

A student wishes to purchase a car priced at \$4000. The student has a part-time job and can afford to repay \$350 every month. A bank offers the student a loan of \$4000 with an interest rate of 15% pa compounded monthly. How many complete months will it take the student to repay the loan and how much interest will be paid in total?

We will use the recursive formula

$T_{n+1} = T_n \times 1.0125 - 350$, $T_0 = 4000$ to solve this problem.


Enter the formula as shown and then set the table range from 0 to 15.

Without interest, the loan will take $4000 \div 350 = 11.4$ months to repay, so allow for up to 15 iterations.

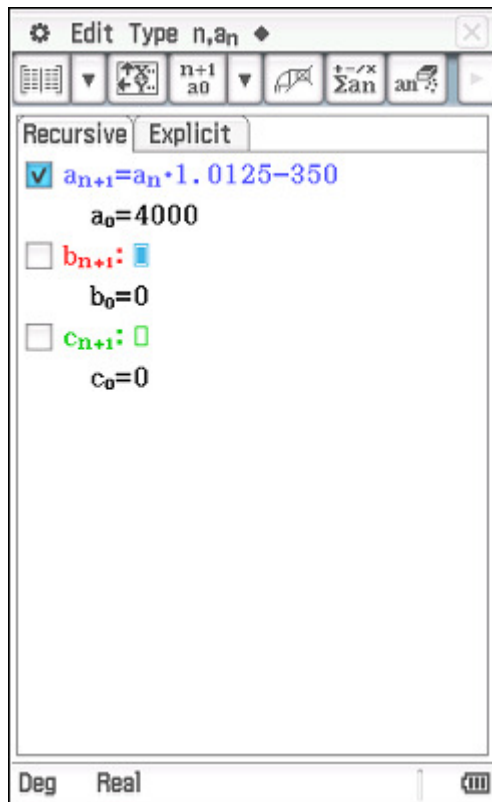
Tap  and **Resize**.

Scroll to the bottom of the table.

The loan is repaid after 13 repayments.

To carry out manual calculations tap  to open Sequence RUN window.

Final repayment is \$143.67, total repaid is \$4343.67 and total interest paid is \$343.67.



Edit Type n, a_n

Recursive Explicit

$a_{n+1} = a_n \cdot 1.0125 - 350$

$a_0 = 4000$

$b_{n+1} =$

$b_0 = 0$

$c_{n+1} =$

$c_0 = 0$

Math1 Line $\sqrt{\square}$ π \rightarrow

Math2 \square^\square e^\square \ln \log_{\square} $\sqrt[\square]{\square}$

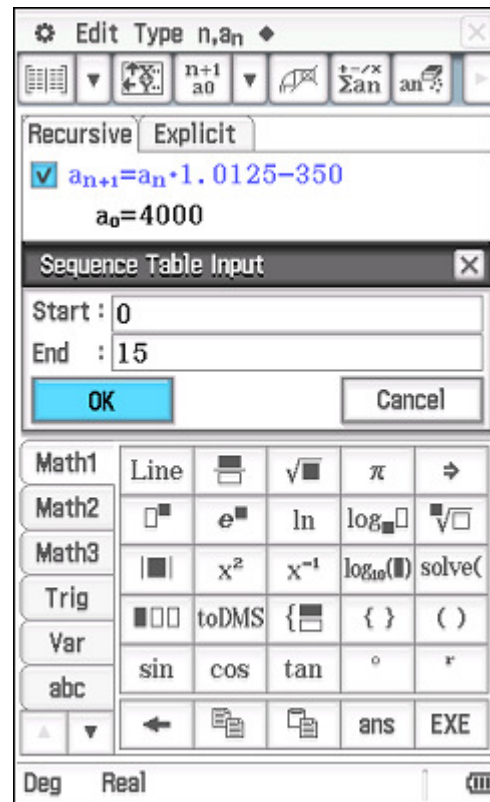
Math3 $|\square|$ x^2 x^{-1} $\log_{10}(\square)$ solve(\square)

Trig $\square\square\square$ toDMS $\{\square\}$ $\{\}$ $(\)$

Var sin cos tan $^\circ$ r

abc \leftarrow \rightarrow ans EXE

Deg Real



Edit Type n, a_n

Recursive Explicit

$a_{n+1} = a_n \cdot 1.0125 - 350$

$a_0 = 4000$

Sequence Table Input

Start : 0

End : 15

OK Cancel

Math1 Line $\sqrt{\square}$ π \rightarrow

Math2 \square^\square e^\square \ln \log_{\square} $\sqrt[\square]{\square}$

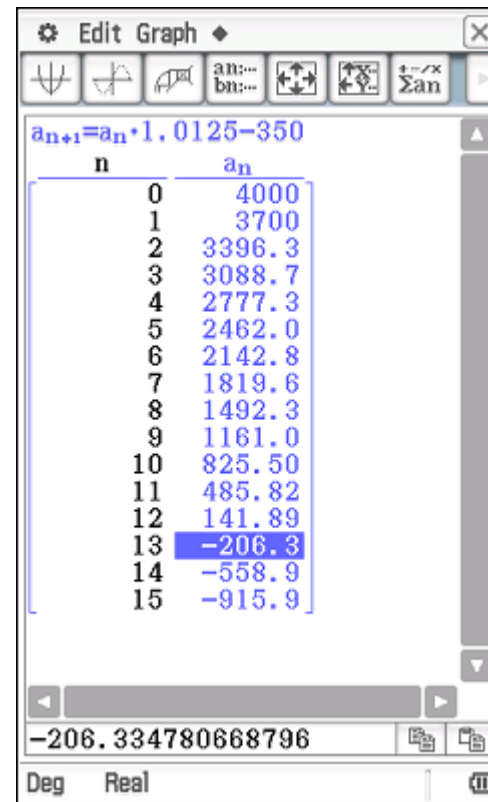
Math3 $|\square|$ x^2 x^{-1} $\log_{10}(\square)$ solve(\square)

Trig $\square\square\square$ toDMS $\{\square\}$ $\{\}$ $(\)$

Var sin cos tan $^\circ$ r

abc \leftarrow \rightarrow ans EXE

Deg Real



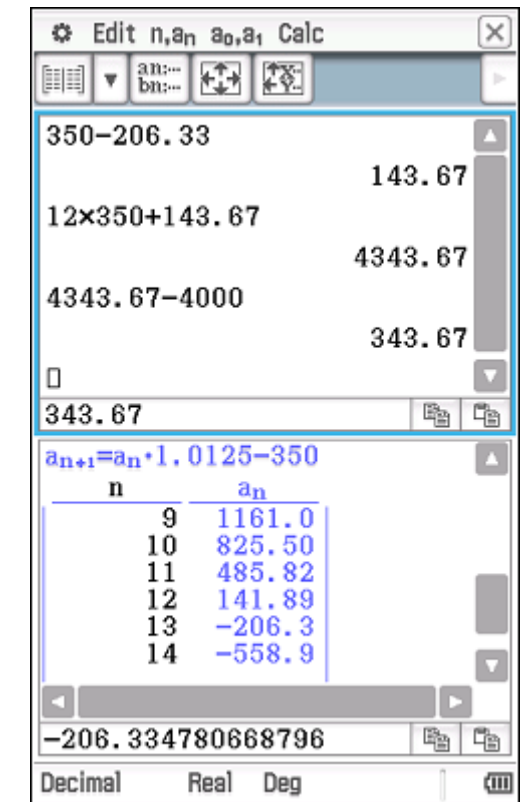
Edit Graph

$a_{n+1} = a_n \cdot 1.0125 - 350$

| n | a _n |
|----|----------------|
| 0 | 4000 |
| 1 | 3700 |
| 2 | 3396.3 |
| 3 | 3088.7 |
| 4 | 2777.3 |
| 5 | 2462.0 |
| 6 | 2142.8 |
| 7 | 1819.6 |
| 8 | 1492.3 |
| 9 | 1161.0 |
| 10 | 825.50 |
| 11 | 485.82 |
| 12 | 141.89 |
| 13 | -206.3 |
| 14 | -558.9 |
| 15 | -915.9 |

-206.334780668796

Deg Real



Edit n, a_n a₀, a₁ Calc

350 - 206.33 = 143.67

12 × 350 + 143.67 = 4343.67

4343.67 - 4000 = 343.67

□

343.67

$a_{n+1} = a_n \cdot 1.0125 - 350$

| n | a _n |
|----|----------------|
| 9 | 1161.0 |
| 10 | 825.50 |
| 11 | 485.82 |
| 12 | 141.89 |
| 13 | -206.3 |
| 14 | -558.9 |


-206.334780668796


Decimal Real Deg

It is also possible to determine the amount of interest paid in any particular month - say the 4th month.


A third column has been added to the table, headed Dfrn (the difference of consecutive terms).

Without interest, the loan should reduce each month by the regular repayment of \$350. The reduction of only \$311.39 is due to the interest added.

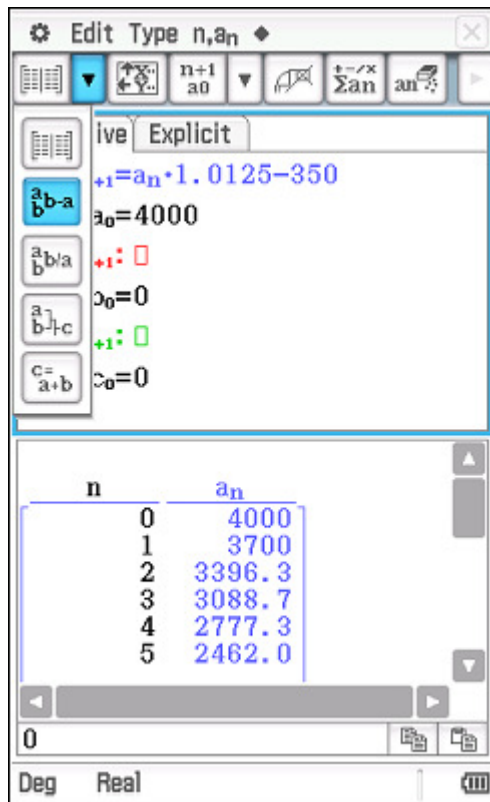
Close the RUN window using .

Tap  and choose the second option.

Note the difference of \$311.39 for the 4th month.

Tap  to again open the Sequence RUN window.

The interest for the 4th month was \$38.61.



Edit Type n, a_n

ive Explicit

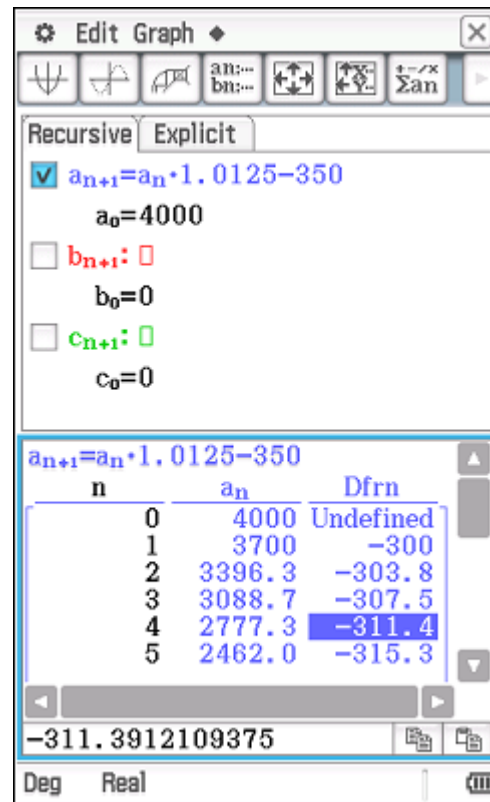
$a_{n+1} = a_n \cdot 1.0125 - 350$

$a_0 = 4000$

| n | a_n |
|---|--------|
| 0 | 4000 |
| 1 | 3700 |
| 2 | 3396.3 |
| 3 | 3088.7 |
| 4 | 2777.3 |
| 5 | 2462.0 |

0

Deg Real



Edit Graph

Recursive Explicit

$a_{n+1} = a_n \cdot 1.0125 - 350$

$a_0 = 4000$

$b_{n+1} = \square$

$b_0 = 0$

$c_{n+1} = \square$

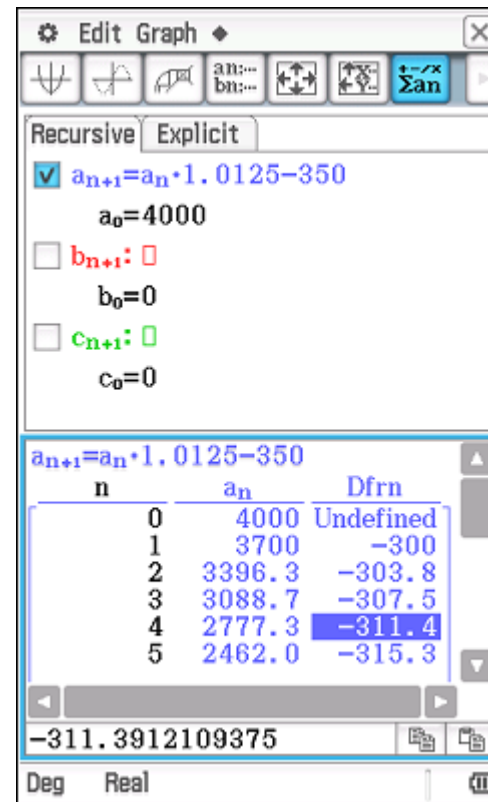
$c_0 = 0$

$a_{n+1} = a_n \cdot 1.0125 - 350$

| n | a_n | Dfrn |
|---|--------|-----------|
| 0 | 4000 | Undefined |
| 1 | 3700 | -300 |
| 2 | 3396.3 | -303.8 |
| 3 | 3088.7 | -307.5 |
| 4 | 2777.3 | -311.4 |
| 5 | 2462.0 | -315.3 |

-311.3912109375

Deg Real



Edit Graph

Recursive Explicit

$a_{n+1} = a_n \cdot 1.0125 - 350$

$a_0 = 4000$

$b_{n+1} = \square$

$b_0 = 0$

$c_{n+1} = \square$

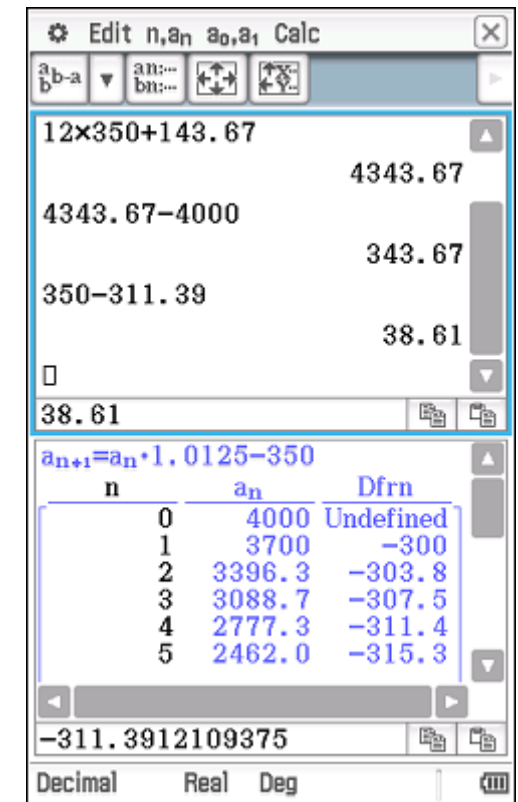
$c_0 = 0$

$a_{n+1} = a_n \cdot 1.0125 - 350$

| n | a_n | Dfrn |
|---|--------|-----------|
| 0 | 4000 | Undefined |
| 1 | 3700 | -300 |
| 2 | 3396.3 | -303.8 |
| 3 | 3088.7 | -307.5 |
| 4 | 2777.3 | -311.4 |
| 5 | 2462.0 | -315.3 |

-311.3912109375

Deg Real



Edit $n, a_n a_0, a_1$ Calc

$12 \times 350 + 143.67$

4343.67

$4343.67 - 4000$

343.67

$350 - 311.39$

38.61

38.61

$a_{n+1} = a_n \cdot 1.0125 - 350$

| n | a_n | Dfrn |
|---|--------|-----------|
| 0 | 4000 | Undefined |
| 1 | 3700 | -300 |
| 2 | 3396.3 | -303.8 |
| 3 | 3088.7 | -307.5 |
| 4 | 2777.3 | -311.4 |
| 5 | 2462.0 | -315.3 |

-311.3912109375

Decimal Real Deg