What's Going On?

Checking In

Minds on   What's a Mortgage?

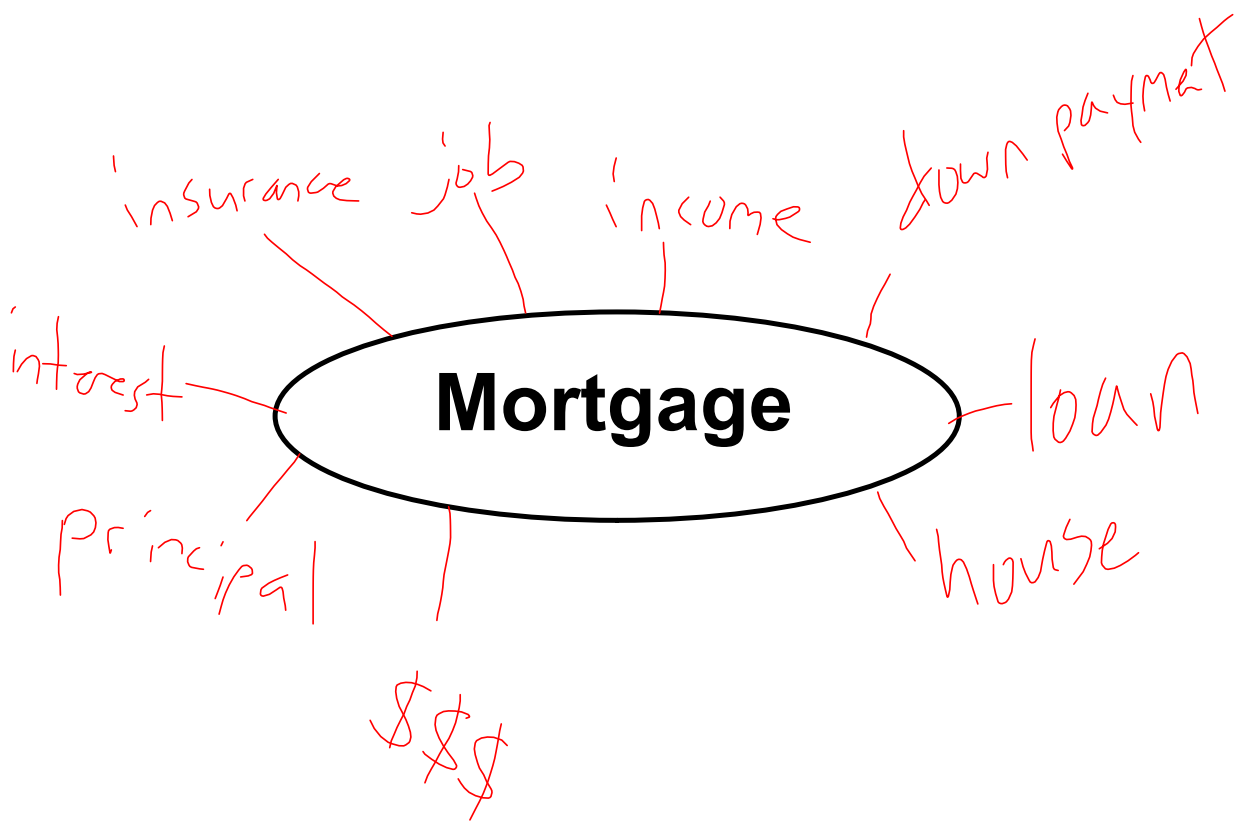**Action!**   Amortization Tables and Your First House

Consolidation   Practice!

Learning Goal - I will be able to solve problems involving mortgages and will be able to work with amortization tables.

Minds on

What's a Mortgage?

insurance job income down paymnt

interest

Mortgage

— loan

Principal

house

$$$

Minds on

What's a Mortgage?

Mortgage	A mortgage is an _annuity_ where the _principal value_ is the amount borrowed to purchase a _home_.
Fixed Rate Mortgage	A mortgage with a _constant_, fixed _interest rate_.
Amortization	The gradual _elimination_ of a _loan_.
Amortization Period	The _time_ for which the calculation of a _mortgage_ payment is determined. _20 or 25 years_
Mortgage Term	The _length_ of the _mortgage_ agreement.

5 years

Minds on

What's a Mortgage?

Amortization Table	A table that shows the breakdown of the _principal_, _payments_, _interest_ paid, and the _unpaid_ loan balances over a certain timeframe.
Appreciation Rate	The _rate_ at which the value of an item _increases_ over time.

Minds on

What's a Mortgage?

N =   Total number of mortgage payments.

I% =   Interest rate.

PV =   Original amount of the loan. (value of house - down payment)

PMT =   Regular payment amount.

FV =   0 do not use

P/Y =   Number of payments per year. (often 12)

C/Y =   Compounding periods per year. (2)

| Action!

Amortization Tables

An amortization table breaks down how much interest is paid per month and how much of the

principal is paid per month.

The _*sum*_ of the interest paid and principal paid for any given month tells us the amount of

the _*monthly*_ _*payment*_.

Month	Principal Paid ($)	Interest Paid ($)
1	554.20	1754.55
2	556.84	1751.91
3	559.49	1749.26
4	562.16	1746.59
5	564.84	1743.91
6	567.53	1741.22
7	570.24	1738.51
8	572.96	1735.79
9	575.69	1733.06
10	578.43	1730.32
11	581.19	1727.56
12	583.96	1724.79

Month	Principal Paid ($)	Interest Paid ($)
1	554.20	1754.55
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12	583.96	1724.79

$= 2308.75$

Based on the amortization table above,

a. Calculate the monthly payment.

$2308.75

b. Calculate the total amount paid in the first year.

2308.75×12

$= 27,709.00$

Month	Principal Paid ($)	Interest Paid ($)
1	554.20	1754.55
2	556.84	1751.91
3	559.49	1749.26
4	562.16	1746.59
5	564.84	1743.91
6	567.53	1741.22
7	570.24	1738.51
8	572.96	1735.79
9	575.69	1733.06
10	578.43	1730.32
11	581.19	1727.56
12	583.96	1724.79

c. Describe the trend in the Principal Paid column. How much of the principal is paid off after the first year?

Goes up

$6827.53

Month	Principal Paid ($)	Interest Paid ($)
1	554.20	1754.55
2	556.84	1751.91
3	559.49	1749.26
4	562.16	1746.59
5	564.84	1743.91
6	567.53	1741.22
7	570.24	1738.51
8	572.96	1735.79
9	575.69	1733.06
10	578.43	1730.32
11	581.19	1727.56
12	583.96	1724.79

d. Describe the trend in the Interest Paid column. How much interest is paid after the first year?

└ decreases slowly

$20877.47

Month	Principal Paid ($)	Interest Paid ($)
1	554.20	1754.55
2	556.84	1751.91
3	559.49	1749.26
4	562.16	1746.59
5	564.84	1743.91
6	567.53	1741.22
7	570.24	1738.51
8	572.96	1735.79
9	575.69	1733.06
10	578.43	1730.32
11	581.19	1727.56
12	583.96	1724.79

Tot   6827.53

e.   How much debt is owed on the house after the first year?

$368,000 mortgage

−   6,827.53
_____

$361,172.47

Action!

Your First House

Example

Mr. Gilbert is considering buying a home for $255,000. As a first-time home buyer, Mr. Gilbert can make a 5% down payment on the house and take out a mortgage for the remaining balance. His mortgage broker found a bank offering an annual interest rate of 5.49% for a five-year fixed rate mortgage based on an amortization period of 25 years.

a. Determine the down payment and the amount to be mortgaged.

$$255,000 \times 0.05$$

Down Payment $= \$12,750$

Mortgage Amount $=$

$$255,000 - 12,750$$

$$= 242,250$$

$$\boxed{PV}$$

| **Action!**

Your First House

Example

Mr. Gilbert is considering buying a home for $255,000. As a first-time home buyer, Mr. Gilbert can make a 5% down payment on the house and take out a mortgage for the remaining balance. His mortgage broker found a bank offering an annual interest rate of 5.49% for a five-year fixed rate mortgage based on an amortization period of 25 years.

b. List the variables that you will input into the TVM solver.

$$N = 12 \times 25$$
$$= 300$$
$$I\% = 5.49$$
$$PV = 242,250$$
$$PMT = ?$$
$$FV = 0$$
$$P/Y = 12$$
$$C/Y = 2$$

| **Action!**

Your First House

Example

Mr. Gilbert is considering buying a home for $255,000. As a first-time home buyer, Mr. Gilbert can make a 5% down payment on the house and take out a mortgage for the remaining balance. His mortgage broker found a bank offering an annual interest rate of 5.49% for a five-year fixed rate mortgage based on an amortization period of 25 years.

c.   Determine the monthly payment.

[ALPHA] – [Solve]

$1477.26

d.   Determine the total amount paid over the course of the mortgage.

$1477.26 × 300

=$443,178.00

e.   Determine the total amount of interest paid over the course of the mortgage.

Total paid – initial mortgage

= 443,178 – 242,250
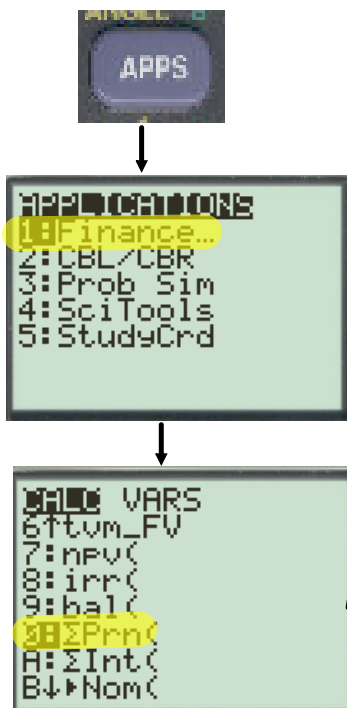
= 200,928.00

Action!

Your First House

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f.   Determine the amount of interest accumulated on the loan in the first month.

$$242{,}250 \times (0.0549/2)^{(1/6)}$$

$$= 1095.43$$

g.   How much of the principal is paid off in the first payment?

Payment – interest

$$1477.26 - 1095.43$$

$$= \$341.43$$

h.   How much debt is owed on the house after one month?

$$242{,}250 - 341.43$$

$$= 241{,}464.57$$

Action!

Your First House

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i.   Determine the total amount paid over 5 years.

$$\$1477.26 \times 12 \times 5 \quad \overbrace{\quad}^{60}$$

$$= 88,635.60$$

j.   Calculate the total principal paid in the first 5 years of the mortgage.

APPS

APPLICATIONS
1: Finance…
2: CBL/CBR
3: Prob Sim
4: SciTools
5: StudyCrd

CALC VARS
6: tvm_FV
7: npv(
8: irr(
9: bal(
0: ΣPrn(
A: ΣInt(
B↓▶Nom(

$$\Sigma Prn(1, 60)$$

Sum   Principal payments   1st payment   60th payment
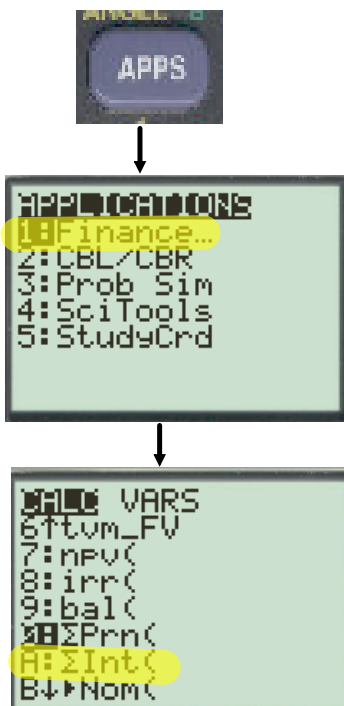
$$= \$26,225.49$$

Action!

Your First House

Example

Mr. Gilbert is considering buying a home for $255,000. As a first-time home buyer, Mr. Gilbert can make a 5% down payment on the house and take out a mortgage for the remaining balance. His mortgage broker found a bank offering an annual interest rate of 5.49% for a five-year fixed rate mortgage based on an amortization period of 25 years.

k.   Calculate the total interest paid in the first 5 years of the mortgage.

$$\Sigma Int (1,60)$$

$$= \$62,410.32$$

APPS

APPLICATIONS
1:Finance…
2:CBL/CBR
3:Prob Sim
4:SciTools
5:StudyCrd

CALC VARS
6↑tvm_FV
7:npv(
8:irr(
9:bal(
0:ΣPrn(
A:ΣInt(
B↓►Nom(

Action!

Your First House

Example

Mr. Gilbert is considering buying a home for $255,000. As a first-time home buyer, Mr. Gilbert can make a 5% down payment on the house and take out a mortgage for the remaining balance. His mortgage broker found a bank offering an annual interest rate of 5.49% for a five-year fixed rate mortgage based on an amortization period of 25 years.

I.   Calculate the debt owing on the house after the first 5 years.

Subtract the amount paid on the principal from the initial value of the mortgage.

242,250 - 26,225.49

= 216,024.51

There is still $216,024.51 owing on the house.

Action!

Your First House

Example

Mr. Gilbert is considering buying a home for $255,000. As a first-time home buyer, Mr. Gilbert can make a 5% down payment on the house and take out a mortgage for the remaining balance. His mortgage broker found a bank offering an annual interest rate of 5.49% for a five-year fixed rate mortgage based on an amortization period of 25 years.

m. Calculate the value of the house after 5 years if it has an appreciation rate of 5% per year.

Value $= 255,000(1 + 0.05)^5$

$= 325,451.80$

The value of the house $325,451.80 after 5 years assuming a 5% appreciation rate.

Consolidation

Practice It!

Mortgages and Amortization

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1, 3, 5, 7, 9