:	Display:	Description:
1.5 #HRS	#HRS=1.50	Stores hours to complete repair.
120 R/HR	R/HR=120.00	Stores rate per hour.
150 PARTS	PARTS=150.00	Stores cost of parts.
37 MILE	MILES=37.00	Stores miles.
MORE		
.2 R/MI	R/MI=0.20	Stores cost per mile.
45 ÷ 60 TIME	TIME=0.75	Stores time to drive.
MORE		
CHARG	CHARGE=427.40	Calculates charge.

* To key in the / character, press ■ W.
To key in the > character, press ■ Z.

Example 4. You are a freelance recording/sound engineer. You figure your quotes as follows:

Daily rate × number of days
+ equipment rental per day × number of days
+ quantity of tape used each day × cost per tape × number of days
+ batteries used each day × cost per battery × number of days

Your formula is:
`QUOTE=(RATE+RENT+TAPE×TCOST+#BAT×BCOST)×#DAYS`

Follow the steps on page 62 to enter and use the formula.

Store seven of the following eight variables:

- Quote in `QUOTE`.
- Daily rate in `RATE`.
- Daily equipment rental charge in `RENT`.
- Quantity of tape used each day in `TAPE`.
- Cost per tape in `TCOST`.
- Number of batteries used each day in `#BAT`.
- Cost per battery in `BCOST`.
- Number of days in `#DAY`.

Press the menu key to calculate the unknown variable.

Part 1. You have been asked to bid on a two day job making three 30 second commercials. Your daily rate for this customer is $250. You charge $125 per day for use of your equipment. You use seven rolls of tape each day at $4 each, and 12 batteries per day at $1 each. Calculate your quote.

Keys:	Display:	Description:
250 RATE	RATE=250.00	Stores daily rate.
125 RENT	RENT=125.00	Stores daily equipment rent.
7 TAPE	TAPE=7.00	Stores daily tape usage.
4 TCOST	TCOST=4.00	Stores cost per tape.
MORE		
12 #BAT	#BAT=12.00	Stores daily battery usage.
1 BCOST	BCOST=1.00	Stores cost per battery.
2 #DAY	#DAYS=2.00	Stores number of days.
MORE		
QUOTE	QUOTE=830.00	Calculates quote.

Part 2. Your customer is willing to pay only $750. What daily rate would you earn if you accept his offer?

750 QUOTE	QUOTE=750.00	Stores quote.
RATE	RATE=210.00	Calculates new daily rate.

A

Conserving Memory

The formulas in this book are intended to provide useful solutions. The variable names are several characters long to be meaningful to you. The formulas change a percent to a decimal so you don't have to remember to do it. These features make the formulas longer and take up more memory. Here are a few hints to help you conserve memory, should you need to:

- Shorten variable names. Variables are named to be as intuitive as possible. One way to save memory is to use single letter variable names.
- Delete division by 100. The formulas using a percent are written so you enter the percentage rather than the decimal value. Examples of this are tax rate as a percent, discount rate as a percent, or interest rate. If you do delete division by 100 from the formulas, remember to divide the percent by 100, or enter the percent and press [%], before storing the value in the variable.
- Delete variables for other formulas. When the SOLVE menu is displayed and you press [CLEAR ALL] [VARS], the variables are erased, giving you more usable memory. (If you select [BOTH] instead of [VARS], all formulas and their variables will be gone.)
- Delete individual formulas. When the SOLVE menu is displayed, move the pointer to the formula you want to delete, and press [DELET] [BOTH].

Working With Your Business Consultant Professional Calculator

The *Small Business Consultant* contains a variety of applications, formulas and keystrokes to help you solve the specialized problems of your profession.

- Markup Calculations
- Setting a Sales Price
- Forecasting Using Simple Moving Average
- Forecasting Based on History
- Revising Your Forecast to Reflect Current Market Conditions
- Estimating Inventory Availability
- Stockturn or Inventory Turnover Rate
- Economic Ordering Quantity
- Planning Advertising Expenditures
- Cost of Failing to Take a Cash Discount
- Simple Payback Period
- Using NPV and IRR to Make Investment Decisions
- Return on Investment
- Break-Even Analysis
- Depreciation Calculations
- Leasing Calculations
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