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## FINANCE TEST

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

1. James invested \$45 000 at 5.5% interest. He would like his investment to double in value.

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

$$90\ 000 = 45\ 000 (1 + 0.055d)$$

$$2 = 1 + 0.055d$$

$$1 = 0.055d$$

$$d \approx 18 \text{ years}$$

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

$$90\ 000 = 45\ 000 (1 + 0.055)^d$$

$$2 = 1.055^d$$

$$1.055^{12} = 1.901$$

$$1.055^{13} = 2.006$$

$$\Rightarrow 13 \text{ years}$$

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

$$90\ 000 = 45\ 000 \left(1 + \frac{0.055}{4}\right)^{4d}$$

$$2 = 1.01375^{4d}$$

$$1.01375^{50} = 1.979$$

$$1.01375^{51} = 2.007$$

$$\Rightarrow 51 \text{ trimesters i.e. } 12 \text{ years } 3 \text{ trim}$$

2. Lucie must renovate her house. She borrows some money to her cousin with interest rate 6% compounded monthly. She would like to reimburse the loan in 1 payment after 4 years, but she doesn't want to pay more than \$16000. How much can she borrow max?

$$16\ 000 = C \left(1 + \frac{0.06}{12}\right)^{12 \times 4}$$

$$16\ 000 = C \times 1.005^{48}$$

$$C = \frac{16\ 000}{1.005^{48}}$$

$$C = \$12\ 593.57$$

3. Last year, Simon borrowed \$6000 to repair his roof. He borrowed the money for 2 years with interest rate 7.3% compounded quarterly. He's making monthly payments to reimburse his loan.

a) How much are the monthly payments?

$$N = 2 \times 12$$

$$FV = 0$$

$$I\% = 7.3$$

$$P/Y = 12$$

$$PV = -6000$$

$$C/Y = 4$$

$$PMT = ?$$

$$\Rightarrow \boxed{\$269.33}$$

b) How much interest did he pay total?

$$269.33 \times 24 = \$6463.92$$

$$6463.92 - 6000 = \boxed{\$463.92}$$

4. When he turned 6, Alain started investing money. Every month, he paid \$10 towards a savings account at 5.6% interest compounded quarterly. He has kept doing it until he turned 26. How much money did he end up with? How much interest did he earn?

$$N = 20 \times 12 = 240$$

$$FV = ?$$

$$\Rightarrow \boxed{\$4394.22}$$

$$I\% = 5.6$$

$$P/Y = 12$$

$$PV = 0$$

$$C/Y = 4$$

$$PMT = -10$$

$$10 \times 20 \times 12 = \$2400 \text{ paid.}$$

$$4394.22 - 2400 = \boxed{\$1994.22}$$

5. Kevin used a new credit card to pay for her vacations. She spent \$3245, and the interest rate is 18.75%, compounded daily. He wants to reimburse \$250 every month.

a) When will he be done reimbursing his debt?

$N = ?$

$FV = 0$

$I\% = 18.75$

$P/Y = 12$

$PV = -3245$

$C/Y = 365$

$PMT = 250$

$\Rightarrow N = 14.6$

$\Rightarrow$  15 months

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

$N = ?$

$FV = 1622.5$

$I\% = 18.75$

$P/Y = 12$

$PV = -3245$

$C/Y = 365$

$PMT = 250$

$\Rightarrow N = 7.7$

$\Rightarrow$  8 months

6. You decide to buy a \$650 000 house. You make a \$65 000 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?

$N = 20 \times 12$

$FV = 0$

$I\% = 6.75$

$P/Y = 12$

$PV = 585\ 000$

$C/Y = 2$

$PMT = ?$

$\Rightarrow \$ 4\ 415.84$

$4\ 415.84 \times 12 \times 20 = \$ 1\ 059\ 801.60$

$+ 65\ 000$

$\$ 1\ 124\ 801.60$

7. Paula has 2 credit cards, and she would like to be debt free in 5 years.
- She owes \$3 000 on credit card A (which has a 18.5% interest rate compounded daily)
  - She owes \$2 500 on credit card B (which has a 19% interest rate compounded daily)
- Paula decides to pay off her debt using monthly payments with a line of credit which has 9.6% interest rate, compounded monthly. How much money will she save that way?

### Line of Credit

$$N = 5 \times 12$$

$$I = 9.6$$

$$PV = 5500$$

$$PMT = ?$$

$$FV = 0$$

$$P/Y = 12$$

$$C/Y = 12$$

$$PMT = \$115.78$$

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

### Credit Cards

	A	B
N	5x12	5x12
I	18.5	19
PV	3000	2500
PMT	?	?
FV	0	0
P/Y	12	12
C/Y	365	365

$$PMT_A + PMT_B = 77.23 + 65.05 = \$142.28$$

$$\text{Total} : 142.28 \times 5 \times 12 = \$8536.80$$

Interests saved :

$$8536.80 - 6946.80 = \boxed{\$1590}$$

Costs

B	A	
2x15	2x15	N
11	15.2	I
200	300	P
5	5	PMT
0	0	FV
15	17	PV
300	300	C/A

$20.20 + 55.77 = 8 \text{ PMT} + 1 \text{ PMT}$   
 $85.58 = 9 \text{ PMT} + 62.12$   
 $23.46 = 9 \text{ PMT}$   
 $2.61 = \text{Total} : 145.58 \times 2 \times 15$   
 $828.80 =$

12.51

$828.80 = 0.044 \times 80 = 25.28$

Costs

11	2x15
I	2.4
PV	2800
PMT	5
FV	0
PV	15
0	0

$87.21 = \text{PMT}$   
 $08.344 \times 80 = \text{Total}$

Interest