

Paying off a BIG loan for a BIG TV.

Checkpoints



Activity One

- Continually pressing **EXE** will repeat the process for the following months. You should find you would owe \$12060.18 (to the nearest cent) at the start of the third month. (The *present value* at the start of the third month).

```

12000
Ans×(1+7÷1200)-40 12000
                    12030
                    12060.175
                    12090.52602
                    12121.05409
MAT
    
```

This shows that paying only \$40 will result in the present value of the annuity increasing – it will never be paid off!

- Lets suppose you pay back \$50 per month. You can investigate this **without** re-entering the whole calculation.

- First commit 12000 to the ANS memory (12000 and **EXE**). You must do this as the machine takes the last number computed and places it in the ANS memory.
- Now press **AC/ON** to clear the **RUN-MAT** screen and then press **↶** on the arrow pad *twice* to recall the previous calculation we entered (unless you have turned the machine off or changed modes).
- Now press **↶** to have the cursor enter the calculation line. You can move through calculation by pressing **↶** or **↷** repeatedly until you have the cursor in front of the 4 in the numeral 40. Then press the **DEL** key and then 5.

```

Ans×(1+7÷1200)-40 12030
                    12060.175
                    12090.52602
                    12121.05409
12000
MAT
                    12000
    
```

```

Ans×(1+7÷1200)-40
MAT
    
```

You should find that you owe \$12020 at the start of the second month. So you are still not making large enough repayments.

Through trial and error, you should find that any monthly payment greater than \$70 – the monthly interest charge – will see the loan diminish. An amount of around \$350 per month would be required to pay the loan off in three years.

- The minimum payment will be the amount of interest charged plus 'tad'. Then the loan will have a reducing present value. If the payment is the same as the amount of interest for the first period, the present value will be constant and 'last forever'.

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Activity Two

1.

<pre>Eq:P=M((1+R)^N-1)÷(R(P=0 M=200 R=5.8333E-03 N=36 Lower=-9E+99 Upper=9E+99 RCL DEW SOLV</pre>	→	<pre>Eq:P=M((1+R)^N-1)÷(R(P=6477.29289 Lft=6477.29289 Ret=6477.29289 REFT</pre>
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The loan would be \$6477.29 (to the nearest cent).

2.

<pre>Eq:P=M((1+R)^N-1)÷(R(P=12000 M=200 R=5.8333E-03 N=36 Lower=-9E+99 Upper=9E+99 RCL DEW SOLV</pre>	→	<pre>Eq:P=M((1+R)^N-1)÷(R(N=74.06368256 Lft=12000 Ret=12000 REFT</pre>
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We would need to pay 74 full payments and one part payment.

3.

<pre>Eq:P=M((1+R)^N-1)÷(R(P=12000 M=200 R=5.8333E-03 N=36 Lower=-9E+99 Upper=9E+99 RCL DEW SOLV</pre>	→	<pre>Eq:P=M((1+R)^N-1)÷(R(M=370.5251624 Lft=12000 Ret=12000 REFT</pre>
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We would need to make payments of \$370.53 (to the nearest cent).



Activity Three

1.

<pre>Eq:P=M((1+R)^N-1)÷(R(P=245000 M=1500 R=3.3333E-03 N=36 Lower=-9E+99 Upper=9E+99 RCL DEW SOLV</pre>	→	<pre>Eq:P=M((1+R)^N-1)÷(R(N=236.2641819 Lft=245000 Ret=245000 REFT</pre>	→	<pre>N=12 19.68868182 MAT</pre>
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A little over 19.5 years.

2.

<pre>Eq:P=M((1+R)^N-1)÷(R(P=245000 M=1500 R=3.3333E-03 N=300 Lower=-9E+99 Upper=9E+99 RCL DEW SOLV</pre>	→	<pre>Eq:P=M((1+R)^N-1)÷(R(M=1293.200259 Lft=245000 Ret=245000 REFT</pre>
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The payments will be \$1293.20 (to the nearest cent).

3.

<pre>Eq:P=M((1+R)^N-1)÷(R(P=245000 M=2000 R=3.3333E-03 N=300 Lower=-9E+99 Upper=9E+99 RCL DEW SOLV</pre>	→	<pre>Eq:P=M((1+R)^N-1)÷(R(P=378904.9659 Lft=378904.9659 Ret=378904.9659 REFT</pre>	→	<pre>P=245000 133904.9659 MAT</pre>
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He will need to deposit \$133904.97 (to the nearest cent) extra.

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4.

```
Eq: P=M*((1+R)^N-1)/(R(
P=15000
M=350
R=0.01
N=300
Lower=-9E+99
Upper=9E+99
RCL DEL SOLU
```

→

```
Eq: P=M*((1+R)^N-1)/(R(
N=56.24092266
Lft=15000
Ret=15000
REFT
```

→

```
N=12
4.686743555
MAT
```

Fifty six full periods (plus a part period) which is a little over 4 and a half years.

5.

```
N=12
4.686743555
N*350-15000
4684.32293
MAT
```

Interest paid would be \$4684.32 (to the nearest cent).

6.

```
Eq: P=M*((1+R)^N-1)/(R(
P=10000
M=350
R=0.01
N=0
Lower=-9E+99
Upper=9E+99
RCL DEL SOLU
```

→

```
Eq: P=M*((1+R)^N-1)/(R(
N=33.81518078
Lft=10000
Ret=10000
REFT
```

Therefore it will take 56.24 - 33.81 periods (22.43 periods - leaving us wondering if it is 22 or 23 periods).

Reverting to our approach from Activity One shows us it is after 23 periods.

```
15000
Ans*(1+0.01)-350
14800
MAT
```

```
11313.91137
11077.05049
10837.82099
10596.1992
10352.16119
10105.6828
9856.739633
MAT
```