GENERAL

125 real estate math problems solved

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125 Real Estate Math Problems Solved: A Comprehensive Guide

Whether you're a budding real estate investor, a seasoned developer, or simply someone who wants to understand the numbers behind property deals, mastering real estate math is essential. From calculating mortgage payments to determining after tax return on investment, every transaction hinges on accurate calculations. This guide presents **125 real estate math problems solved**across a range of common scenarios, complete with step by step solutions and key take away insights.

Why Real Estate Math Matters

Real estate is a numbers game. Even a small miscalculation can turn a profitable venture into a loss. Accurate math helps you:

- Evaluate investment viability.
- Compare financing options.
- Project cash flow and profitability.
- Meet regulatory and tax requirements.
- Make informed decisions under pressure.

Below, we break down the math into five core categories, each containing 25 problems. By the end of this guide, you'll have a solid toolkit for tackling any real estate calculation.

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Loan Calculations (25 Problems)

Problem: A borrower takes out a $300,000 mortgage at 4.5% annual interest for 30 years. What is the monthly payment?

Solution:

1. Convert the annual rate to a monthly rate: 4.5% ÷ 12 = 0.375% = 0.00375.
2. Number of payments: 30 years × 12 = 360.
3. Use the formula: P = (r × PV) / (1 – (1 + r)–n).
4. Plugging in: P = (0.00375 × 300,000) / (1 – (1 + 0.00375)–360) "H $1,518.12.

Answer: $1,518.12 per month.

Problem: Using the same mortgage, create an amortization schedule for the first 12 months.

Solution: Compute interest and principal portions each month and update the balance accordingly. (Detailed table omitted for brevity – the pattern follows standard amortization.)

Problem: The lender imposes a 2% prepayment penalty on the remaining balance if the borrower pays off the loan early. If the borrower pays off after 10 years, what is the penalty?

Solution: Remaining balance after 120 payments is approximately $240,000. Penalty = 2% × $240,000 = $4,800.

Problem: An ARM starts at 3% for 5 years, then adjusts annually by 0.5% up to a cap of 5%. What will be the rate in year 7?

Solution: Year 6: 3% + 0.5% = 3.5%; Year 7: 3.5% + 0.5% = 4%. Since 4%

Problem: A 10 year interest only mortgage on $200,000 at 4% requires a balloon payment at the end. What is the balloon?

Solution: Monthly interest = 4% ÷ 12 × $200,000 = $666.67. After 120 months, balloon = $200,000.

Problem: PMI is 0.5% of the loan amount annually for a 20% down payment on a $250,000 home. What is the monthly PMI?

Solution: Annual PMI = 0.5% × $200,000 = $1,000. Monthly = $1,000 ÷ 12 "H $83.33.

Problem: A buyer finances $180,000 on a $225,000 property. What is the LTV?

Solution: LTV = $180,000 ÷ $225,000 = 80%.

Problem: A rental property generates $36,000 annual cash flow; the debt service is $28,800. What is the DSCR?

Solution: DSCR = $36,000 ÷ $28,800 = 1.25.

Problem: Operating expenses are $10,000 per year. What annual debt service keeps the property at break even?

Solution: Break even debt service = operating expenses + desired cash flow (0) = $10,000.

Problem: A $500,000 loan at 5% for 30 years. What is the payoff after 15 years?

Solution: Use amortization formula or spreadsheet. Payoff "H $305,000.

Problem: A 5 year balloon mortgage with a 25 year amortization. When does the balloon occur?

Solution: At the end of the 5th year (60th payment).

Problem: Monthly principal payment on a $400,000 loan at 4% is $1,900. How much equity builds in 6 months?

Solution: Principal portion "H $1,900 × 6 = $11,400.

Problem: 6 month interest only on $350,000 at 3.75%.

Solution: Monthly interest = 3.75% ÷ 12 × $350,000 = $1,093.75.

Problem: How does a 0.5% increase in rate affect monthly payment on a $250,000 loan for 30 years?

Solution: New rate = 4.5% !’ monthly payment "H $1,266.43. Old rate (4%) !’ $1,193.54. Increase = $72.89.

Problem: FHA MIP is 0.85% annually for the first 5 years. What is the monthly MIP on a $150,000 loan?

Solution: Annual MIP = 0.85% × $150,000 = $1,275. Monthly = $1,275 ÷ 12 "H $106.25.

Problem: Reducing a 30 year mortgage to 20 years on a $300,000 loan at 4% increases monthly payment. By how much?

Solution: 20 year payment "H $1,796.02; 30 year payment "H $1,432.25. Increase = $363.77.

Problem: An ARM at 3% with 0.25% cap adjusts to 4% after 3 years. What is the new monthly payment?

Solution: Monthly rate = 4% ÷ 12 = 0.3333%. Payment "H $1,193.54.

Problem: Making an extra $200 monthly payment on a $250,000 loan at 4% reduces payoff to how many years?

Solution: Payoff "H 19.5 years.

Problem: A loan at 2% with a 0.5% payment only leads to negative amortization. What is the annual loss?

Solution: Monthly payment = 0.5% × $200,000 = $1,000. Interest = 2% ÷ 12 × $200,000 = $333.33. Loss = $666.67 per month !' $8,000 annually.

Problem: A $400,000 loan at 3.5% for 30 years. What is the balance after 12 payments?

Solution: Balance "H $391,200.

Problem: Monthly income is $8,000; debt service is $2,400. What is DTI?

Solution: DTI = $2,400 ÷ $8,000 = 30%.

Problem: Closing costs are 2% of loan amount on a $350,000 loan. How much is paid?

Solution: 2% × $350,000 = $7,000.

Problem: A homeowner refinances a $200,000 loan to $250,000 at 3.8% for 25 years. What is the cash out?

Solution: Cash out = $250,000 – $200,000 = $50,000.

Problem: Lender offers 4% on a 15 year loan, broker offers 3.5%. What is the spread?

Solution: Spread = 0.5%.

Problem: Extra $300 monthly on a $300,000 loan at 4% for 30 years. Payoff after 3 years?

Solution: Payoff "H $280,000.

Depreciation & Tax Calculations (25 Problems)

Problem: A commercial building costs $1,200,000 with a 39 year depreciation schedule. What's annual depreciation?

Solution: $1,200,000 ÷ 39 = $30,769.23.

Problem: A residential rental is placed in the 27.5 year MACRS class. What's the first year depreciation rate?

Solution: 3.636% (per IRS tables).

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