

# Resumão

especial

# MATEMÁTICA FINANCEIRA COM A HP 12C

## A CALCULADORA

Lançada em 1981, a HP 12C (chamada popularmente de HP) é a calculadora mais conhecida e utilizada por quem necessita trabalhar com cálculos financeiros.

**Avançada** — trabalha com muitas funções e memórias — e **programável** — possui funções para edição de programas, número ampliado de memórias, etc. — utiliza o método RPN (sigla em inglês de *Reverse Polish Notation*, ou notação polonesa reversa), criado pelo cientista australiano Charles Hamblin nos anos 50 a partir de um aprimoramento do método de notação polonesa, conhecido desde os anos 20. Esse sistema, combinado com outra característica da HP, que é o funcionamento com **pilha operacional**, possibilita realizar operações lógicas encadeadas, com a inserção de todos os dados de uma única vez, diferentemente do que ocorre com as calculadoras que operam no modo algébrico, em que os cálculos complexos devem ser executados etapa a etapa. E por conta desse modo de funcionamento que na HP os elementos devem ser inseridos antes da operação.

Operação	Notação Algébrica (calculadora comum)	Notação Polonesa Reversa (HP 12C)
$a+b$	$a+b$	$ab+$
$\frac{a+b}{c}$	$(a+b)/c$	$ab+c/$
$\frac{a-b-cd}{ef}$	$(a-b-cd)/ef$	$ab*cd+ef/$

Assim, para realizar a operação  $4+6$  na HP, procede-se da seguinte forma:



Ou seja, digitam-se primeiro os elementos da operação e, por último, a operação (no caso, soma), sem a necessidade de digitar [=], tecla que existe na calculadora HP (no versão Pilha Simples, a tecla [=] existe, porque um dos diferenciais desse modelo é permitir o uso no modo algébrico de cálculo).

## A PILHA OPERACIONAL

A HP utiliza um processo de armazenamento de dados denominado **pilha operacional**, que nada mais é do que um arquivo com quatro registradores (X, Y, Z e T) nos quais são "guardados" os valores necessários à realização das operações. Usa-se o nome "pilha" porque os registros vão sendo "empilhados" dentro da máquina; os dados apresentados no visor são os relativos ao registrador X.

A medida que são inseridos novos dados, eles vão sendo "empilhados" até a realização de operações subsequentes. Utilizando o exemplo anterior, é possível compreender, pela figura a seguir, como funciona a pilha operacional da HP.

## USO DO TECLADO

Para selecionar a função auxiliar localizada em uma tecla situada acima de uma tecla, aperte a tecla [F] e, em seguida, a tecla de função.

Para selecionar a função primária impressa na face superior de uma tecla, aperte somente a tecla.



Para selecionar a função secundária impressa em uma face inferior de uma tecla, aperte a tecla [C] e, em seguida, a tecla de função.



Tecla	Preparar	Após a operação
[ON]	T	Limpa os registros
[C]	X	
[CE]	Y	
[M+]	X	0
[M-]	Z	
[M]	Y	4
[MC]	X	
[MR]	Y	4
[M+] (segunda)	X	4
[M-] (segunda)	Y	4
[M] (segunda)	X	6
[M+] (terceira)	Y	4
[M-] (terceira)	X	6
[M] (terceira)	T	
[M+] (quarta)	Z	
[M-] (quarta)	Y	
[M] (quarta)	X	10

Como dito, é a combinação do sistema RPN e do funcionamento com pilha operacional que permite otimizar as operações na HP em relação às calculadoras convencionais.

Vejamus a seguinte expressão:

$$(7+3) + (15-4)$$

Enquanto em uma calculadora algébrica (convencional) é necessário realizar cada operação colocada entre parênteses de uma vez e anotar o resultado, na HP é possível realizar todas as operações simultaneamente:



Note que as operações são feitas seguindo a hierarquia algébrica (primeira, a que está dentro dos parênteses). Assim, a soma entre os parênteses é a última etapa, precedida ape-

nas depois que a calculadora já armazena, na pilha operacional, o resultado da operação de cada um deles.

*Nota: a tecla ENTER somente é utilizada para a introdução dos primeiros números. Isso porque, após o segundo número, em cada operação, é dado um comando (somar e subtrair). Assim, a calculadora pode identificar que o número "arrabou". Isso não ocorre quando se introduz o primeiro valor. Portanto, ENTER "informa" à calculadora que o próximo número a ser digitado não constitui mais o primeiro elemento da soma e que ela pode armazenar aquele valor já introduzido na pilha operacional.*

## TESTE SUA CALCULADORA

Para realizar um teste rápido de funcionamento, proceda da seguinte forma: desligue a calculadora. Com a HP desligada, aperte a tecla correspondente ao sinal de multiplicação [x]. Mantendo a tecla pressionada, tecla [=] e, em seguida, tecla [C]. A calculadora apresentará a mensagem "testing" (processando) e, na sequência, o visor mostrará todos os bits ligados, com o sinal (-) à frente, dez números e todas as funções possíveis, o que demonstra que sua calculadora está em perfeito funcionamento. Apertando qualquer tecla, a máquina voltará ao modo normal.

## MEMÓRIA

A memória da HP é constante, ou seja, conserva os dados armazenados mesmo quando a calculadora é desligada. Há 20 memórias, que são armazenadas em registradores numerados de 0 a 9 e de 0 a 9 (coloca-se o ponto antes do número do registrador).

Por exemplo, para armazenar o número 15 no registrador 3 e o número 71 no registrador 1:



Para recuperar os dados:



# Manual Da Hp12c

**CH Cherryholmes**



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