



## REAL ESTATE MATH FORMULAS & TIPS

### Use the calculator - it doesn't make mistakes!

Verbs of being such as *is*, *was*, and *will be* usually mean “equals”, *of* in a word problem usually means “multiply”, and the word *per* means “divide”.

### Rounding

On decimals - Use mathematical rounding rules. If the last digit is 5 or more, round up, otherwise round down  
On building lots – ALWAYS round down. You can't use a partial lot.

### Equity and Capital Gain

Market Value - Debt = Owner's Equity

Basis + Cost of Capital Improvements - Total Accumulated Depreciation = Adjusted Basis

Sales Price - Cost of Sale = Adjusted Sale Price

(Adjusted) Sales Price - (Adjusted) Basis = (Capital) Gain

Property Value - Land Value = Improvement Value

Improvement Value / 27.5 = Annual Depreciation (residential)

Improvement Value / 39 = Annual Depreciation (non-residential)

Annual Depreciation x Number of Years in Service = Total Accumulated Depreciation

Improvement Value - Total Accumulated depreciation = Book Value of the Improvement

Book Value of the Improvement + Land Value = Book Value of the Property

The Taxpayer Relief Act of 1997 allows a property owner to exclude up to \$250,000 as an individual or \$500,000 for a couple married filing jointly (MFJ) from capital gains tax on sale of a property if used as a primary residence for an aggregate of twenty-four months out of the last 60 months.

### Formulas

Sales commission (how/what agent/broker gets paid):

Sales Price (\$) x Commission Rate (%) = Total Commission (\$)

Total Commission (\$) x Split Rate (%) = Broker/Agent Share (\$)

Or, Sales Price (\$) x Commission Rate (%) x Split Rate (%) = Broker/Agent Share (\$)

Net Proceeds:

100% - Commission Rate (%) = Net Percentage (%)

Sales price (\$) x Net Percentage (%) - Closing Costs (if applicable) (\$) = Net Proceeds (\$)

Sales price (\$) - Total Commission (\$) = Net Proceeds (\$)

Sales Price (\$) x Net Percentage (%) = Net Proceeds (\$)

Finance:

1 Point = 1% of the ***loan amount***

Loan Amount (\$) x Origination Rate (%) = Origination Fee (\$)

Loan Amount (\$) x Discount Points (%) = Discount Fee (\$)

Sales Price/Appraised Value (whichever is lower) (\$) x LTV Ratio = Loan Amount (\$)

Interest:

Loan Principal (\$) X Annual Interest Rate (%) = Annual Interest (\$)

Monthly Interest (\$) X 12 = Annual Interest (\$)

Quarterly Interest (\$) X 4 = Annual Interest (\$)

Daily Interest (\$) X 360 = Annual Interest (\$)

Proration:

Annual Charge (Cost) / 12 = Monthly Charge (Cost) } Does not apply outside of class;

Annual Charge (Cost) / 360 = Daily Charge (Cost) } in real world, actual number of

Monthly Charge (Cost) / 30 = Daily Charge (Cost) } days in year/month is used.

When the charge is paid in advance, any unused portion is returned to the seller as a credit. If the unused portion will be used by the buyer, he will be charged (debit) for the same amount. The seller paid it and the buyer benefits. This would apply to HOA dues, insurance, and property taxes in some areas.

When the charge is paid after it is owed (in arrears), the seller will be charged for any amount that he owes (debit). The buyer will get a credit for that same amount. The buyer will pay it on behalf of the seller. This would apply to property taxes (in some areas), and interest on assumed loans.

On the transfer of income property, the rents are paid to the seller in advance. Prorate the rents to determine the daily rent. Any unearned rents are charged to the seller (debit) and credited to the buyer (credit). ***Security deposits are not prorated.*** They are transferred to the buyer intact (debit seller and credit buyer) as the buyer will be responsible to the tenants for them.

Property Tax:

Market Value x Assessed Rate = Assessed Value (tax value)

Assessed Value x Equalization Factor = Equalized Value

Assessed Value x Tax Rate = Annual Property Tax

Equalized Value x Tax Rate = Annual Property Tax

Semi-annual Property Tax x 2 = Annual Tax

One mill is 1/1000 of \$1.00, or 0.001. When property tax is expressed in mills, convert the mills to a decimal by dividing the mill amount by 1000 or multiplying the mill amount and 0.001

Tax stamps:

Sales Price / Per Amount = Number of Units (always round up)

Number of Units x Cost per Unit = Cost for Tax Stamps

Income Approach:

Gross Rent (monthly) x Gross Rent Multiplier (GRM) = Market Value (Sales Price)

Gross Income (annually) x Gross Income Multiplier (GIM) = Market Value (Sales Price)

Market Value (Sales Price) x Capitalization Rate = Net Income

Potential Gross Income (PGI) = All actual income plus market value of all vacant units

Effective Gross Income (EGI) = PGI minus Loss of income from vacant units and uncollected rent

Expenses = All property related expenses (i.e. taxes, insurance, maintenance, etc.), but not mortgage payments (debt service)

EGI - Expenses = NOI (Net Operating Income)

Remember IRV; I = NOI, R = Rate (Cap), V = Value

$$\frac{I}{R \times V} \quad \text{or} \quad I = R \times V; R = I/V; V = I/R$$

### Conversions

To convert a fraction to a decimal, divide the numerator (top) by the denominator (bottom)

To convert a decimal to a percentage, multiply by 100 and add the percent (%) sign

To convert a decimal to a fraction, make the decimal the numerator(top) and 100 the denominator (bottom) - then reduce the fraction

### Measurements

There are three different types of measurement, linear (one dimension), which is used when measuring distance; square (two dimensions), which is used when measuring area; and cubic (three dimensions) which is used when measuring volume.

When calculating area and volume, be sure that all dimensions are measured in the same units - inches, feet, yards, etc. You cannot multiply feet by inches and develop anything useful. Mixed measurements such as 6' 8" must be converted to either feet (6.75 feet) or inches ((6' x 12") + 8").

Linear Measurement – (Straight Line) - Single dimension

i.e., inches, feet, yards, miles

feet x 12 = inches

yards x 3 = feet

yards x 36 = inches

miles x 5,280 = feet

Square Measurement – (Area) - Two dimensions

i.e., square inches, square feet, square yards, square miles, acres

square feet x 144 = square inches

square yards x 9 = square feet

acres x 43,560 = square feet

1 section = 640 acres

Area is expressed in square measurement

Area of a rectangle or square = base x height

Area of a room = width x depth

Area of a lot = front feet x depth

Area of a triangle = 1/2 base x height

Cubic Measurement – (Volume) - Three dimensions

i.e. cubic inches, cubic feet, cubic yards

cubic feet x 1,728 = cubic inches

cubic yards x 27 = cubic feet

Volume is expressed in cubic measure. When volume is expressed in yards, it is cubic yards. Use this when calculating amount of sand, cement, water, or other material used to fill an area during construction.

Volume of material = length x width x depth