

1. Match the definitions

- mortgage loan insurance
- amortization period
- variable interest rate
- mortgage
- mortgage term

It is a type of loan used to buy a home or other property	mortgage
If your down payment is less than 20%, you have to buy	mortgage loan insurance
It is the length of time that the mortgage agreement at your agreed interest rate is in effect	mortgage term
It is the length of time it will take to fully pay off the amount of the mortgage loan	amortization period
The interest rate can change during the mortgage term	variable interest rate

2. Below is a list of expenses associated to buying and/or renting a home. For each expense, identify each expense:

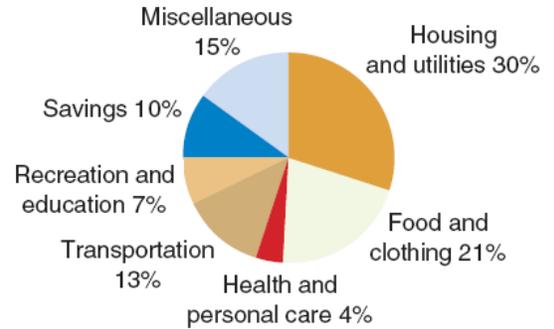
- only someone purchasing a property would pay (**P**),
- or only a renter would pay (**R**),
- or both purchasers and renters may pay (**B**)

Down Payment P	Insurance B	Legal Fees P
Home Inspection P	Moving Costs B	Appliances P
Mortgage Payments P	Furnishings B	Utilities (water, heat, hydro) B
Land Transfer Tax P	Property Taxes P	Landscaping P
Repairs & Maintenance B	Painting B	Renovations B
Cable, Phone, Internet B	Security System B	Condo Fees P
Security Deposit R	Parking B	Cleaning B

3. Convert the following non-monthly expenses to MONTHLY expenses:

- Bi-weekly mortgage payment of \$771 $771 \times 26 = 20046 \xrightarrow{\div 12} \1670.50
- Annual property taxes of \$3588 $3588 \div 12 = \$299$
- Semi-monthly house insurance of \$42 $42 \times 2 = \$84$
- Gas/hydro bill of \$531 every three months $531 \div 3 = \$177$
- Quarterly Water/Sewer bill of \$75 (equal billing) $75 \div 3 = \$25$
- Annual Monthly Internet/Cable bill of \$1320 $1320 \div 12 = \$110$
- Weekly laundry expense of \$12 $12 \times 52 = 624 \xrightarrow{\div 12} \52

4. This pie chart shows Bella's expenses for one month. Bella spent \$2500 in one month for all of her expenses.



a) How much did she spend on housing and utilities?

30% of her monthly expense is on h & u
 $2500 \times 30 \div 100 = \boxed{\$750}$

b) How much did she spend on food and clothing?

21% of her monthly expense is on f & c
 $2500 \times 21 \div 100 = \boxed{\$525}$

c) How much did she spend on her top two expenses combined?

$750 + 525 = \underline{\underline{\$1275}}$

5. Ethan has just gotten a job as a carpenter. He estimates his annual income will be \$52000; however, his deductions are 35% of his salary.

He is currently living at home, but wants to know if he can afford to move out on his own. He has found a furnished bachelor's apartment that would cost \$1500 every month, utilities included.

He estimates he will spend \$200 on food and \$100 on phone and cable every month.

He will have to do laundry every week at a nearby laundromat that costs \$12 weekly.

His transportation costs are currently \$3600 for the year, and will stay the same in his new place.

a) Calculate his net income (NET INCOME = ANNUAL INCOME - TOTAL DEDUCTIONS)

Total deductions = $52000 \times 35 \div 100 = \$18,200$
 Net Income = $52,000 - 18,200 = \$33,800$
 Monthly = $\$2816.67$

b) Convert non-monthly costs to monthly costs.

Rent = \$1500/monthly
 Food = \$200/monthly
 Phone & Cable = \$100/monthly
 Laundry = \$12/weekly = \$52/monthly

Transportation = $\$3600/\text{yearly} = \$300/\text{monthly}$
 Savings = $\$6000/\text{yearly} \xrightarrow{\div 12} \$500/\text{monthly}$

c) Are there expenses that you think Ethan has forgotten to include? Explain.

Wifi apr \$50/month Going out/Entertainment ...

d) Prepare a personal monthly budget for Ethan, and determine whether Ethan can afford to move out.

INCOME	
Pay	\$2816.67
Total Monthly Income	\$2816.67
EXPENSES	
Rent	\$1500
Food	\$200
Phone & Cable	\$100
Laundry	\$52
Transportation	\$300
Savings	\$500
Total Monthly Expenses	\$2652
INCOME - EXPENSES	
	\$164.67

He can move out

RECALL: FUTURE VALUE

Use to find the value **at the end of an annuity**
(after all deposits are made & interest is accrued)

$$A = \frac{R[(1+i)^n - 1]}{i}$$

RECALL: PRESENT VALUE

Use to find the money needed **at the beginning of an annuity** to provide regular annuity payments

$$PV = \frac{R[1 - (1+i)^{-n}]}{i}$$

6. Charlie deposits \$500 every 3 months into his daughter's RESP. If the account earns 6% / a, compounded quarterly, how much will be in the account after 10 years?

* Lump sum at the end; therefore future value

Type: compounded quarterly

A: ?

R: \$500

i: 6% / year $\rightarrow \frac{0.06}{4} = 0.015$

n: 10 years $\times 4 = 40$

$$A = \frac{500((1+0.015)^{40} - 1)}{0.015}$$

$$= \$27,133.95$$

\therefore There will be \$27,133.95 in the account after 10 years.

7. Mikayla is setting up an income fund for her retirement. She wishes to receive \$3000 every month for the next 25 years, starting 1 month from now. The income fund pays 4.8% per year compounded monthly. How much must Mikayla deposit now to be able to receive the desired amount every month?

* Lump sum in the beginning; thus present value $PV = \frac{R(1 - (1+i)^{-n})}{i}$

Type: compounded monthly

PV: ?

R: \$3000

i: 4.8% / year = 0.004

n: 25 years $\times 12 = 300$

$$= \frac{3000(1 - (1+0.004)^{-300})}{0.004}$$

$$= \$523,562.99$$

\therefore She needs to invest \$523,562.99 the day she wants to start receiving monthly payments of \$3000 to last her 25 years.

8. Bilal receives a quarterly bonus of \$500 which he deposits into a savings account that pays him 4.8% interest compounded quarterly. How much will he have saved after 5 years?

Lump sum at the end; thus, future value

Type: compound quarterly

A: ?

R: \$500

i: 4.8% / year $\div 4 = 0.004$

n: 5 years $\times 4 = 20$

$$A = \frac{R((1+i)^n - 1)}{i}$$

$$= \frac{500((1+0.004)^{20} - 1)}{0.004}$$

$$= \$10,389.28$$

\therefore He will have \$10,389.28 saved after 5 years.

9. During her third year of post-secondary education, Angela moves back in with her parents and agrees to pay \$150 per week for rent. If her bank account has an interest rate of only 2.08% per year compounded weekly, and she plans to stay for 2 years, how much money must Angela have in her account before moving in? Assume she does not earn any other income during the 2 years.

Lump sum in the beginning; thus present value
Type: compounded weekly

$$PV = \frac{R(1-(1+i)^{-n})}{i}$$

$$= \frac{150(1-(1+0.0004)^{-104})}{0.0004}$$

$$= \$15,276.98$$

PV: ?

R: \$150

i: 2.08%/year $\xrightarrow{\div 52}$ 0.0004

n: 2 years $\times 52 = 104$

\therefore She needs to have \$15,276.98 in her account

10. Katelyn wants to save up for a \$30,000 down payment. If she wants to have this money in 2 years, how much must she deposit every month into an account that makes 3.72% interest compounded monthly, to reach her goal?

Lump sum at the end; thus future value
Type:

$$A = \frac{R((1+i)^n - 1)}{i}$$

$$30000 = \frac{R((1+0.0031)^{24} - 1)}{0.0031}$$

A: \$30,000

R: ?

i: 3.72%/year $\xrightarrow{\div 12}$ 0.0031

n: 2 years $\times 12 = 24$

$$30000 = R \cdot 24.8754$$

$$1206.01 = R$$

\therefore She must deposit \$1206.01 monthly.

11. Niloufar borrows now \$20,000 to buy a vehicle. She will repay the loan in equal monthly payments over 5 years, starting 1 month from now. She is charged interest at 6% per year compounded monthly. How much is Niloufar's monthly payment?

Lump sum in the beginning; thus, present value
Type: compounded monthly

$$PV = \frac{R(1-(1+i)^{-n})}{i}$$

$$20000 = \frac{R(1-(1+0.005)^{-60})}{0.005}$$

PV: \$20,000

R: ?

i: 6%/year $\xrightarrow{\div 12}$ 0.005

n: 5 years $\times 12 = 60$

$$20000 = R \cdot 51.7256$$

$$\div 51.7256 \quad \div 51.7256$$

$$\$386.66 = R$$

\therefore She will pay \$386.66 every month for 5 years.

12. Bella wants to save \$8000 for a trip she plans to take in 3 years. What regular deposits should she make at the end of every 6 months into an account that earns 6% per year compounded semi-annually?

Lump sum at the end; thus, future value
Type: compounded semi-annually

$$A = \frac{R((1+i)^n - 1)}{i}$$

$$8000 = \frac{R((1+0.03)^6 - 1)}{0.03}$$

A: \$8000

R: ?

i: 6%/year $\xrightarrow{\div 2}$ 0.03

n: 3 years $\times 2 = 6$

$$8000 = R \cdot 6.4684$$

$$\$1236.78 = R$$

\therefore She needs to make \$1236.78 every 6 months.