hp calculators

HP 20b Breakeven analysis

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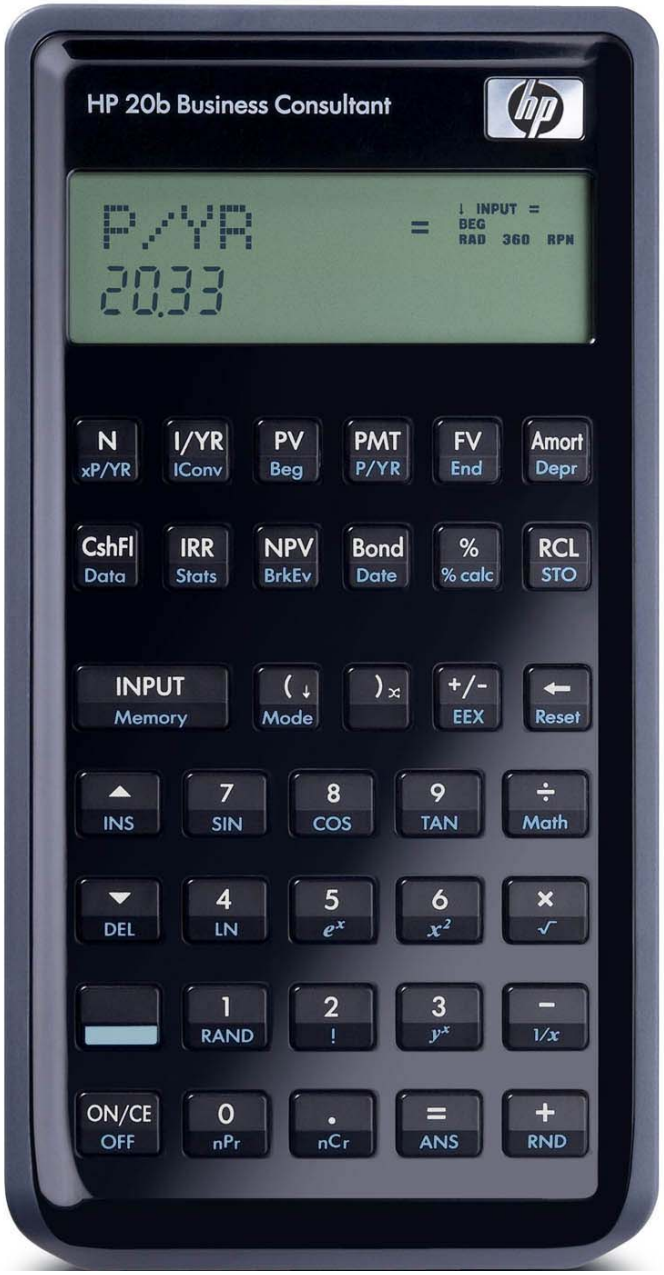
Breakeven analysis on the HP 20b

Practice solving problems involving breakeven



Breakeven analysis

Businesses use breakeven analysis to determine the quantity of product that must be sold or produced to recover the total costs involved. While, most businesses would much rather make a profit, the quantity required just to break even is an important value to know.

The breakeven formula is presented in figure 1 below. In this formula, the fixed costs to be covered by the sale of the product are added to a target profit value in the numerator. Fixed costs are costs that do not change with the volume of product sold or produced, at least within some relevant range of units. The target profit is the profit desired after covering the fixed and variable costs. In a true breakeven situation, this would be $0, but another value can be used. The solution would then generate that much profit after subtracting all costs. The sales price per unit is the price for which each unit will be sold. The variable cost per unit is the cost of producing or selling one incremental unit. All expenses that increase at the margin are considered variable costs, whether direct materials, direct labor, sales commissions, etc.

$$\text{BreakevenUnits} = \frac{\text{FixedCost} + \text{TargetProfit}}{\text{SalesPricePerUnit} - \text{VariableCostPerUnit}}$$

Figure 1

Often, breakeven problems will be presented with a “contribution margin per unit” specified. This contribution margin per unit is the difference between the sales price per unit and the variable cost per unit. If only the contribution margin per unit is specified, any sales price and variable cost per unit can be used as long as the difference between them is equal to the contribution margin per unit. The actual values used will not matter, as long as the difference is the same.

Breakeven analysis on the HP 20b

The HP 20b solves these types of breakeven problems using the BrkEv menu. This menu is entered by pressing ▬ BrkEv and contains areas where you can enter or compute values related to breakeven problems. The map of this menu is presented below. To move from one item in the menu to the next, press the down arrow key ▼. This key is abbreviated DWN in the map below. At the top of the next page is a table explaining each of the entries in the breakeven menu in more detail.

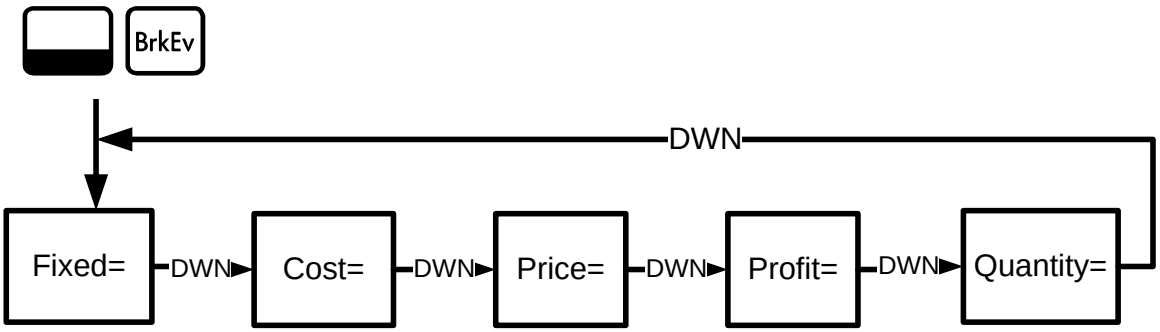


Figure 2 The Menu Map for the Break-even Menu

Breakeven Menu Items

Menu Item/Key	Description
[▬] [BrkEv]	Opens the Breakeven menu starting with *Fixed.*
Fixed	Fixed costs.
Cost	Variable cost per unit
Price	Sales price per unit.
Profit	Target profit desired. A value of $0 indicates a true breakeven analysis.
Quantity	Units required to satisfy the breakeven relationship

Each of these menu items is considered a read/write menu item, because when it are selected, both the *INPUT* and small (=) annunciators are lit in the top right corner of the HP 20b display. When lit, these annunciators indicate that entering a number and pressing [INPUT] will store the entered number in the displayed menu item. Pressing [=] (outside of a mathematical operation) will then calculate the value for that item based on available data. Any of the breakeven menu items can be solved if the other 4 are known.

To clear the breakeven menu <u>while in the menu</u>, press [▬] [Reset] [INPUT].

Practice solving problems involving breakeven

<u>Example 1:</u> A business is looking to produce a product that costs $4 per unit to make, but would require spending $100,000 a year in additional fixed costs. They hope to sell it for $9 per unit. How many units per year would they have to sell in order to break even?

<u>Solution:</u>

[ON/CE] [ON/CE] [▬] [BrkEv] [▬] [Reset] [INPUT]
[1] [0] [0] [0] [0] [0] [INPUT]
[▼] [4] [INPUT]
[▼] [9] [INPUT]
[▼] [▼]
[=]

Figure 3

<u>Answer:</u> 20,000 units. The two down arrows bypass the target profit menu item, leaving it as $0 for breakeven.

<u>Example 2:</u> Using the information from example 1 again, what if management wants to earn at least $20,000 from this product. How many units would have to be sold to achieve this? Assume that this problem is worked immediately after the [=] key is pressed from example 1.

<u>Solution:</u>

[▲]
[2] [0] [0] [0] [0] [INPUT]

Figure 4

▼ =

Figure 5

Answer: 24,000 units must be sold to achieve a target profit of $20,000.

Example 3: ABC company is planning to sell a new product. This product will cost $2.55 per unit to make and will require spending $45,000 for incremental fixed costs. The sales department has indicated they can sell 11,500 units of this product per year. What would the sales price have to be in order to break even?

Solution:

ON/CE ON/CE ▬ BrkEv ▬ Reset INPUT
4 5 0 0 0 INPUT
▼ 2 • 5 5 INPUT
▼ ▼ ▼
1 1 5 0 0 INPUT
▲ ▲ =

Figure 6

Answer: To break even, the sales price per unit would need to be $6.46.

Example 4: If fixed costs are $230,000 and the contribution margin on a product is $4, how many units must be sold in order to break even?

Solution: In this example, the contribution margin is given, but not its component sales price and variable cost per unit. To solve this problem, simply enter values for the sales price and variable cost that give a difference of $4. The actual values you choose to enter will not matter, as long as the difference between them is $4.

ON/CE ON/CE ▬ BrkEv ▬ Reset INPUT
2 3 0 0 0 0 INPUT
▼ 6 INPUT
▼ 1 0 INPUT
▼ ▼
=

Figure 7

Answer: 57,500 units would need to be sold to break even.