

Want to turn \$1000 into \$47000?

Checkpoints.



Activity 2.

1. In RUN-MAT this calculation looks like... and by pressing EXE repeatedly...

```

1000
Ans×1.08      1000
                1080
┌┐MAT
    
```

```

1000
Ans×1.08      1000
                1080
                1166.4
                1259.712
                1360.48896
                1469.328077
┌┐MAT
    
```

Based on this we can see that the interest is worth \$1469.33 after 5 years.

2. We can also determine that the interest earned in the 5th year is equal to \$108.84



Activity 3.

1. By entering this input we can confirm the value after 5 years

```

Eq:H=P(1+R)^N
H=0
P=1000
R=0.08
N=5
Lower=-9e+99
Upper=9e+99
┌RCL┐DEL┐ SOLV
    
```

```

Eq:H=P(1+R)^N
A=1469.328077
Lft=1469.328077
Ret=1469.328077
┌REPT
    
```

2. By pressing REPT F1 , altering the input and resolving...

```

Eq:H=P(1+R)^N
H=1469.328077
P=1000
R=0.08
N=50
Lower=-9e+99
Upper=9e+99
┌RCL┐DEL┐ SOLV
    
```

```

Eq:H=P(1+R)^N
A=46901.61251
Lft=46901.61251
Ret=46901.61251
┌REPT
    
```

...we see that the claimed \$47 000 is pretty much correct!

Want to turn \$1000 into \$47000?

Checkpoints.

3. To find the amount earned in the 50th year we need the value after 49 years,

```
Eq: A=P(1+R)^N
A=46901.6125
P=1000
R=0.08
N=49
Lower=-9E+99
Upper=9E+99
RCL DEL SOLV
```

```
Eq: A=P(1+R)^N
A=43427.41899
Lft=43427.41899
Ret=43427.41899
REFT
```

So that we can find that the interest earned in the 50th years is...

```
46901.61-43427.42
3474.19
DMMAT
```

\$3474.19, a lot more than the \$80 earned in the first year!



Activity 4.

1. By inputting \$100 000 for A and solving for N

```
Eq: A=P(1+R)^N
A=100000
P=1000
R=0.08
N=59.83768044
Lower=-9E+99
Upper=9E+99
RCL DEL SOLV
```

```
Eq: A=P(1+R)^N
N=59.83768044
Lft=100000
Ret=100000
REFT
```

We see that just under 60 years are needed for this growth to occur.

2. By now inputting 50 years for N and solving for R

```
Eq: A=P(1+R)^N
A=100000
P=1000
R=0.09647819614
N=50
Lower=-9E+99
Upper=9E+99
RCL DEL SOLV
```

```
Eq: A=P(1+R)^N
R=0.09647819614
Lft=100000
Ret=100000
REFT
```

We see that a slightly higher rate of around 9.65% is needed for this growth to occur in 50 years. By comparing with the \$47 000 value previously verified we see that, by increasing the interest rate by less than 2%, our investment was doubled in size after the 50 year period.

Want to turn \$1000 into \$47000?

Checkpoints.



Activity 6.

1. The investment compounded quarterly...

```
Eq: A=P(1+R)^N
  A=0
  P=125000
  R=5.4166E-03
  N=3*12
  Lower=-9E+99
  Upper=9E+99
```

```
Eq: A=P(1+R)^N
  A=151833.9534
  Lft=151833.9534
  Rst=151833.9534
```

IREPT

2. The same investment compounded yearly...

```
Eq: A=P(1+R)^N
  A=150993.7031
  P=125000
  R=0.065
  N=3
  Lower=-9E+99
  Upper=9E+99
  RCL DEL SOLW
```

```
Eq: A=P(1+R)^N
  A=150993.7031
  Lft=150993.7031
  Rst=150993.7031
```

IREPT

A difference of \$840.25



Further Exercises

- 1.

```
Eq: A=P(1+R)^N
  A=150993.7031
  P=1800
  R=3.1666E-03
  N=60
  Lower=-9E+99
  Upper=9E+99
  RCL DEL SOLW
```

```
Eq: A=P(1+R)^N
  A=2175.995944
  Lft=2175.995944
  Rst=2175.995944
```

IREPT

2. a.

```
Eq: A=P(1+R)^N
  A=6003.2
  Lft=6003.2
  Rst=6003.2
```

IREPT

- b.

```
Eq: A=P(1+R)^N
  A=6014.217625
  Lft=6014.217625
  Rst=6014.217625
```

IREPT

- c.

```
Eq: A=P(1+R)^N
  A=6016.775339
  Lft=6016.775339
  Rst=6016.775339
```

IREPT

- d.

```
Eq: A=P(1+R)^N
  A=6018.027196
  Lft=6018.027196
  Rst=6018.027196
```

IREPT

By compounding more frequently we increase the value of the investment, but the increases become less as this process continues.

3. Based on the above information it would seem that there is a *relatively* small advantage to an investor in compounding more often than daily. However, it might be 'worth it' for a very large investment, or over a long time.

Want to turn \$1000 into \$47000?

Checkpoints.

4.

```
Eq: A=P(1+R)^N
N=8018.98719
P=5600
R=0.018
N=20
Lower=-9E+99
Upper=9E+99
[RCL] [DEL] [SOLV]
```

```
Eq: A=P(1+R)^N
A=8000.98741
Lft=8000.98741
Ret=8000.98741
[REPT]
```

5. Based on what has been learned through previously exercises we would expect Simon's investment to be worth less than Kellie's, as his investment is compounded less frequently (half as often in fact).

```
Eq: A=P(1+R)^N
N=8000.9874
P=5600
R=0.036
N=10
Lower=-9E+99
Upper=9E+99
[RCL] [DEL] [SOLV]
```

```
Eq: A=P(1+R)^N
A=7976.008004
Lft=7976.008004
Ret=7976.008004
[REPT]
```

This calculation confirms our prediction.

6. Did you get the following?

```
Can't Solve!
Adjust initial
value or bounds.
Then try again.
Press: [EXIT]
[RCL] [DEL] [SOLV]
```

In some cases the Solver will fail to find an answer. Especially when the answer is a very small number and an exponential function is involved. In this case we would need to find the following:

```
30√(275000-1)
√160000
0.01821718763
Ans×12
0.2186062515
[JUMP] [DEL] [PMAT] [MATH]
```

and so we see the home has increased by about 22%.

7. The solution for N is in days, which can be converted into around 11.5 years.

```
Eq: A=P(1+R)^N
A=200
P=100
R=1.6438E-04
N=0
Lower=-9E+99
Upper=9E+99
[RCL] [DEL] [SOLV]
```

```
Eq: A=P(1+R)^N
N=4216.991913
Lft=200
Ret=200
[REPT]
```

```
N=365
11.5534025
[PMAT]
```