Real Estate Math Formulas Cheat Sheet

Measurement Math:

Area: Width x Depth	**1 Acre** = 43.560 SF
Depth: Area / Width	**1 Section** = 640 Acres
Width: Area / Depth	**¼ Section** = 160 Acres
Area of a Triangle: (Base x Height) / 2	**1 Township** = 36 Sections
Area of a Trapezoid: (Top L + Bottom L /2) x H	**Volume:** Length x Width x Depth
	Converting SF to Square Yards: Divide SF by 9

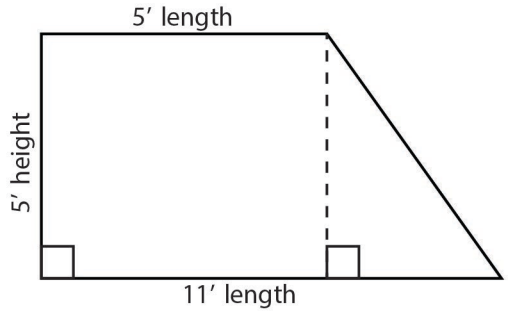
Calculating Size of a Parcel:

EXAMPLE: How many acres are there in the S ½ of the SE ¼ of the SW ¼ of section 24, township 32 north, range 18 east?

STEPS:

1. Ignore the text ***"section 24, township 32 north, range 18 east***." It doesn't affect the answer.
2. Multiply all denominators together (the bottom number of the fraction): 2 x 4 x 4 = 32.
3. Divide 640 by that answer, 640 / 32 = 20 acres. ALWAYS use 640 in this step as there are 640 acres in one section.

Area of a Trapezoid:



Formula:

([Top Length + Bottom Length] / 2) x Height = Area

Steps:

1. 5′ L + 11′ L = 16′ L
2. 16′ / 2 = 8′ L
3. 8′ L x 5′ H = 40 SF

Converting SF to Acres:

Total Square Footage / 43,560 = Number of Acres

The "T" Method

Part (small # or part) ÷		
Whole (BIG #)	X	Rate %

Don't Forget!
TGIF: Top Goes In First!

Commissions and Seller's Net Profit

Total Commission Paid to Broker from Seller

Total Commission	
Contract Price or Sales Price	Listing Commission Rate %

Contract Price (Sales Price) X Listing Commission Rate % = Total Commission Paid
Total Commission / Contract Price (Sales Price) = Listing Commission Rate %
Total Commission / Listing Commission Rate % = Contract Price (Sales Price)

Salesperson's Share of Commission

Salesperson's Commission	
Brokerage's Share of Commission	Salesperson's Split %

Brokerage's Share of Commission X Salesperson's Split % = Salesperson's Commission
Salesperson's Commission / Brokerage's Share of Commission = Salesperson's Split %
Salesperson's Commission / Salesperson's Split % = Brokerage's Share of Commission

Seller's Net Profit

Seller's Net	
Sales Price or Minimum Listing Price	Seller's Net % (100% - Com %)*

**Seller's Net % is 100% minus the Listing Commission % the seller has agreed to pay the listing brokerage. It is the percentage of the sale that the seller keeps as profit.*

Sales Price (or Minimum Listing Price) x Seller's Net % = Seller's Net
Seller's Net / Listing % = Sales Price (or Minimum Listing Price)
Seller's Net / Sales Price (or Minimum Listing Price) = Seller's Net %

Proration Guidelines:

PAID IN ADVANCE: Credit Seller, Debit Buyer	Calculate the cost for time AFTER the closing date; Usually applies to property insurance.
PAID IN ARREARS: Debit Seller, Credit Buyer	Calculate the cost for time BEFORE the closing date; Usually concerns property tax payments.
Who gets the DAY of CLOSING?	▪ **Paid in Advance:** If seller gets the day of closing, do not include the day of closing in your count. If buyer gets the day of closing, include the day of closing in your count. ▪ **Paid in Arrears:** If seller gets the day of closing, include the day of closing in your count. If buyer gets the day of closing, do not include the day of closing in your count.
CALENDAR YEAR vs BANKER YEAR	The question will state which type of year should be used to solve the problem. *If the question doesn't state which method to use, use the banker year method.* ▪ A calendar year consists of 365 days with varying calendar days per month. ▪ A banker year consists of 360 days per year with 30 days per month.

Appraisal Methods:

Income Approach: Used for large, income-producing properties like apartments and shopping centers.

Steps for calculating Annual Net Operating Income (NOI):

Potential Gross Income
– Vacancy Rate
+ Additional Income
Effective Gross Income
– Expenses
Annual Net Operating Income (NOI)

Annual Net Operating Income (NOI) ÷		
Value	X	Cap Rate

Capitalization Rate X Value = Annual Net Operating Income (NOI)
Annual Net Operating Income (NOI) ÷ Value = Capitalization Rate
Annual Net Operating Income (NOI) ÷ Capitalization Rate = Value

Gross Income Multiplier: Used for large income-producing properties.

Value ÷		
GIM	X	Annual Rent

GIM x Annual Rent = Value
Value / GIM = Annual Rent
Value / Annual Rent = GIM

Gross Rent Multiplier: Used for small income-producing properties like single-family rental homes.

Value ÷		
GRM	X	Monthly Rent

GRM x Monthly Rent = Value
Value / GRM = Monthly Rent
Value / Monthly Rent = GRM

Cost Approach: Used for special-use buildings such as churches, schools, government buildings, etc.

Cost of Improvements
– Depreciation Rate*
+ Land (or Lot) Value
Total Property Value

**Depreciation can either be calculated using the straight-line or useful-life method.*
Straight-line: % of depreciation x number of years = Depreciation Rate
Useful life: Improvement Value / Total Useful-life in years = Improvement value per year
Improvement value per year x Age of building = Depreciation Rate

Capital Gains Tax:

Original Investment
+ Improvements
Adjusted Basis

Selling Price
– Selling Expenses
Adjusted Sales Price

Adjusted Sales Price
– Adjusted Basis
Capital Gains

Capital Gains Tax Limits: Married Couples, filing jointly: $500,000 | Singles: $250,000

Annual Property Taxes:

Step #1: Calculate Assessed Value	Market Value X Assessment Rate Assessed Value

Step #2: Convert Local Tax Rate to a decimal:
For MILLS: Move decimal point 3 spaces to the left: 55 mills → 0.055 local tax rate
For $ per $100: Move decimal point 2 to the left: $5.50 → 0.055 local tax rate

Step #3: Calculate Annual Property Taxes	Assessed Value X Local Tax Rate Annual Property Taxes

Annual Property Taxes with Equalization Factor:

Step #1: Calculate Assessed Value	Market Value X Assessment Rate Assessed Value
Step #2: Multiply Assessment Value	X Equalization Factor Assessed Value with EQ Factor

Step #3: Convert Local Tax Rate to a decimal:
For MILLS: Move decimal point 3 spaces to the left: 55 mills → 0.055 local tax rate
For $ per $100: Move decimal point 2 to the left: $5.50 → 0.055 local tax rate

Step #4: Calculate Annual Property Taxes	Assessed Value with EQ Factor X Local Tax Rate Annual Property Taxes

Calculations for Loans

Origination Fee

Origination Fee ÷		
LOAN	X	Fee %

LOAN X Fee % = Origination Fee
Origination Fee / LOAN = Fee %
Origination Fee / Fee % = LOAN

Pre-Payment Penalty

Pre-payment Penalty ÷		
Principal Balance	X	Penalty Fee %

Principal Balance X Penalty Fee % = Pre-payment Penalty
Pre-payment Penalty / Principal Balance = Penalty Fee %
Pre-payment Penalty / Penalty Fee % = Principal Balance

Loan-To-Value Ratio (LTV %)

Loan Amount ÷		
Appraised Value or Contract Price*	X	LTV %

**When given the appraised value and the contract price, use the LOWER of the two in your calculations.*

Appraised Value or Contract Price* X LTV% = Loan Amount
Loan Amount / Appraised Value or Contract Price = LTV%
Loan Amount / LTV% = Appraised Value or Contract Price

Simple Annual Interest

Annual Interest in $	
Loan Amount	Interest Rate %

Loan Amount X Interest Rate % = Annual Interest in $
Annual Interest in $ / Loan Amount = Interest Rate %
Annual Interest in $ / Interest Rate % = Loan Amount

Discount Points

A **discount point** is a fee paid by the mortgagor (borrower) to lower the interest rate on a mortgage.

- **One point COSTS 1% of the loan amount**, BUT the original interest rate does not drop by one percent. One point DOES NOT EQUAL 1% of interest.
- **One point = 0.125% of interest**, meaning the original interest rate will only drop by 0.125% per point purchased.

1 Discount Point:	
COST:	1% of the loan
EFFECT:	Lowers the % rate by 0.125%

Point = Percentage of Interest	
1 pt = 0.125%	5 pts = 0.625%
2 pts = 0.250%	6 pts = 0.750%
3 pts = 0.375%	7 pts = 0.875%
4 pts = 0.500%	8 pts = 1.000%

Loan Amount x Number of Points in % = Discount Points in $
Discount Points in $ / Loan Amount = Number of Points in %
Discount Points in $ / Number of Points in % = Loan Amount

Amortization Tables

Formulas:

(Payment / Amortization Factor) x $1,000 = Loan

(Loan amount / $1000) x Amortization Factor = Payment

Amortization Factor: Interest Rate intersected with Term

EXAMPLE: Monthly Payment per $1,000 on Fixed-rate, Fully-amortized Loans				
Rate	**10-year term**	**15-year term**	**30-year term**	**40-year term**
4%	10.125	7.397	4.775	4.180
5%	10.607	7.908	5.369	4.822
6%	11.102	8.439	5.996	5.503
7%	11.611	8.989	6.653	6.215
8%	12.133	9.557	7.338	6.954

**You do not need to memorize the amortization table. One will be provided to you during the exam.*