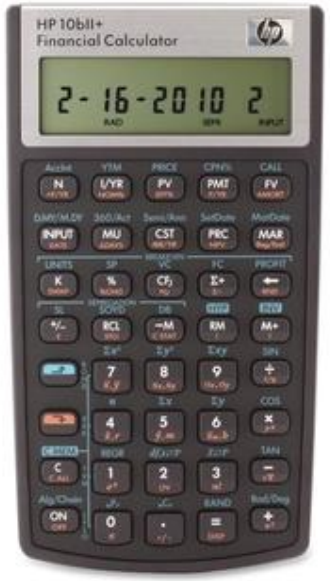
real | smart
real estate training

Real Estate Calculator

Flash Cards



Suggestions:

The following are formulas designed to help you through the UBC calculator portion of the course.

You ***must*** put these formulas to **Memory** BUT the only way to ensure this is to not just memorize them but **UNDERSTAND** what they mean.

As you ask yourself the questions, visualize the formula in your head and then "talk" yourself though, as you write out the formulas.

It is highly recommended that you go through the Real Smart Workbook and make sure you have done all the math questions & reviews.

Go through and do all the math questions from the UBC Examination Study Guide

Go through all the UBC Assignment questions again that pertain to the math.

Real Smart wants to thank you for choosing our ***Calculator Review Cards*** and wishes you the *very* best on your exam.

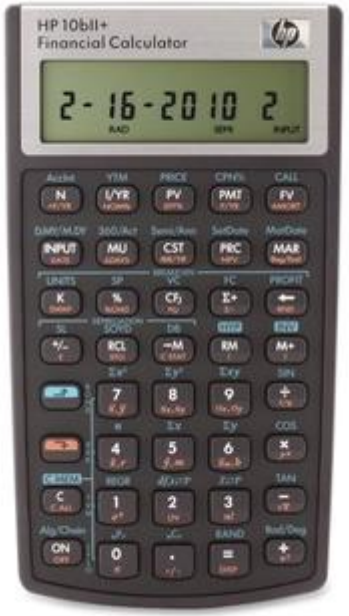
real | smart
real estate training

Remember… you can take the entire course through our E-Learning Online…24/7!

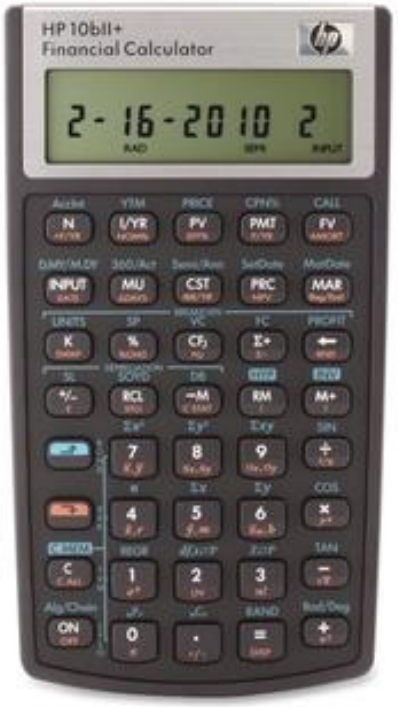
www.realsmart.ca

Q.

How do you re-set the calculator so **.6 Zeros** is on the screen?



real | smart
real estate training



Turn Calculator "ON"

Touch: **Shift** (orange button) let go

Touch: Equals (=) let go

Touch: 6 **6** let go

0.000000 will be on the screen

Q.

What are the <u>3 little Questions</u> you ask yourself *<u>before</u>* starting any math question?

real | smart
real estate training

Payment ***"Rules"***

When reading any math question, ask yourself…

(1) What am I looking for?

(2) Are there any payments?

(3) What kind of payments are they asking for?

(monthly, daily, quarterly, annually etc.)

12 365 4 1

Once you know the compounding period your payments are to be, then you must follow these rules.

Q.

What are the *3 things* you do once you have found Pmt?

Answer:

1. _____ **Normal Rounding Rules**

   (Possibly…. Round up ($1.00 $10.00 etc)

2. **+/-**

3. **PMT** **Re-enter into Pmt**

Q:

What is the Formula for Finding: PMT

real | smart
real estate training

Formula #1:

Find Pmt

What am I looking for? **Pmt**
Are there any pmt's? **Yes**
What kind? **Monthy - 12**

J ___ = ___ %

- Nom
- P\yr
- Eff

12 ___

- P\yr
- Nom

(x 12)

N
Nom
PV
FV
Pmt

?

-

+/- Pmt

1 **2** **3**

Q:

What is the Formula for Finding: N

real | smart
real estate training

FIND N

J 2 = 16.5 %

16.5 ■ Nom
2 ■ P\yr
■ Eff
12 ■ P\yr
■ Nom

J12 = 15.95983...%

?	N *(months)*
✓	Nom
12,500	PV
0	FV
169.50 +/-	**Pmt**

N = 299.244200328

("months")

Q.

What is important to remember to ask yourself when finding N?

real | smart
real estate training

Answer:

Know what compounding period you will be coming out with and Know what compounding period the question is asking for?

What do I HAVE & What do I NEED?

Q:

How do you Find: PV

PV - Solution

J2 = 18%

18	■	Nom
2	■	P\yr
	■	Eff
12	■	P\yr
	■	Nom

J12 = 17.359911..%

(8 x 12)

96		N
✓		Nom
?		**PV**
0		FV
870.17	**+/-**	Pmt

$45,000.27

Normal rounding rules

Q:

What is the ‘ 0 ‘ Payment Rule

real | smart
real estate training

1. What am I looking for?
2. Are there any Pmts?

3. **NO?** **Yes?** What kind?

(1, 2, 4, 12, 52, 365)

"O" Pmt Rule

1. **N Rules**
2. **+/- goes with the FV**

real | smart
real estate training

"0" Pmt Rule

J12 = 15%

15	Nom	
12	P\yr	
	Eff	
months 12	P\yr	
	Nom	

What?

50	N
✓	Nom
5700	PV
?	FV
0	Pmt

15%

- $10,607.83 FV

Q:

What is the formula to Find: IYR with No Payments?

Find: Interest Rate – I/yr

Going fishing for the I/yr ?

(x ___)

___ ■

N
P/yr
PV
FV
Pmt
I\yr

0
?

J ___ = _____ %

Q.

Why when finding I/YR do we start at the <u>bottom?</u>

Answer:

Because we ask ourselves:
What are we looking for? I/yr
Are there any pmts? No
Then go directly to the bottom J___
And ask :

What compounding period does the question want?

Q:

How do you Find: IYR <u>with a Payment</u>?

real | smart
real estate training

(17 x **12**)

204	N
12	P/yr
23,250	PV
0	FV
281.72 +/-	Pmt
?	**I\yr**

J12 = 12.898410...%

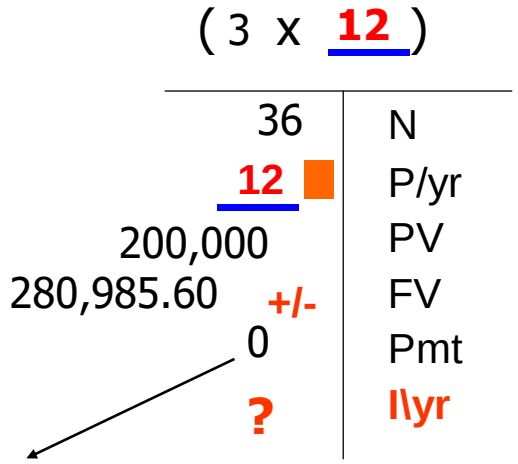
Nom
12 P\yr
Eff
2 P\yr
Nom

J2 = 13.250020..%

Q:

What formula would you use to Find IYR with*out* any Payments, *but* finding the Periodic Rate?

I/yr – 0 pmts



J12 = 11.386552..% *Nominal*

÷ 12 = 0.948879 ***Periodic***

Divide by 12 to find Periodic Rate

Q.

What is the difference in the formula when finding I/yr if the question gives you a payment versus not?

real | smart
real estate training

Answer:

Gives you a Pmt: then Pmt rules so you must change everything in the "T" to the compounding period of the Pmt, then possibly change the compounding period (convert) to something different that the questions is asking for.

J12 to a J2 for example

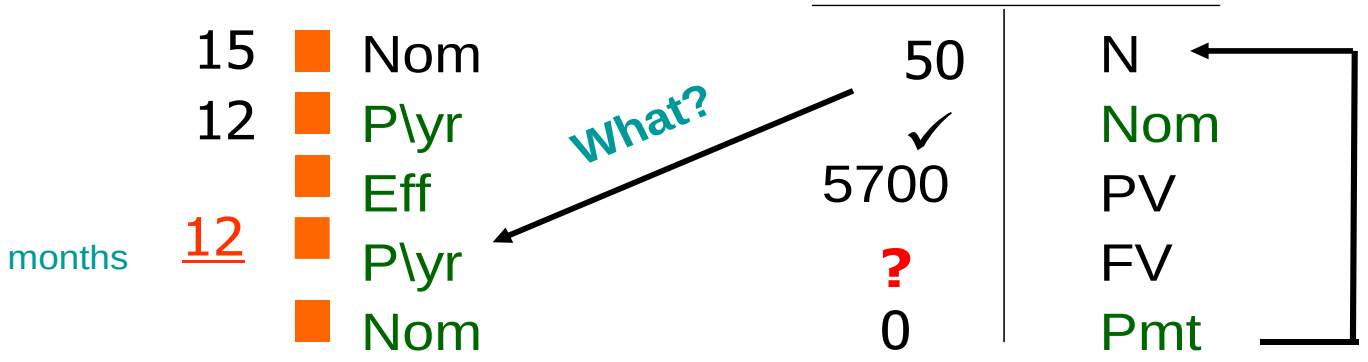
No Pmt: Once you put in 0 Pmt, you can go directly to the J___ at the bottom of the "T" and put in the compounding period the question is asking for.

Q:

How do you Find: FV

"0" Pmt Rule – Find FV

J12 = 15%



15%

- $10,607.83 FV

Q:

How do you go from a NoMinal to a Periodic rate?

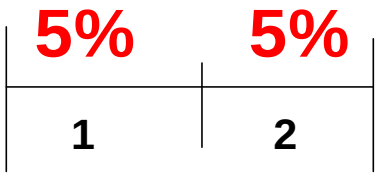
Nominal to a Periodic

What if the question gives you the **Nominal** interest rate, 10% per annum, compounded semi-annually or **J2 =10%,** but…. asks for the interest charged in its **Periodic** state? **How do we find the Periodic Rate?**

“ ÷ ”

10 ÷ 2 = 5%

10%



Periodic Rate – ***the small rate charged each compounding period***

Pay Cheque $

Q:

How do you go from a Periodic rate to a NoMinal rate?

real | smart
real estate training

Periodic to **Nominal** Rate " **x** "

5 X 2 = (10%) ?

2 = # of times the interest is compounded

Periodic

5%	5%	
1	2	(10%) ?

Jan → Dec Nominal

Q.

How do you know if a question is giving you the Nominal or Periodic rate of interest?

Answer:

Nominal:

You should look for "10% PER ANNUM, COMPOUNDING semi annually" for example.

Periodic:

5% semi annual, 4% quarterly, 3% interest daily

They are not saying "*per annum, compounded*"

Q:

How do you Convert or Find the Equivalent Rate for:

J2 = 10% to a monthly rate

Converting or find the Equivalent Rate

J2 = 10%

10	Nom	>	What you **"Have"**
2	P\yr		
	Eff		
12	P\yr	>	What you **"Need"**
	Nom		

J12 = **9.797815..%**

Q:

What is the formula for: OSB?

real | smart
real estate training

J 2 = 14 %

14	Nom
2	P\yr
	Eff
12	P\yr
	Nom

J12 = 13.60831..%

(20 x 12)

240	N
✓	Nom
40,000	PV
0	FV
?	Pmt

- 486.07....

- 486.07 +/- Pmt

- 486.07

"Term"

(5 x 12) =

60 Input ■ Amort

= = = $37,230.84

P I O.S.B.

Q:
What is the Formula for Final Pmt?

real | smart
real estate training

J2 = 15%

15 ■ Nom
2 ■ P/yr
■ Eff
12 ■ P/yr
■ Nom

J12 = 14.55165..%

(25 x 12)

300	N
✓	Nom
116,000	PV
0	FV
?	Pmt

1,445.528….

1450 +/- Pmt

- 1450

Step #3

1. ✓ N (291.2231)

…

2. 292 N FV (- 1124.86)

3. 1124.86 - (1450) = $325.14

Final Payment

Because the monthly (for example) payments are **Rounded UP**, this actually deceased the length of the loan (N) and it makes the very **FINAL** payment **Lower.**

Question?

What is an Accelerated Biweekly Payment?

A mortgage loan has a face value of $315,000, an interest rate of j2 = 4%, an amortization period of 20 years, a term of 5 years, and an option to make accelerated biweekly payments.

What is the amount of the accelerated biweekly payment rounded up to the next highest dollar?

real | smart
real estate training

A mortgage loan has a face value of $315,000, an interest rate of j2 = 4%, an amortization period of 20 years, a term of 5 years, and an option to make accelerated biweekly payments. What is the amount of the accelerated biweekly payment rounded up to the next highest dollar?

#1 – Find Pmt based on Monthly

J 2 = 4 %

4 ■ Nom

2 ■ P\yr

■ Eff

12 ■ P\yr

■ Nom

J 12 = 3.967068%

(20 x) 12

240	N
✓	Nom
315,000	PV
0	FV
?	Pmt

1903.3763…

÷ 2 = $951.69

952 +/- Pmt

Q.

What are the *key* things to look for in **Interest Only**?

Answer:

1. **PV & FV** is the same amount of money

2. **+/-** goes with the FV

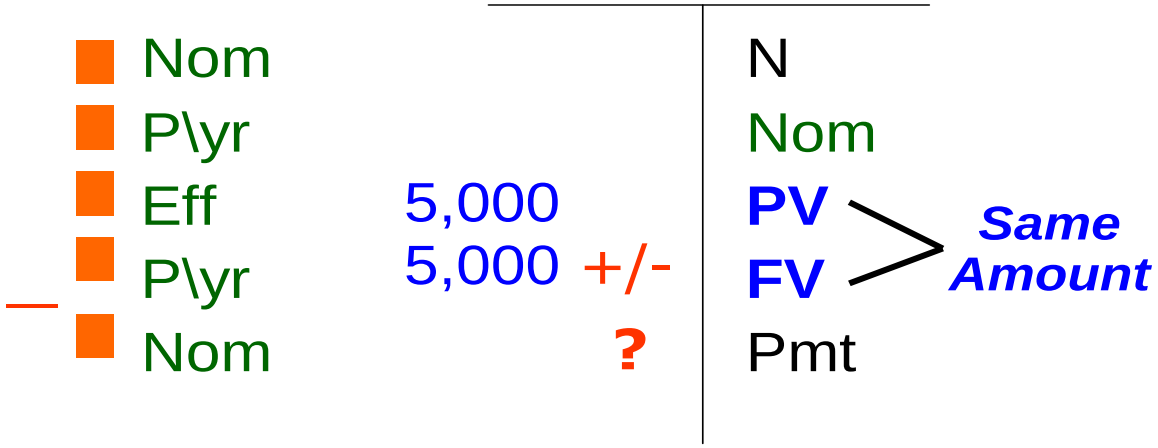
Q.

What is the formula for

Interest Only?

Interest Only

J__ = ____ % (x __)



Q.

What are the *key* things in **Interest Accruing**?

Answer:

1. Always “0” Pmt
2. Which automatically means you have the “0” Pmt

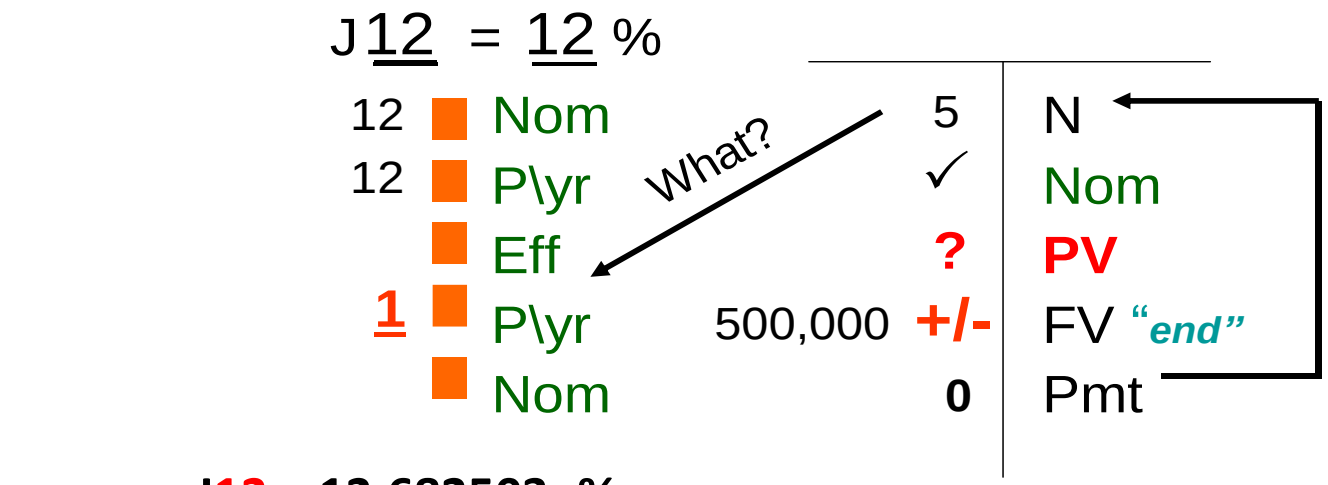
N now Rules!

3. +/- FV

Q.

What is the formula for
Interest Accruing?

Interest accruing



J12 = 12.682503..%

$275,224.81 PV

Q.

What are the key things in **Interest Cost**?

real | smart
real estate training

Answer:

1. Find Pmt normally, round normal rounding rules

2. Then do the **Interest Cost Formula**

___ Input □ Amort = = _____

3. Remember, there are only ***2 equals*** (principal & interest)

Q.

What is the formula for
Interest Cost?

real | smart
real estate training

Interest Cost

J2 = 19.25 % **(25 x 12)**

19.25	Nom	300 N
2	P\yr	✓ Nom
	Eff	75, 500 PV
12	P\yr	0 FV
	Nom	? **Pmt**

J12 = 18.520520..%

- 1,177.143.. **(Principal & Interest)**

1,177.14 **+/- Pmt**

1 Input Amort = = **-1,165.249...** **(Interest)**

Q:

What is the formula for **Market Value** for No Term?

Market Value - 4 Steps

Contract Rate | **Bank Rate** | **Market Value**

(1)

J 2 = 14 %

14 / 2 / 12 — Nom / P/yr / Eff / P/yr / Nom

(2)

(25 x 12)

300 ✓ N
105,000 Nom
0 PV (mtge)
? FV
Pmt

(3)

J 2 = 13.5 %

13.5 / 2 / 12 — Nom / P/yr / Eff / P/yr / Nom

(4)

? PV

13.608.. % - 1,232.5703 +/- Pmt 13.13... %

- 1,232.57

$108,307 Mortgage

\+ $40,000 Down Pmt

$145,000 ← = $148,307 OFFER

Sale Price/Offer

"NO TERM"

Q:

What is the formula
for
Market Value
with a term?

real | smart
real estate training

Market Value – 5 Steps

J2 = 12 %

12 Nom
2 P/yr
Eff
12 P/yr
Nom

11.710.. %

(20 x 12)

240	N
✓	Nom
115,000	PV (mtge)
0	FV
?	Pmt

- 1,243.12...

1,243.12 +/- Pmt

#3 TERM

(4 x 12) = 48 N FV

- $107,645.434795

#4 BANK

J 2 = 16.5 %

16.5 Nom
2 P/yr
Eff
12 P/yr
Nom

$ 220,000
Sale Price/Offer

15.95.. %

#5 Market Value

?	PV

$100,987.54 Mortgage
$ 105,000 Down Pmt
$205,987.54 OFFER

Q:

What is the formula for
Remainder of the Term
in **Market Value'?**

Remainder of the Term

J 4 = 15 %

15 Nom
4 P/yr
Eff
12 P/yr
Nom

(20 x 12)

240	N
✓	Nom
175,000	PV
0	FV
?	Pmt = 2280.67 +/- Pmt

Q. #309

(5 x 12) = 60 N FV - 164,427.94

J4 = 12.5 %

12.5 **Nom**
4 **P/yr**
Eff
12 **P/yr**
Nom

"REMAINDER OF THE TERM"

36	N
?	PV

← What's Left?

181,959.46 Mtge
45,000 Down Pmt
226,959.46 OFFER

Q:

What is the formula for
Bonus if:
we have to find pmt first?

real | smart
real estate training

Bonus – Find Pmt = Convert T T

Find Pmt ***(you are given an Interest rate)*** What is the **Cost of Funds Advanced?**

J ___ = ____ %

(x __) Face Value

Funds Advanced

- Nom
- P\yr
- Eff
- P\yr
- Nom

	N
	Nom
55,000 Mtge + All Fees	PV ☺
	FV
?	Pmt

50,000 Deduct all fees	PV
?	I/yr

_____%

_____ +/- Pmt

J __ = _____ %

Mortgage	$50,000
appraisal fee	$ 975.00
survey certificate	$1025.00
mortgage brokers fee	$3,000.00
Totals =	**$5,000.00 in Fees**

Mortgage + All Fees = $55,000

Q:

What is the formula for
Bonus if:
we sell to an Investor?

Bonus - Sell to an Investor

J2 = 17.75%

17.75 ■ Nom
2 ■ P/yr
■ Eff
12 ■ P/yr
■ Nom

(20 x 12)

240 N
Nom
217,200 PV
0 FV
? **Pmt**

- 3,206.90…

3,206.90 +/- Pmt

225,000 PV
? **I/yr**

J12 = 16.452178..%

■ **Eff**
2 ■ **P/yr**
■ **Nom**

J2 = 17.026497..%

Q:

What is the formula for
Bonus if:
we are looking for I/yr
and we have a Pmt?

Bonus – Given a Pmt

Note: PV is *funds advanced* not face value because we already have the pmt

(After)

(20 x 12)	240	N
	12 ■	~~Nom~~ **P/yr**
	73,900	PV
	0	FV
	1125 **+/-**	Pmt
	?	**I/yr**

HAVE... *monthly (12)*

J12 = 17.726912..%

■ **Eff**

J 1 = 19.240530..%

NEED..... *annual (1)*

$75,418.15
- 1,000 commission
- 218.85 legal fees
- 300.00 appraisal fee

= $73,900

What if a Question GAVE you the Monthly Payment and GAVE you the OSB. What would you do?

For Example in Market Value or Bonus?

real | smart
real estate training

Market Value:

Means you do NOT have to Convert T – to find Pmt
Means you do NOT have to do the OSB after you Convert T

So we **do NOT** Convert T (x) __ Input / Amort = ==
They give us the answers to this in the question, so all you do is what is left to do in the question. You can still do the entire formula if you like, but you don't have to.

Banks Rate
J2 – 15%

98,500	+/-	FV (OSB)
785	+/-	Pmt
	?	PV

(Add in down payment if required)

Bonus

Means you do NOT have to Convert T – to find Pmt
Means you do NOT have to do the OSB after you Convert T

So we **do NOT** Convert T (x) __ Input / Amort = ==
They give us the answers to this in the question, so all you do is what is left to do in the question. You can still do the entire question if you like.

__(x _12__)

		N
_12_	■	P/yr
50,0000		PV (Funds Advanced Money)
47,500	+/-	**FV OSB**
655	+/-	**Pmt Monthly pmt based on Face Value Money**
	?	I/yr

J12 = _____%

J1 = _____$

Q.

What is the formula for Loan to Value Constraint?

real | smart
real estate training

(138,750)

LA ÷

LV x = **R**

($185,000) **?** (75%)

138,750 ÷ 75% = $185,000

Q:

What is the formula for

Income Constraint?

Income Constraint

Income Constraint

J 2 = 10.5%

10.5 / 2 Nom
P\yr
Eff
12 P\yr
Nom

(25 x 12)

300	N
✓	Nom
?	PV
0	FV
1158.34 +/-	Pmt

J12 = 10.277418..%

Pmt missing… go to P.I.G.

$124,776.79 PV

P.I. + T

? 1100

P ÷

Income $50,000 I x G GDS 30%

(- taxes)

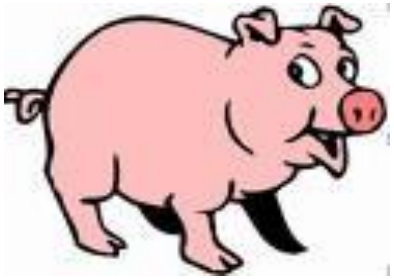
$50,000
x 30%
= 15,000
- 1,100 (taxes)
= 13,900 (yearly)
÷ 12 = 1158.33…

1158.34 +/- Pmt

Q:

GDS

What is the formula to Find Income?



real | smart
real estate training

GDS: Find Income

Find Income necessary to get a loan of $66,000

$J\frac{2}{\ } = 13.5\ \%$ $\quad (30 \times 12)$

13.5	Nom	360
2	P\yr	✓
	Eff	66,000
12	P\yr	0
	Nom	?
13.1352…%		737.07…

N, Nom, PV, FV, Pmt

737.08 x 12 = $8,844.96

P.I. + T

$8,844.96 + 1500 = $10,344.96

?

Go Find Pmt **P** ÷

Income

? I x G GDS

(- taxes) 30%

$\frac{P}{G}$ $\frac{\$10,344.96}{30\%} = \$34,483.20$

What formula do we use to figure out the Stress Test?

Solution:

The lender looks at the **Contract Rate** (J2 = 3%) and today's **Bank Rate** J2 = 5.25) then the bank will either add on another 2% to the Contract Rate (so J2 = 5%) and then see if the bank rate is higher or lower than the Contract Rate.

Then make the buyer qualify on the Higher Rate. In this case the Bank rate is Higher **J2= 5.25%** as compared to the Contract rate of J2 =3 + 2 = **J2 = 5%**

So now the buyer must qualify for a mortgage at J2 = 5.25% even though his/her mortgage is actually J2 = 3%.

Just incase the rates go up when they buyer re-mortgages.

Question:

A borrower approaches a bank for a mortgage loan that has an 80% loan-to-value ratio. The contract rate is 3.5% per annum, compounded semi-annually and the Bank of Canada posted 5-year rate is 5.25% per annum, compounded semi-annually.
At what rate will the borrower have to qualify to fulfil the stress test borrower qualification rule for uninsured mortgages?

(1) j2 = 4.7%
(2) j2 = 3.5%
(3) j2 = 5.5%
(4) j2 = 6.7%

SOLUTION:

Contract Rate = 3.5% Bank of Canada 5.25%

So Bank takes the contract rate of 3.5% add another 2% and buyer must qualify for this rate. So now the buyer must qualify for the Contract Rate of j2 = 5.5 %

Q:

What is the formula for Cost Approach of Appraisal?

Cost Method $$

Sq Ft.	1,500	
Cost per sq. ft.	x $48	
	$72,000	"New"
- Depreciation	- 10% =	
	= $ 64,800	
+ Land	+ $ 45,000	
Market Value	**$109,800**	

Q.

What is the formula for

Income Approach?

Sold

Sold

?

Income Method Formula

Gross **Potential** Revenue	**$300,000**
- Vacancy and Bad Debt Allowance	**- 4%**
= Gross **Realized** Revenue	**= $288,000**
- Operating Expenses	**- $50,000**
= **Net Operating Income**	**= $238,000**

N.O.I

real | smart
real estate training

Income

$Y = \frac{I}{P}$

Sold "A" - $190,000	Sold "B" - $220,000	? Subject Property
GPR $38,000	GPR $49,000	GPR $54,000
Coe $25,000	Coe $32,000	Coe $36,000
Vac $ 3,800	Vac $ 4,900	Vac $ 5,400
NOI $ 9200	NOI $ 12,100	NOI $ 12,600
SP $ 190,000	SP $ 220,000	A. Yield 0.0517106
A Y = 0.0484211	B Y = .055	
A + B = 0.103421		
÷ 2 = 0.0517106	(Ave. Yield)	

Sale Price $243,663.77

(rounded up to the nearest $100)

Sale Price $ 243,700

$Y \div \frac{I}{P} ?$

$Y \times \frac{I}{P} ?$

Q:

What is the formula for the Comparative Approach of Appraisal?

Comparative Approach of Appraisal

	Comp A	Comp B	Comp C	Subject Prop
SP	**$126,500**	**$134,000**	**$121,000**	**?** **$128,100**
# of bed	4		3	**4**
# of bath	3	**4**	2	**4**
Air Con	No	**3**	Yes	**Yes**
Sq Ft	2,100	**Yes**	2,000	**2,000**
Vendor Mtge	No	**2,200**	No	**No**
Adjustments		**Yes**		
Bed	0	0		
Bath	+$2,700	+$ 2,700	**+3200**	
Air Con	+$4,500	0	**+5400**	
Sq. Ft.	- $5,000	-$10,000	**0**	
Vendor Mtge	0	-$ 700	**0**	
			0	
	$128,700	**$126,000**	**$129,600**	

The Market value of:

1 bedroom is $3,200
1 bathroom is $2,700
an air conditioner is $4,500
each 100 square feet Is $5,000

I. A. S. S.
+ -

Q.

What is the **Interest Adjustment?**

Interest Adjustment

Mortgage payments are made in arrears. In other words, when each payment period is over, lenders look back and calculate their interest based on the money you owed during that period. The interest adjustment date is the date from which your lender first starts calculating the normal ongoing interest that you'll pay.

Interest
adjustment dates tend to commonly fall on the 1st day of the month *after* mortgage funds are advanced to the borrower.

For example, suppose you close your mortgage on April 25 and have signed up for monthly payments. Here is how the dates might
stack up:

April 25: Mortgage starts (a.k.a. the closing date)
May 1: Interest adjustment date
June 1: First payment date

Your first payment on June 1 will therefore be based on the interest that accrued since your interest adjustment date (i.e. from May 1 to May 31). If you plan to make bi-weekly payments, then instead of one month after, your first payment would be two weeks after the interest adjustment date. Before the interest adjustment date, however, you will have held the lender's money for a period of time. In the example above, this period would have been April 25 to April 30.

Lenders like to get paid for this time. As a result, lenders charge a one-time amount of pro-rated interest to cover it. This interest-only payment is called an "interest adjustment." It compensates the lender for the time you held their money *before* your first official payment period began.

real | smart
real estate training

Examples of what an Interest Adjustment Formula would look like, although not needed for the exam.

Interest Adjustment

J12 = 17.5%

17.5	Nom
12	P\yr
	Eff
365	P\yr
	Nom

26	N
✓	Nom
450,000	PV
?	FV
0	Pmt

J12 = 16.8941…%

$ - 455,603.68
$ + 450,000.00

- $ 5,603.68

(PV) $450,000
Funds Adv

(1 day before)

(FV) ?
Int Adj

1st Pmt

March 20

April 14

April 15

May 15

1. # of Days - 26
2. PV or FV? ? FV

Q.

Where does a ***deposit*** show up on the ***Vendors*** statement of adjustment?

D	C

Answer:

It doesn't. Deposit is ONLY on the Purchasers …..

……..UNLESS the deposit was paid DIRECTLY to the Vendor. Then…. The deposit will show up as a Credit to the Purchaser and a Debit to the Vendor.

Q.

Does the purchaser's mortgage he is assuming from the vendor, show up as a debit on the statement of adjustment for the purchaser?

Answer:

No, as a Credit. The buyer does not have to come up with the money that day at the lawyers. It is coming from the Vendor.

Q.

On a Statement of Adjustment for the Vendor, who would pay the tax adjustment, the Vendor or Purchaser, if the adjustment date was before July 1st?

Answer:

The Vendor will *owe* the Purchaser for the number of days the vendor lived there from Jan 1st to *one day before* Completion.

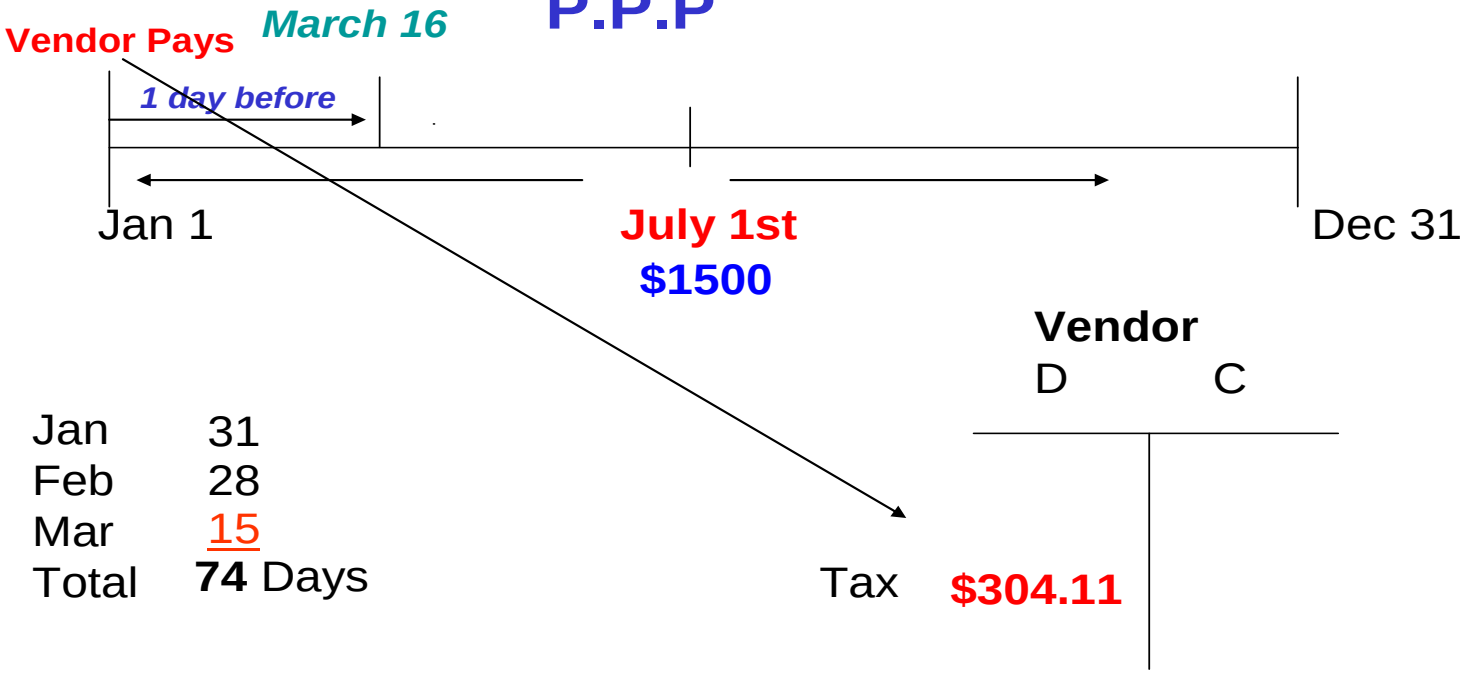
Because the Purchaser Pays Adjustment day.

PPA

Tax Adjustment

If sale is *"Before"* July 1st..... *Vendor Pays*

P.P.P



Jan	31
Feb	28
Mar	15
Total	**74** Days

74 ÷ 365 = x 1500 = $304.11

The End……

- **Keep these with you everywhere you go. Ask yourself these questions and start to "see" the formulas.**
- **Test yourself often by writing out the formulas.**
- **Make sure you practice the math questions out of the UBC practice questions, your assignments and the Real Smart Book.**

Thank you. **The Real Smart Team**

604-313-4878 **info@realsmart.ca**