Intro to Math

Agent Rising Real Estate School Prelicensing

Rounding numbers

When rounding you must first identify the place you are rounding to (etc: dollar, hundred, or thousand) Then if the number in that place holder is

- ❏ <5 round down
- ❏ >5 round up

Rounding numbers: Example

Round to the nearest dollar
- ❏ $37.25

Round to the nearest hundred dollars
- ❏ $456.76

Round to the nearest thousand dollars
- ❏ $7833.56

Round to the nearest 100,000 dollars
- ❏ $675,934.12
- ❏ $123,087.18

Rounding numbers: Answers

1. Round to the nearest dollar
   - ❏ $37.**2**5 = **$37.00**
2. Round to the nearest hundred dollars
   - ❏ $4**5**6.76 = **$500.00**
3. Round to the nearest thousand dollars
   - ❏ $7**8**33.56 = **$8,000.00**
4. Round to the nearest 100,000 dollars
   - ❏ $675,934.12 = **$700,000.00**
   - ❏ $123,087.18 = **$100,000.00**

Fractions, Decimals, and Percents

- ❏ When adding and subtracting fractions the denominator (bottom number) must be the same ex: ⅜ + ⅞ = 10/8
  - ❏ If they don't you must find it using a common denominator

  Ex: 2/3 + 5/9 = 6/9 + 5/9 = 11/9
- ❏ When multiplying the denominators do not need to be the same, you multiply the numerators and then denominators to get your new answer ex: ⅙ x ¾ = 3/24

Fractions, Decimals, and Percents cont.

❏ To find the decimal of a fraction you divide the denominator by the numerator
> ❏ Ex: ¾ → 0.75

❏ To find the percent, you must convert a decimal
> ❏ To do this move the decimal place over two spots to the right

Fractions, Decimals, and percents Examples

Add the two fractions 7/8 + 1/2 =
Multiply the two fractions 6/7 x 2/4 =
Convert the fraction to a decimal 5/8 =
Convert the decimal to a percent .347 =

Fractions, Decimals, and percents answers

Add the two fractions 7/8 + 1/2 = 7/8 + 4/8 = **11/8**
Multiply the two fractions 6/7 x 2/4 = **12/28** simplify **3/7**
Convert the fraction to a decimal 5/8 = **0.625**
Convert the decimal to a percent .347 = **34.7%**

Related example

A lot costs $40,000 and sells for $48,000. What is the percentage for profit?

Related example answer

A lot costs $40,000 and sells for $48,000. What is the percentage for profit?

48,000 - 40,000 = 8,000

48,000/40,0000 = 1.2

8,000/40,000 = .2   1.2 - 1 = 0.2

20% Profit   20% Profit

Related example

A commercial lot sells for $60,000 making a 25% profit. What was the cost for the lot?

Related example Answer

A commercial lot sells for $60,000
making a 25% profit.
What was the cost for the lot?

100% + 25% = $60,000
125% = $60,000
$60,000/$1.25 = $48,000

USING PERCENT IN REAL ESTATE

Realtors use percents to find commision, profits, losses, and many other daily problems. As we have previously gone over, here are percentage basics
25% = 0.25
0.75 = 75%
1/2 = 1 ÷ 2 = 0.5

RELATED EXAMPLE ANSWER

A broker's listing agreement specifies that **7% commision** is paid on the **sale price**. A **sales associate** for the firm lists and sells the property and is to receive **55% of the total commision**. How much will the sales associate earn after selling the property for **$262,000**?

RELATED EXAMPLE ANSWER

Sales Commision: $262,000 x 0.07 = $18,340
Sale's Associate Commision: $18,340 x 0.55 = $10,087

Related example

Your competitor sold a house for $89,800. The seller said that he paid a sale commision of $4,041. What sale commision rate did your competitor charge?

RELATED EXAMPLE ANSWER

Your competitor sold a house for **$89,800**. The seller said that he paid a sale commision of **$4,041**. What sale commision rate did your competitor charge?

$4,041/$89,800 = 0.045

0.045 → 4.5%

Related Example

A client is considering the purchase of a commercial property for $1,522,500 cash. She will not buy unless a reasonable probability exists that the property will produce a 16% first-year net return on investment. How much net income must the property produce in the first year to qualify for the purchase?

Related Example answer

A client is considering the purchase of a commercial property for **$1,522,500** cash. She will not buy unless a reasonable probability exists that the property will produce a **16% first-year net return on investment**. How much net income must the property produce in the first year to qualify for the purchase?
$1,522,500 x 0.16 = **$243,600**

RELATED EXAMPLE

The monthly interest is $70 on a 6% APR loan. What is the loan amount?

RELATED EXAMPLE ANSWER

The **monthly interest is $70** on a **6% loan**.
What is the loan amount?
$70 single month interest x 12 months = $840
int. for 1 year
$840 ÷ 0.06 = $14,000 loan

Related example

You borrow 80% of the value of a property at an annual interest rate of 6%. The first monthly payment of $423.49 includes $400 of interest. What is the value of the property.

Related example answer

You borrow 80% of the value of a property at an annual **interest rate of 6%**. The **first monthly payment of $423.49** includes **$400 of interest**. What is the value of the property.

$400 monthly interest x 12 months = $4,800 int. for 1 year

$4,800 ÷ 0.06 rate = $80,000 loan amount

$80,000 loan ÷ 0.80 = **$100,000**

RELATED EXAMPLE

The seller wants to clear $100,000. Seller closing costs are estimated at $3,000. The broker charges a 5% commission. What must the property sell for
(Hint add closing costs before finding commission)

RELATED EXAMPLE ANSWER

The **seller wants to clear $100,000**. Seller **closing costs are estimated at $3,000**. The **broker charges a %5 commission**. What must the property sell for?
(Hint add closing costs before finding commission)
$100,000 + $3,000 = $103,000
100% value - 5% commission = 95 % owner's gains
$103,000 ÷ 0.95 = **$108,421.05 value**

Legal descriptions and area problems

Area- the amount of surface contained within a described boundary, stated in square units, such as square feet
Base- the side of a geometric figure on which the figure should rest
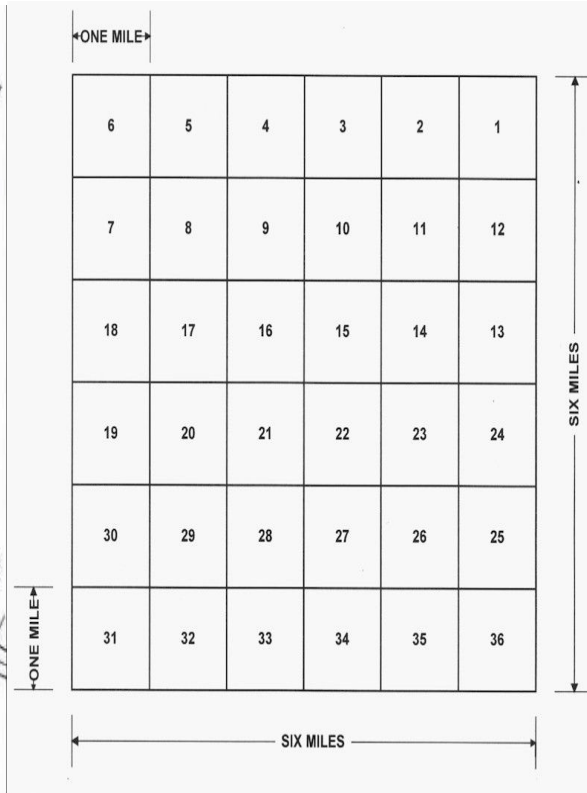**Height**- the perpendicular distance from a geometric figure to the highest point
Area = Base x Height
Know how many sq. feet in acre (43,560). How many feet in a mile (5,280)

LEGAL DESCRIPTIONS AND AREA PROBLEMS

❏ **Lot and Block:** a method of legal description that identifies lots within a recorded subdivision plat map
❏ **Metes and Bounds:** A method of legal description used to describe regular and irregular shaped parcels
❏ **Government survey method:** A method of legal description based on a grid system of base lines and meridians

California Pines – Unit 3

NOTE-ASSESSOR'S BLOCK & LOT NUMBERS SHOWN IN CIRCLES

Assessor's Map 37-42
County of Modoc, Calif.
1970

MEASUREMENTS TO KNOW

Linear Measure
- ❏ 12 INCHES = 1 FOOT
- ❏ 3 FEET = 1 YARD
- ❏ 5,260 FEET = 1 MILE

Area Measure
- ❏ 1 FOOT X 1 FOOT = 1 SQUARE FOOT
- ❏ 43,560 SQUARE FEET = 1 ACRE
- ❏ 1 MILE X 1 MILE = 1 SQUARE MILE = 640 ACRES
- ❏ 1 SECTION = 640 ACRES
- ❏ 36 SECTIONS (6 MILES X 6 MILES) = 1 TOWNSHIP

MORTGAGE MATH

- ❏ **Amortized Mortgage**: Periodic payments cover both interests on the outstanding balance and a partial repayment of principle
- ❏ **Assumption Mortgage:** The taking over of an existing mortgage by a buyer
- ❏ **Doc Stamp Tax Notes:** Tax required on promissory notes (MA is Tax Stamps)
- ❏ **Intangible Tax**: Required prior to recording new mortgage
- ❏ **Interest:** Cost of using someone else's money

MORTGAGE MATH

❏ **Mortgage**: A written agreement that pledges real estate property as security for payment of a debt
❏ **Principal**: The amount of money borrowed
❏ **Rate of Interest**: The annual percent that must be paid to use the money
❏ **Time:** The term or duration a borrower has use of money expressed in years (or part of a year)

CALCULATIONS

When three elements in a mortgage problem are known, the fourth can always be calculated:
I = P x R x T
P = I / (R x T)
R = I / (P x T)
T = I / (P x R)

EXAMPLE

What is the interest on $10,000 at 8% per year for 1 year?

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INTEREST= PRINCIPAL x RATE x TIME

    = 10,000 x 8% x 1 YEAR

    = 10,000 x .08 x 1

    = $800

DIFFERENCES IN TIME

If the amount of time is not 1 year, we have to express it in terms of years:

❏ 2 YEARS = 2
❏ 1 YEAR = 1
❏ 18 MONTHS = 1.5

❏ 9 MONTHS = 0.75
❏ 6 MONTHS = 0.5
❏ 3 MONTHS = 0.25
❏ 1 MONTH = 0.0833

EXAMPLE

What is the principal amount borrowed if a 9% rate of interest results in payment of $135 interest for a period of 6 months?

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What is the principal amount borrowed is a 9% rate of interest results in payment of $135 interest for a period of 6 months?

$P = I / (R \times T)$

$\quad = 135 / (9\% \times 6 \text{ MONTHS})$

$\quad = 135 / (0.09 \times 0.5)$

$\quad = 135 / 0.045$

$\quad = \$3,000$

AMOUNT OF DOWN PAYMENT

SELLING PRICE x % REQUIRED DOWN = DOWN PAYMENT

EXAMPLE: What is the down payment for a home appraised at $84,000 and requiring a 20% down payment?

84,000 x 0.20 = $16,800 DOWN PAYMENT

EXAMPLE

You are a broker and have placed in escrow a 10% earnest money deposit on the appraised value of a house. A mortgage company has agreed to lend the buyer $58,800, which is 80% of the appraised value of the property. How much earnest money do you have in escrow?

ANSWER

$58,800 (TOTAL) ÷ 0.80 (RATE) = 73,500 APPRAISED VALUE
$73,500 X 0.10 = **$7,350 IN ESCROW**

EXAMPLE

A BUYER HAS MADE AN EARNEST MONEY DEPOSIT OF $5,000 ON A HOME SELLING FOR $79,500. A BANK HAS AGREED TO LEND THE BUYER 75% OF THE SALE PRICE. HOW MUCH ADDITIONAL CASH MUST THE BUYER FURNISH TO COMPLETE THE REQUIRED DOWN PAYMENT?

EXAMPLE

A buyer has made an earnest money deposit of $5,000 on a home selling for $79,500. A bank has agreed to lend the buyer 75% of the sale price. How much additional cash must the buyer furnish to complete the required down payment?

$79,500 SALE PRICE X 0.75 = 59,625 LOAN AMOUNT
79,500 - 59,625 = 19,875 DOWN PAYMENT
19,875 - 5,000 EARNEST MONEY = 14,875 REMAINING DOWN PAYMENT

DISCOUNT POINTS

The borrower is charged an upfront fee to increase the actual yield to the lender without showing an increase in the interest rate on the mortgage. The amount charged for the discount points is based on the loan amount.

RULE OF THUMB 1 DISCOUNT POINT WILL INCREASE YIELD ⅛% TO LENDER

EXAMPLE

DIFFERENCE IN RATES:

CURRENT MARKET RATE - STATED (CONTRACT) INTEREST RATE

8¼% - 7½% = ¾% DIFFERENCE

CONVERT TO EIGHTHS OF PERCENT

¾% = 6/8%

CONVERT TO DISCOUNT POINTS

6/8% / 1/8% = 6 POINTS

CALCULATE COST OF DISCOUNT POINTS CHARGED

CONVERT DISCOUNT POINTS TO DISCOUNT RATE

6 POINTS x 1% PER POINT = 6%

CALCULATE THE AMOUNT OF DISCOUNT

TOTAL LOAN AMOUNT x DISCOUNT RATE = AMOUNT OF DISCOUNT

60,000 (LOAN) x 0.06 = $3,600 COST OF DISCOUNT

EXAMPLE

A bank has agreed to lend $87,900 at 6.5% interest for 30 years. The borrower is charged 2 discount points. How much will the borrower be required to pay for the discount points?

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A bank has agreed to lend $87,900 at 6.5% interest for 30 years. The borrower is charged 2 discount points. How much will the borrower be required to pay for the discount points? $87,900 LOAN AMOUNT x 0.02 = $1,758

REAL ESTATE TAXES

Ad Valorem Tax: A tax based on the value of the item being taxed

Assessed Valuation: The value established for property tax purposes

Homestead Exemption: A reduction in the assessed value allowed for one's principal residence

Mill: One one-thousandth of a dollar and one tenth of a cent; used in expressing tax rates on a per-dollar basis

MILL EXAMPLE

CONVERT MILLS TO DECIMALS
1 MILL =
10 MILLS =
100 MILLS =

MILL EXAMPLE

CONVERT MILLS TO DECIMALS
1 MILL = 0.001
10 MILLS = 0.010
100 MILLS = 0.100

MILLS

CONVERT DECIMALS TO MILLS
0.016589
0.003014
0.03554

MILLS

CONVERT DECIMALS TO MILLS
0.016589 = 16.589 MILLS
0.003014 = 3.014 MILLS
0.03554 = 35.54 MILLS

The city tax rate is 9 mills, the county rate is 8.5 mills, the school board rate is 6 mills. the property is homestead. the assessed value is $285,000.

Total Millage = 9 + 8.5 + 6 = 23.5 mills or 0.0235 taxable value 285,000-25,000= 260,000

A home has a living area on 60' X 35' and an attached garage that is 22' X 25'. In today's market, the cost to build the main living area of the house is $80 per square foot. The garage costs $42 per square foot. What is the home's reproduction cost?

Depreciation

Building Reproduction Cost New - Accrued Depreciation + Land Value = Property Value

Effective Age / Total Economic Life = Age Life Accrued Depreciation

Assume a structure is 10 years old and has an effective age of 7 years. The appraiser estimates the total economic life at 50 years. If the reproduction cost new is $327,500, what is the accrued depreciation using the age life method?

Building Reproduction Cost New - Accrued Depreciation + Land Value = Property Value

Effective Age / Total Economic Life = Age Life Accrued Depreciation