Savings With Regular Deposits (Annuities) | MEL4E

We will now do some examples that demonstrate the power of compound interest. We will solve some realistic questions to give you an impression of the importance of saving money.

Saving as a Lifestyle

Example 2: If you put 10$ away in a savings account **every week** for 50 years, how much money would you have in the end? You can assume that you get 2% compounded weekly on your investment.

N	2600 (deposits)
I(%)	2
PV	0
Pmt	-10
FV	44,661.74
PpY	52
CpY	52

a) What is PpY and CpY if we deposit every week? 52

b) How many weeks are in 50 years? $50 \times 52 = 2600$

c) Solve for FV: ✓

d) How much money did you deposit in total over those 50 years?

2600 of $10

= $26,000

e) How much interest did you make? Are you surprised by this answer?

$44,661.74 − $26,000

= $18,661.74 in interest.

Saving for Retirement

Example 3: Jim invests $250 every month into an RRSP (retirement savings plan). This plan pays 5.2% interest compounded monthly. How much money will Jim have when he retires in 40 years?

N	480 (deposits)
I(%)	5.2
PV	0
Pmt	-250
FV	402,033.46
PpY	12
CpY	12

a) What is PpY and CpY if we deposit every month? 12

b) How many months are in 40 years? $40 \times 12 = 480$

c) Solve for FV: ✓

d) How much money did Jim deposit in total over those 40 years?

480 deposits of $250

= $120,000

e) How much interest did Jim earn over those 40 years?

$402,033.46 − $120,000

= $282,033.46 in interest

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You can always count on your grandma to give you 100$ at Christmas. Instead of spending that money, you decide that for 5 years starting next Christmas, you are going to deposit that money into a savings account at the end of the year.

If you could save the money in a bank account that pays 5% compounded annually, how much would you have after the 5 years? Complete the following table to find the future value:

Year	Starting Balance	Calculate the Interest	Ending Balance	Deposit	Ending Balance
1	$0	× 1.05	$0	+100	$100
2	$100	× 1.05	$105	+100 ~~×1.05~~	$205
3	$205	× 1.05	$215.25	+100 ~~×1.05~~	$315.25
4	$315.25	× 1.05	$331.01	+100 ~~×1.05~~	$431.01
5	$431.01	× 1.05	$452.56	+100 ~~×1.05~~	$552.56

In general, we will use two ways to calculate the future value of a series of deposits:

- Use a **table** like above → Tedious
- Use the TVM Solver ✓

Example 1 (The TVM Solver):

The variables represent the following quantities.

N	Total number of payments
I%	Annual interest rate as a percent
PV	Principal or present value
PMT	Regular payment
FV	Amount or future value
P/Y	Number of payments per year
C/Y	Number of compounding periods per year
PMT:	Indicates whether payments are made at the beginning or end of the payment period

always match

N	5 (deposits)
I(%)	5
PV	0
Pmt	−100
FV	552.56 ✓ ✓
PpY	1
CpY	1

The calculator displays either positive or negative values for PV, PMT, and FV. Negative values indicate that money is *paid out*, while positive values mean that money is *received*.

In annuity calculations, only one of the amount (FV) or present value (PV) is used. Enter 0 for the variable not used.