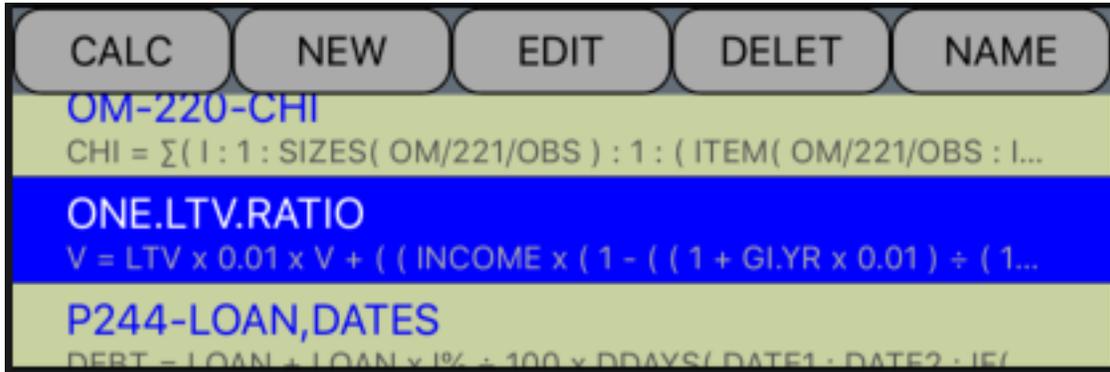


Solver Menu

The calculator has a powerful equation solver menu to store and edit equations that you enter. To show it, touch the **[SOLVE]** button in the main menu.



The listing shows all the equations successfully entered into memory. When one is selected, touching **[CALC]** the solver creates a menu with all the variables of the equation. Then any variable can be calculated using the values stored in the others.

Solver Menu Buttons	
[CALC]	Shows the equation solver menu of the selected equation.
[NEW]	Shows the Equation Editor View to create a new equation.
[EDIT]	Shows the Equation Editor View to edit the selected equation.
[DELET]	Delete the selected squation.
[NAME]	Allows to enter a name for the selected equation

Equation Editor View

The Equations Editor view allows you to edit an existing equation or create a new one.

The image shows a screenshot of an Equation Editor interface. At the top, a grey bar displays the text "Equation Name: 'ONE.LTV.RATIO'". Below this, a large green area contains a complex mathematical equation. The equation is:
$$V = LTV \times 0.01 \times V + \left((INCOME \times (1 - ((1 + GI.YR \times 0.01) \div (1 + YE \times 0.01))^{-HOLD/P}) \div ((YE - GI.YR) \times 0.01) - (O.EXP - TAX\%V \times 0.01 \times (EST.V - V)) \times (1 - ((1 + GE.YR \times 0.01) \div (1 + YE \times 0.01))^{HOLD/P}) \div ((YE - GE.YR) \times 0.01) \right) \div USPV(YE : HOLD/P) - V \times LTV \times 0.12 \div USPV(I\%YR \div 12 : N) \times (1 - (1 + YE \times 0.01)^{-HOLD/P} \div (YE \times 0.01) + ((V \times (1 + GV.YR \times 0.01)^{HOLD/P} \times (1 - \%EXP \times 0.01) \times (1 - \%DEP \times 0.01) - LTV \times 0.01 \times V \div USPV(I\%YR \div 12 : N) \times (1 - (1 + I\%YR \div 1200)^{-N - 12 \times HOLD/P}) \div (I\%YR \div 1200)))$$

Below the equation is a virtual keyboard with several callout boxes pointing to specific keys:

- Operations keys:** Points to the row of mathematical operators: +, -, x, ÷, ^, (,), =.
- Argument separator:** Points to the colon key (:).
- Number entry keys:** Points to the row of numeric keys: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.
- Delete character key:** Points to the left arrow key (←).
- Enter the Equation:** Points to the yellow "Done" button at the bottom right.
- Shows the Functions Menu:** Points to the "Functions" button at the bottom center.
- Shift keyboard keys:** Points to the up arrow key (↑) on the left side of the keyboard.

At the bottom of the interface, there are three buttons: "Cancel" on the left, "Functions" in the center, and "Done" on the right.

Solver Build-In Functions

ABS(x) : Absolute value of “x”.

ACOS(x) : Arc-cosine of “x” in the current angle mode.

ACOSH(x) : Hyperbolic Arc-cosine of “x”.

ALOG(x) : Common (base 10) antilogarithm; 10^x .

ALOG2(x) : Base 2 antilogarithm; 2^x .

ANGLE(x:y) : Angular polar coordinate for an (x.y) rectangular coordinate calculated in the current angle mode.

ASIN(x) : Arc-sine of “x” in the current angle mode.

ASINH(x) : Hyperbolic Arc-sine of “x”

ATAN(x) : Arc-tangent of “x” in the current angle mode.

ATANH(x) : Hyperbolic Arc-tangent of “x”.

CDATE : Current Date in the current date format.

COMB(x:y) : Number of combination of “x” items taken “y” at a time.

COS(x) : Cosine of “x” in the current angle mode.

COSH(x) : Hyperbolic Cosine of “x”.

CTIME : Current Time in HH.MMSSdd, 24-hour format.

DATE(d1:n) : The date “n” days after or before the date d1.

DDAYS(d1:d2:cal) : Number of days from date “d1” to “d2” using calendar “cal”. If (cal = 2), uses 365 days/year calendar; if (cal = 3), uses 360-days/year calendar; otherwise uses the actual calendar.

DEG(x) : Convert “x” radians to decimal degrees.

EXP(x) : Natural antilogarithm; e^x .

EXPM1(x) : Calculates e^{x-1} .

FACT(n) : Factorial of a positive integer “n”.

FLOW(name:idx) : Returns the value of the flow at index “idx” from the “name” CFLO list.

FP(x) : Fractional part of “x”.

FV(N:I%YR:PV:PMT:P/YR:m) : TVM function for future value.
($m \neq 0 \Rightarrow$ BEG mode).

G(x) : Returns (Get) the value of a variable. The variable is local, not appears in the variables list, if it is only used in the L() and G() functions.

HMS(time) : Converts “time” from decimal hours to HH:MMSSdd format.

HRS(time) : Converts “time” from HH.MMSSdd to decimal hours.

IDIV(x:y) : Integer part of the quotient of $x \div y$.

**IF(cond:expr₁:
expr₂)** : Conditional expression. If (cond is true) uses the “expr₁”; otherwise uses “expr₂”.

INT(x) : Greatest integer less than or equal to “x”

INV(x) : Inverse of “x”; $1 / x$.

INORM(x) : Inverse Normal standard cumulative distribution.

ISTUD(x:n) : Inverse t-Student of 'n' degrees of freedom cumulative distribution.

IP(x) : Integer part of “x”.

ITEM(name:idx) : Returns the value of the item at index “idx” from the “name” SUM list.

I%YR(N:PV:PMT:FV:P/YR:m) : TVM function for interest rate per year.
(m ≠ 0 => BEG mode).

L(x:expr) : Store the value of “expr” in the variable “x”. The variable is local, not appears in the variables list, if it is only used in the L() and G() functions.

LN(x) : Natural (base-e) logarithm of “x”.

LNP1(x) : Natural logarithm of (1+x).

LOG2(x) : Base 2 logarithm of “x”.

LOG(x) : Common (base-10) logarithm of “x”.

MAX(x:y) : Compares “x” and “y”, and returns the larger of the two.

MIN(x:y) : Compares “x” and “y”, and returns the smaller of the two.

MOD(x:y) : Remainder of the division x / y.

N(I%/YR:PV:PMT:FV:P/YR:m) : TVM function for number of periods.
(m ≠ 0 => BEG mode).

NORM(x) : Normal standard lower-tail probability of ‘x’.

NOT(logical) : Logical operation NOT

PERM(x:y) : Number of permutations of “x” items taken “y” at a time.

PMT(N:I%/YR:PV:FV:P/YR:m) : TVM function for periodic payment.
(m ≠ 0 => BEG mode).

PV(N:I%/YR:PMT:FV:P/YR:m) : TVM function for present value.
(m ≠ 0 => BEG mode).

RAD(x) : Convert “x” decimal degrees to radians.

RADIUS(x:y) : Magnitude polar coordinate “r” for an (x.y) rectangular coordinate.

RAN#: Pseudo-Random number ($0 \leq r < 1$).

RND(x:y) : Round “x” to “y” decimal places.

S(variable name) : Returns ”TRUE” if the current variable solved is “variable name”.

SGN(x) : Sign of “x”; returns +1 if $x > 0$, 0 if $x = 0$ or -1 if $x < 0$.

SIN(x) : Sine of “x” in the current angle mode.

SINH(x) : Hyperbolic Sine of “x”.

SIZEC(name) : Returns the value of the last entry index from the list specified by “name”.

SIZES(name) : Returns the number of entries in the list specified by “name”.

SPFV(i%:n) : Future value of a single \$1.0 payment; $(1+i\%/100)^n$.

SPPV(i%:n) : Present Value of a single \$1.0 payment; $1 / (1+i\%/100)^n$.

SQ(x) : Square of “x”; x^2 .

SQRT(x) : Square root of “x”; \sqrt{x}

STUD(x:n) : t-Student of 'n' degrees of freedom lower-tail probability of 'x'.

#T(name:idx) : Returns the value of the frequency at index "idx" from the list specified by "name".

TAN(x) : Tangent of "x" in the current angle mode.

TANH(x) : Hyperbolic Tangent of "x".

TRN(x:y) : Truncates "x" to "y" decimals.

USFV(i%:n) : Future Value of a uniform series of \$1.0 payments.

USPV(i%:n) : Present Value of a uniform series of \$1.0 payments.

XCOORD(r:ø) : "x" rectangular coordinate for (r,ø) polar coord. "ø" is taken in the current angular mode.

YCOORD(r:ø) : "y" rectangular coordinate for (r,ø) polar coord. "ø" is taken in the current angular mode.

Σ(ctr:c₁:c₂:s:expr) : Sum values of algebraic expression "expr" for values of the counter "ctr" from c₁ to c₂ with increments of step "s".

Example: Loan with an Odd First Period.

A 36-month loan for \$4,500 has an annual interest rate of 15%. If the first payment is made in 46 days, what is the monthly payment amount?

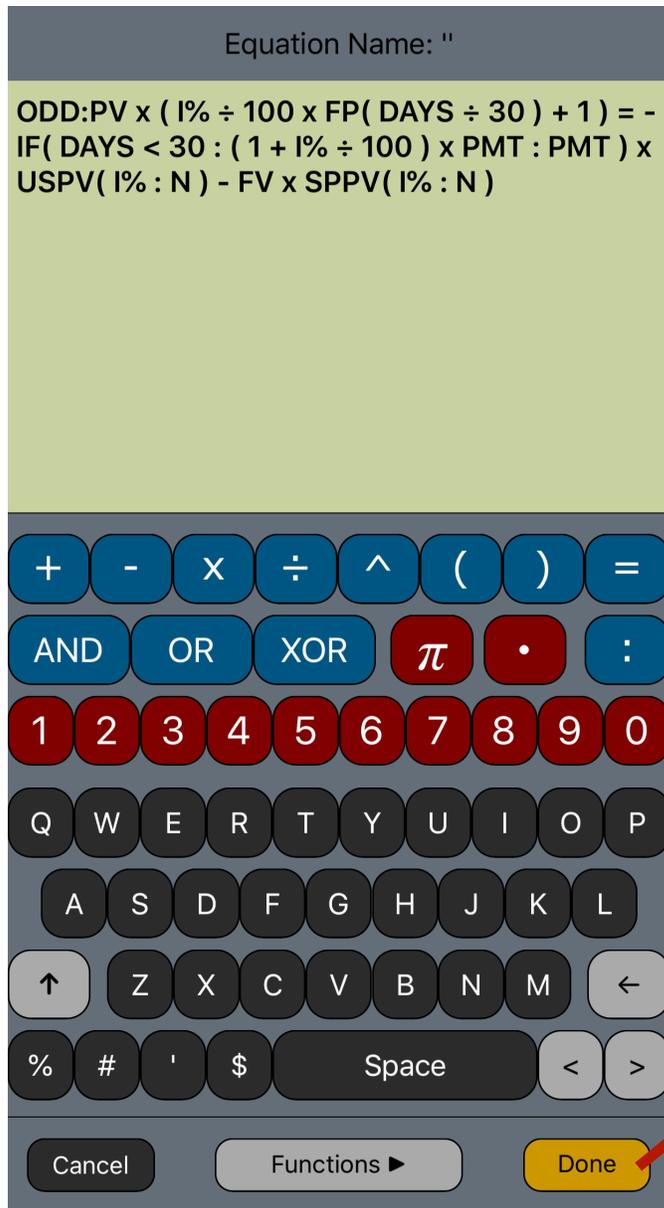
The equation is :

$$\text{ODD: } PV \times (I\% \div 100 \times FP(DAYS \div 30) + 1) = - IF(DAYS < 30 : (1 + I\% \div 100) \times PMT : PMT) \times \text{USPV}(I\% : N) - FV \times \text{SPPV}(I\% : N)$$

Solution:

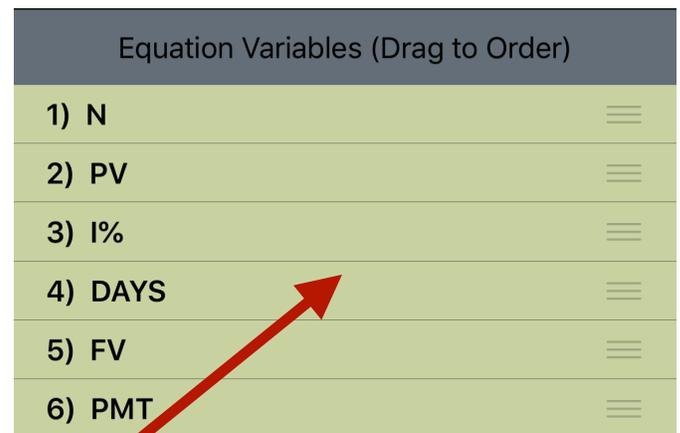
First, show the Solver menu touching the **[SOLVE]** key in the main menu. Then touch the **[NEW]** tab to open the equation editor. Type the ODD equation in the editor as shown in the next screenshot.

Equation Name: "

$$\text{ODD:PV} \times (\text{I\%} \div 100 \times \text{FP} (\text{DAYS} \div 30) + 1) = -$$
$$\text{IF} (\text{DAYS} < 30 : (1 + \text{I\%} \div 100) \times \text{PMT} : \text{PMT}) \times$$
$$\text{USPV} (\text{I\%} : \text{N}) - \text{FV} \times \text{SPPV} (\text{I\%} : \text{N})$$


Equation Variables (Drag to Order)

1) N	≡
2) PV	≡
3) I%	≡
4) DAYS	≡
5) FV	≡
6) PMT	≡



Once the equation is ready, touch the **[Done]** button and the variables ordering view will appear. There, drag the variables to the above order:

Finally, touch the **[Save]** button, type “ODD” as the equation name and **[Save]** to get back to the **SOLVER** menu. There, select the ODD equation and touch **[CALC]** tap to load the equation calculation menu:



Now, follow the next sequence to solve the problem:

Keystrokes	Description
36 [N]	Input the number of periods. N = 36.00
4500 [PV]	Input loan amount. PV = 4,500.00
15 ÷ 12 [I%]	Input monthly interest rate. I% = 1.25
46 [DAYS]	Input days until first payment. DAYS= 46.00
0 [FV]	Input future value (No balloon payment). FV = 0.00
[PMT]	Calculates payment. PMT = -157.03