



CALIFORNIA SALESPERSON EXAM / FOCUSED REFERENCE

California real estate math reference

18 topics with formulas, units, assumptions and common setup mistakes.

Original exam-preparation material. DRE controls the examination. Review the linked full lesson for context; these sheets do not guarantee a passing result.

Commission

$$\text{Commission} = \text{Sale Price} \times \text{Rate}$$

For a percentage-based commission, multiply the sale price by the agreed rate as a decimal. Compensation is negotiable, not set by law. A broker's right to payment depends on the agreement and performance, not this calculation alone. Apply each split to the amount allocated at the previous step.

- Forgetting to convert the percentage to a decimal (6% = 0.06, not 6)
- Applying the agent's split directly to the sale price instead of the commission
- In 4-party splits, confusing which percentage applies at each level
- Dividing when you should multiply (or vice versa). Ask: "Am I finding a part or a whole?"

Loan-to-Value

$$\text{LTV (\%)} = \text{Loan} / \text{Stated Value Basis} \times 100$$

LTV compares the loan with the value basis required by the exercise or loan program. A \$240,000 loan divided by a \$300,000 value basis is 80%. If a \$300,000 purchase appraises at \$280,000 and underwriting uses the lower figure, the same loan has an LTV of about 85.71%. The buyer still pays \$60,000 toward the purchase price. Down payment and LTV use different bases in that example.

- Dividing value by loan instead of loan by value
- Assuming 20% down always means 80% LTV; that requires the purchase price and LTV value basis to match
- Ignoring the exercise's stated value basis; purchase underwriting commonly uses the lower of price or appraisal



Proration

$$\text{Daily Rate} = \text{Annual Amount} / \text{Stated Year Basis}; \text{Share} = \text{Daily Rate} \times \text{Assigned Days}$$

Proration allocates an expense or income between ownership periods. Use the problem's day-count convention and closing-day assignment. A 30/360 exercise uses 30-day months; an actual-day exercise uses the stated calendar basis. Prepaid expenses paid by the seller can create a seller credit. Advance rent collected by the seller for the buyer's period creates a buyer credit instead.

- Confusing "paid in arrears" with "paid in advance"; arrears flips who owes whom
- Dividing by 365 when the problem specifies a 30/360 convention, or the reverse
- Counting a tax proration from 1 January; California's tax year starts 1 July
- Changing the divisor to 360 but still counting actual calendar days instead of 30-day months
- Counting the closing day for the wrong party
- Forgetting to convert monthly amounts to daily before prorating

Gross Rent Multiplier

$$\text{GRM} = \text{Price} / \text{Gross Rent}; \text{Value} = \text{Gross Rent} \times \text{GRM (matching periods)}$$

Monthly and annual multipliers both exist. A \$360,000 property with \$3,000 monthly rent has a monthly multiplier of 120 or an annual multiplier of 10. Match the rent period to the multiplier. GRM ignores operating expenses, so a lower multiplier alone does not establish a better investment.

- Pairing monthly rent with an annual multiplier, or the reverse
- Using NOI instead of gross rent
- Dividing rent by price when asked for the multiplier

Cap Rate

$$\text{Cap Rate (\%)} = \text{NOI} / \text{Value} \times 100; \text{Value} = \text{NOI} / \text{Decimal Cap Rate}$$

A capitalization rate compares a representative year's net operating income with property value or price. Divide NOI by value to find the decimal rate; multiply by 100 to express it as a percentage. Divide NOI by a decimal cap rate to estimate value. This is a property-income measure before debt service, not the buyer's total investment return or a guaranteed interest payment.

- Using gross income instead of NOI (must subtract operating expenses first)
- Including mortgage payments when calculating NOI



- Multiplying instead of dividing when finding value ($\text{Value} = \text{NOI} / \text{Cap Rate}$)
- Forgetting to convert the cap rate percentage to a decimal

Area Calculation

Rectangle Area = Length x Width

For a rectangular parcel, multiply the length by the width. For irregular shapes, break them into simple rectangles or triangles, calculate each piece, and add them up. To convert square feet to acres, divide by 43,560 (the number of square feet in one acre).

- Mixing units: one side in yards, the other in feet (1 yard = 3 feet)
- Forgetting 43,560 sq ft = 1 acre
- Forgetting to halve for triangles ($\text{Area} = 1/2 \times \text{Base} \times \text{Height}$)
- Double-counting overlapping sections in L-shaped or irregular lots

Appreciation & Depreciation

New Value = Original x (1 + Rate)^{Periods}; use (1 - Rate) for compound decline

Appreciation means a property gains value over time; depreciation means it loses value. To find the new value after one year, multiply the original value by (1 + rate) for appreciation or (1 - rate) for depreciation. If it compounds over multiple years, apply the calculation year by year; each year uses the previous year's value, not the original.

- Using simple growth (rate x years) when the question says "compounded annually"
- Multiplying by the rate alone instead of (1 + rate); this gives only the GAIN, not the new value
- For depreciation, multiplying by (rate) instead of (1 - rate)
- Applying compound growth to the original value each year instead of the running total

Net Operating Income

NOI = Effective Gross Income - Operating Expenses

Start with scheduled income, subtract stated vacancy and collection losses, add other income, then subtract operating expenses. NOI is before debt service, income taxes and depreciation. It is not the owner's spendable cash after financing.

- Subtracting debt service from NOI



- Forgetting vacancy and collection losses
- Omitting stated other income
- Treating income taxes or depreciation as operating expenses

Mortgage Payment

$$\text{Monthly P\&I} = (\text{Loan} / 1,000) \times \text{Factor}$$

When a problem supplies a monthly payment factor per \$1,000, divide the loan by 1,000 and multiply by the factor. A \$200,000 loan with a \$6.00 factor has monthly P&I of \$1,200. Use the factor for the stated rate and term. Add taxes and insurance separately when asked for PITI.

- Multiplying the entire loan amount by the factor instead of dividing by 1,000 first
- Confusing PITI (Principal, Interest, Taxes, Insurance) with P&I: the factor only gives P&I
- Forgetting to add escrowed taxes and insurance when the question asks for the full PITI payment
- Mixing up factors for different loan terms (15-year factors are larger than 30-year at the same rate)

Discount Points & Yield

$$\text{Point Cost} = \text{Loan Amount} \times \text{Number of Points} / 100$$

One point costs 1% of the loan amount. Discount points are upfront charges associated with a lower contractual rate. Actual rate reduction and lender yield depend on the loan terms. Apply a yield approximation only when the exercise supplies it; one point does not universally change the rate or yield by one eighth of a percentage point.

- Treating one point as \$1,000: points are 1% of the LOAN amount, not a flat dollar figure
- Confusing discount points (rate buy-down) with origination points (lender fee for processing the loan)
- Assuming every point changes the borrower's rate by the same fixed amount
- Applying points to the property value instead of the loan amount

Net-to-Seller

$$\text{Required Price} = (\text{Desired Net} + \text{Costs} + \text{Payoffs}) / (1 - \text{Commission Rate})$$

Start with the seller's desired net, then add the stated fixed selling costs and loan payoffs. Divide that total by one minus the commission rate as a decimal. With a \$200,000 target net, an agreed 6% commission, and no other costs or payoffs, the required sale price is $\$200,000 / 0.94$, or about \$212,766. This is a proceeds



calculation under the stated assumptions; an asking price does not guarantee that result.

- Adding the commission percentage to the net (e.g., $\$200,000 + 6\% = \$212,000$) is wrong; you must DIVIDE by $(1 - \text{rate})$
- Multiplying instead of dividing: multiplying by 1.06 produces a wrong result
- Forgetting to add closing costs, mortgage payoffs, or other selling expenses to the net before dividing
- Using $(1 + \text{rate})$ instead of $(1 - \text{rate})$; commission reduces the proceeds available from the sale price

Section / Township Area

Standard Section = 640 acres; multiply by the stated fractions

A standard section is one square mile, or 640 acres. A standard six-by-six-mile township contains 36 sections and 23,040 acres. Actual surveyed acreages can differ. For a standard section, the NW quarter of the SE quarter is $640 \times 1/4 \times 1/4 = 40$ acres. One more quarter gives 10 acres. Read the description from right to left to locate the parcel, and apply each stated fraction to calculate its area.

- Multiplying by denominators rather than fractions; $640 \times 1/4 \times 1/4$ and $640 / 4 / 4$ both give 40 acres
- Confusing a 640-acre section with a 23,040-acre standard township
- Treating compass directions as additional fractions

Property Tax

Value-Based Tax = Taxable Assessed Value x Applicable Decimal Rate; add fixed charges separately

Proposition 13 generally limits the base levy to 1% of assessed value, with qualifying bonded debt and other charges added separately. Factored base-year value generally rises by the inflation factor, capped at 2% annually. A reassessable ownership change establishes current fair market value; exclusions and base-year transfers can change the result. New construction generally reassesses the new portion. Decline-in-value assessments follow separate rules.

- Using market value when the problem supplies assessed value
- Applying only 1% when the problem gives an additional bond rate
- Assuming every transfer reassesses the whole property without exceptions
- Subtracting the \$7,000 homeowner's exemption from the tax instead of assessed value



Documentary Transfer Tax

County Tax = $\text{ceil}((\text{Consideration} - \text{Liens Remaining}) / \$500) \times \$0.55$, if taxable value exceeds \$100

For a taxable transfer under Revenue and Taxation Code section 11911, exclude liens remaining on the property from consideration or value. If that base exceeds \$100, divide by \$500, round the units UP, and multiply by \$0.55. A \$100,100 base gives 201 units and \$110.55. A loan paid off at closing is not a remaining lien. Check statutory exemptions and local ordinances separately; this formula does not determine every city's tax.

- Deducting a loan paid off at closing
- Failing to round partial \$500 units up
- Using \$0.55 per \$1,000 rather than per \$500
- Applying a separate city rate without checking its base and exemptions

Simple Interest

Interest = Principal x Rate x Time

Multiply principal by the annual rate and time in years. For five months, time is 5/12. For a monthly amortizing-loan exercise, interest is the current balance times the annual rate divided by 12; subtract it from the P&I payment to find principal reduction. Use the stated convention when interest is based on days.

- Using months as years
- Dividing by 12 twice
- Assuming equal principal and interest portions
- Using the original balance for a later payment instead of the current balance

Sales Comparison Adjustments

Adjusted Comp = Sale Price $\pm$ Feature Differences

Adjust each comparable's sale price to reflect the subject's characteristics. If the comparable is superior, subtract the market-supported contribution of that difference; if inferior, add. Then reconcile the adjusted indications using the quality and relevance of the evidence.

- Adjusting the subject rather than the comparable
- Adding for a superior comparable



- Assuming cost equals contribution to market value
- Averaging automatically when the facts call for reconciliation

Buyer Qualifying Ratios

Housing Ratio (%) = Monthly Housing Costs / Monthly Qualifying Income x 100; Debt Ratio (%) = Total Monthly Qualifying Debt / Monthly Qualifying Income x 100

Compare stated monthly housing costs with qualifying monthly income. The total-debt ratio includes other qualifying debts. If an exercise supplies both limits, calculate the housing allowance under each and use the smaller. Ratios such as 28/36 or 31/43 are not universal lending limits. Actual eligibility depends on the program, underwriting method, income, debts and other requirements; VA also evaluates residual income.

- Using take-home pay instead of the qualifying income supplied
- Choosing the larger rather than binding allowance
- Leaving out stated taxes, insurance or association dues
- Dropping short-term debt without an applicable instruction or rule

Probate Overbid

Minimum = Bid + 10% of first \$10,000 + 5% of the rest

For a court-confirmed real-property sale, Probate Code section 10311 describes a qualifying increased offer of at least 10% above the first \$10,000 of the original bid plus 5% above the excess. On \$500,000, add \$1,000 and \$24,500 to reach \$525,500. Not every probate sale requires confirmation. The court's procedures and statutory conditions also govern the sale.

- Taking 10% of the whole accepted offer, which massively overshoots
- Taking 5% of the whole offer and ignoring the first \$10,000 slice
- Adding the increment to \$10,000 rather than to the full accepted offer
- Confusing the minimum first overbid with the bidding increments the court sets afterwards



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<https://www.passcaliforniarealestate.com/math-drill>



Controlling sources and further reading

DRE salesperson examination content

<https://www.dre.ca.gov/examinees/SalesExamContent.html>

RTC 11911: county documentary transfer tax

https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=RTC§ionNum=11911.

BOE California property tax overview

<https://www.boe.ca.gov/proptaxes/pdf/pub29.pdf>

Fannie Mae debt-to-income ratios

<https://guide-selling.fanniemae.com/sel/b3-6-02/debt-income-ratios>