

## FINANCE TEST

When using the TVM solver, you need to show all the values entered in the calculator.

1. James invested \$40 000 at 6% interest. He would like his investment to double in value.

- a) How long does he have to wait if it is simple interest?

$$80000 = 40000(1 + 0.06d)$$

$$2 = 1 + 0.06d$$

$$1 = 0.06d$$

$$d \approx 17 \text{ years}$$

- b) How long does he have to wait if the interest is compounded annually?

$$80000 = 40000(1 + 0.06)^d$$

$$2 = 1.06^d$$

$$1.06^{11} = 1.90$$

$$1.06^{12} = 2.01$$

$$d = 12 \text{ years}$$

- c) How long does he have to wait if the interest is compounded quarterly?

$$80000 = 40000 \left(1 + \frac{0.06}{4}\right)^{4d}$$

$$2 = 1.015^{4d}$$

$$1.015^{46} = 1.98$$

$$1.015^{47} = 2.01$$

$$4d = 47$$

$$d = 11.75 \text{ years}$$

(11 years and 3 trimesters)

2. Lucie must renovate her house. She borrows some money to her cousin with interest rate 5.5% compounded monthly. She would like to reimburse the loan in 1 payment after 4 years, but she doesn't want to pay more than \$15000. How much can she borrow max?

$$15000 = C \left(1 + \frac{0.055}{12}\right)^{12 \times 4}$$

$$C = \frac{15000}{\left(1 + \frac{0.055}{12}\right)^{48}}$$

$$C \approx \$12043.83$$

3. Last year, Simon borrowed \$5000 to repair his roof. He borrowed the money for 2 years with interest rate 7.25% compounded quarterly. He's making monthly payments to reimburse his loan.

a) How much are the monthly payments?

$$N = 2 \times 12$$

$$FV = 0$$

$$I\% = 7.25$$

$$P/Y = 12$$

$$PV = -5000$$

$$C/Y = 4$$

$$PMT = ?$$

$$\Rightarrow \boxed{\$224.33}$$

b) How much interest did he pay total?

$$224.33 \times 2 \times 12 = 5383.92$$

$$5383.92 - 5000 = \boxed{\$383.92}$$

4. When he turned 5, Alain started investing money. Every month, he paid \$5 towards a savings account at 5.8% interest compounded quarterly. He has kept doing it until he turned 25. How much money did he end up with? How much interest did he earn?

$$N = 20 \times 12$$

$$FV = ?$$

$$I\% = 5.80$$

$$P/Y = 12$$

$$PV = 0$$

$$C/Y = 4$$

$$PMT = -5$$

$$\Rightarrow \boxed{\$2248.86}$$

$$5 \times 20 \times 12 = \$1200$$

$$2248.86 - 1200 = \boxed{\$1048.86}$$

5. Kevin used a new credit card to pay for her vacations. She spent \$2834, and the interest rate is 18.75%, compounded daily. He wants to reimburse \$200 every month.
- a) When will he be done reimbursing his debt?

$$N = ?$$

$$FV = 0$$

$$I\% = 18.75$$

$$P/Y = 12$$

$$PV = -2834$$

$$C/Y = 365$$

$$PMT = 200$$

$$\Rightarrow N = 16.2$$

In 17 months

- b) When will he have reimbursed half of his debt?

$$N = ?$$

$$FV = 1417$$

$$I\% = 18.75$$

$$P/Y = 12$$

$$PV = -2834$$

$$C/Y = 365$$

$$PMT = 200$$

$$\Rightarrow N = 8.6$$

In 9 months

6. You decide to buy a \$600 000 house. You make a \$50 000 down payment. You borrow the rest at the bank over 20 years with 6.75% interest compounded semi-annually. How much will have spent in total to buy your house if you make regular monthly payments?

$$N = 20 \times 12$$

$$FV = 0$$

$$I\% = 6.75$$

$$P/Y = 12$$

$$PV = 550\ 000$$

$$C/Y = 2$$

$$PMT = ?$$

$$\Rightarrow PMT = -4151.64$$

$$4151.64 \times 12 \times 20 = 996\ 393.60$$

$$+ 50\ 000$$

$$\boxed{\$ 1\ 046\ 393.60}$$



7. Paula has 2 credit cards, and she would like to be debt free in 5 years.
- She owes \$2500 on credit card A (which has a 18.5% interest rate compounded daily)
  - She owes \$3000 on credit card B (which has a 19% interest rate compounded daily)
- Paula decides to pay off her debt using a line of credit which has 9.6% interest rate, compounded monthly. How much money will she save that way?

### Line of Credit

$$\begin{aligned}
 N &= 5 \times 12 \\
 I &= 9.6 \\
 PV &= 5500 \\
 PMT &= \boxed{?} \\
 FV &= 0 \\
 P/Y &= 12 \\
 C/Y &= 12
 \end{aligned}$$

$$PMT = \$115.78$$

$$\text{Total: } \$6946.80$$

### Credit Cards

	(A)	(B)
N	5x12	5x12
I	18.5	19
PV	2500	3000
PMT	$\boxed{?}$	$\boxed{?}$
FV	0	0
P/Y	12	12
C/Y	365	365

$$\begin{aligned}
 PMT_A + PMT_B &= 64.36 + 78.06 \\
 &= \$142.42
 \end{aligned}$$

$$\begin{aligned}
 \text{Total: } &142.42 \times 5 \times 12 \\
 &= \$8545.20
 \end{aligned}$$

$$\text{Interests saved: } 8545.20 - 6946.80$$

$$= \boxed{\$1598.40}$$

4