# Math Review – Test #2
Revised December, 2018

1. A property sells for $250,000 and the Listing Broker earns $17,500. What was the commission rate?

2. The mortgagee will be charging 1 (one) point on a loan. The sale price is $250,000 and the LTV is 80%. How much will the mortgagor pay, in points, at closing?

3. A borrower takes out a $15,000 Straight Loan with a 10% note rate. If the loan is paid off at the end of the first year, what will the final payment be if interest is paid on an annual basis?

4. A seller needs to net $100,000 after paying the real estate commission to have enough to pay off their mortgage loan, the other closing costs and have enough for the down payment on the next property. What is the MINIMUM acceptable sale price that would accomplish this if the commission is 6% of the sale price?

5. Sally buys a home for $275,000 with 90% LTV first mortgage at 6.5% annual interest, payable in equal monthly installments of $1,564.37 for P/I (principal and interest). What is the principal balance of the loan after making the first payment?

6. What is the annual real estate tax on a property that just sold for $188,000, was appraised at $190,000 and is assessed at $195,000 if the tax rate is 38 mills and an equalization factor of 120 percent is applied?

7. Kelli has been granted a loan of $340,500. What will Kelli's monthly P/I (principal and interest) payments be, using a loan payment factor of $7.16 per $1,000 of loan amount?

8. An investor is seeking an 11% return on their money and is considering a commercial property listed for $2.1 million dollars. The listing agent provides the following annual property data: Operating expenses are $133,000, mortgage payments are $56,000 and gross rents are $337,000. What purchase price would accomplish the investor's desired return on investment if a vacancy and loss factor of 4% was used?

9. The seller received a $121,600 check at closing after paying a 7 percent commission, $31,000 in other closing costs, and the $135,700 loan payoff. There were no other seller closing costs . What was the total sales price?

10. A buyer is purchasing a $225,000 home using a 90% LTV 1st mortgage loan for 30 years that has a fixed interest rate of 5% and monthly principal and interest payments of $1,087.06. Over the life of the 30 year loan how much interest will the buyer/borrower pay?

11. A triplex rental property sold for $360,000, each of the units rent for 1,250 per month. With total monthly operating expenses of $650, what would the GRM (gross rent multiplier) be?

Answer Question #1:
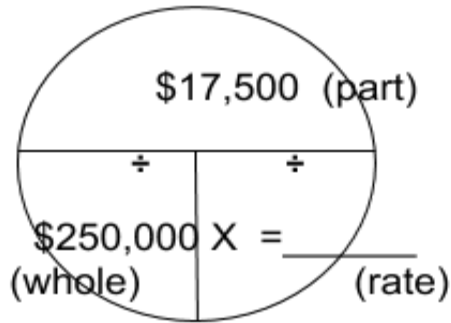
$17,500 ÷ $250,000 = **.07 or 7%**

Answer Question #2:

$250,000   Sale Price
* X   .80   LTV*
$200,000 Loan Amount

$200,000 x .01 = $2,000 *(one of the wrong answers will be $2,500)*

Answer Question #3:
**Note: (the payoff of a mortgage loan is typically the (principal balance) + (accrued interest).**

Annual interest :	**Pay off end of year 1:**	
$15,000	Principal Balance	+$15,000
x .10	Accrued Interest	$1,500
= $1,500	= Payoff	**$16,500**

Answer Question 4: Note: With a commission rate of 6%, the seller's "rate" is 94%. So we divide the seller's "part" by the seller's "rate" to determine the "whole" sales price. If we knew the "whole" sales price, we could have multiplied that by the "seller's rate" of 94% to determine the "Seller's part". In this case we are just going backwards, letting the (whole, rate, part) model tell us what to do when we fill in the blanks with the info we know.
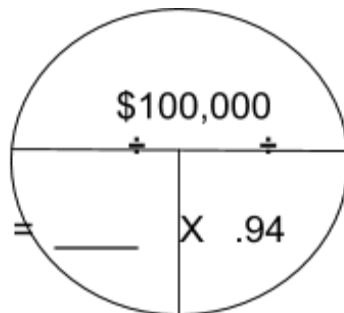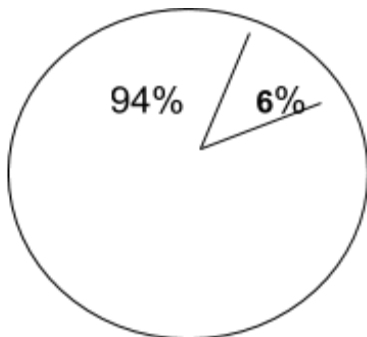
$100,000 ÷ .94 = **$106,382.98** total

Answer Question #5:

Sales Price	**$275,000**
LTV	**X .90**
loan amount	**$247,500**

	MONTH #1	MONTH #2
beginning loan bal.	$247,500	$247, 276.26
X note rate	X .065	X .065
= annual interest	$16,087.50	$16,072.96
annual interest	$16,087.50	$16,072.96
divided by 12	÷ 12	÷ 12
= month interest	$1,340.63	$1,339.41
constant mo. payment (P&I)	$1,564.37	$1,564.37
less mo. interest	-$1,340.63	- $1,339.41
$ for principal reduction	$223.74	$224.96
beginning loan balance	$247,500.00	$247,276.26
less principal reduction	-$223.74	- $224.96
= new loan balance	**$247,276.26 ***	**247,051.30**

* $247,276.26 is the answer to question #5, ….month #2 is shown just to illustrate how the amortization process progressively works each month, the loan balance to will continue to decline (amortize) with each successive payment, so long as that payment is greater than the simple interest due.

Answer Question #6

Assessed Value	$195,000
x Equalization Factor	x 1.20
= equalized value	$234,000
x tax rate (38 mills=.038)	X .038
= annual tax	= $8,892

Answer Question #7:

$340,500	Loan Amount
÷ $1,000	÷ Size of each mortgage factor unit
= 340.5	= Number of $1,000 units in a $340,500
340.5	Number of units
x $7.16	x cost per unit/ aka mortgage factor
=$2,437.98	= Monthly P&I for a $340,500 loan when the mortgage factor is $7.16/$1,000

ANSWER QUESTION #8:

Step 1: Gross income (rents)　　　　$337,000
　　　　- 4% vacancy & loss factor　　- 13,480
　　　　<u>- operating expenses</u>　　　　<u>- $133,000</u>
　　　　= Net Operating Income (NOI)= $190,520

Step 2: NOI ÷ Cap Rate = Price

$190,520 NOI (part)

= $1,732,000 X .11 Cap Rate
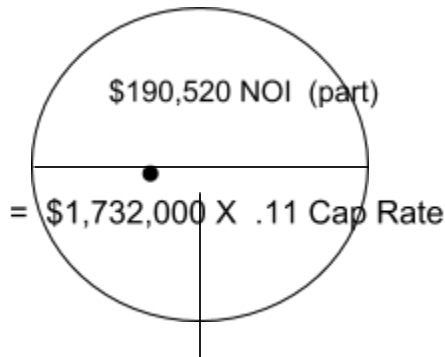
- ***Remember that mortgage payments (debt service)are not used to calculate NOI.***

ANSWER QUESTION#9: (Note: We don't know in dollars what 100% of the sales price was, but we do know what everything other than 7% was, or 93%)

The total amount disbursed after paying the 7% real estate fee was $288,300 =
($121,600 Seller's Net + $31,000 Closing Costs + $135,700 Loan Payoff)

This amount is the "PART" left after paying the 7% fee and is thus equal to 93% of the "WHOLE" Sales Price. The 93% "RATE", is the rate at which a seller would receive their "PART" to pay loan balances, closing costs, and themselves.

(PART) $288,300 ÷

(WHOLE) = $310,000 Sales Price X　　　　93% or 0.93   **(RATE)**

Looking at it another way: If we knew the Sales Price was $310,000, and the Broker charged 7%, we would multiply the "Whole" Sales Price by 93% "Rate", (Whole) X (Seller's Rate) to determine the "seller's part" or how much was left to pay everyone else. It doesn't matter what the seller used their "part" for. We simply need to start with what we already know, i.e. that $288,300 was equal to 93% of the sales price. If we know what 93% of it was, we can figure out what 100% of it was, …100% is the "whole".

ANSWER QUESTION #10:

With fixed monthly P/I (principal and interest) payments of $1,087.06 for 30 years or 360 months, the total payments would equal = $391,341.60. After repaying the principal balance of $202,500 or (90 % of the $225,000 purchase price) out of the total payments, the rest or balance would by definition be the "interest".

Step #1

    $225,000   Purchase price
      X 90%   LTV
   = $202,500   Loan amount or
            principal balance to be repaid

Step #2

    $1,087.06 Monthly payments of P/I
     X 360 # of constant monthly payments
    $391,341.60 Total monthly P/I payments

Step #3

    $391,341.60 Total payments of P/I
  -$202,500.00 Loan amount or principal balance to be repaid
    $188,841.60 Total amount of interest paid

ANSWER QUESTION #11:

This a GRM (Gross Rent Multiplier) question, gross means the total or "gross" rent, and not including or accounting for expenses. So it's sales price divided by the gross monthly rent. GIM (Gross Income Multiplier) is used for 5+ unit properties and uses annual rent figures. Make sure to keep GRM monthly and GIM annual

  $1,250 monthly rent
    X 3 # of units to get "Gross"
=$3,750

  Sales price / gross rent = GRM
  $360,000 / $3,750 = GRM of 96