Prerequisite Course Information

This section has questions from other sections of the course combined together as a Mathematic Chapter. It contains questions concerning Real Estate Ownership (90 min), Brokerage (15 min), and Financing (90 min).
For these questions and the questions on the test use the following rules:
12 months per year; 30 days per month; thus 360 days per year
If A x B = C; then C / B = A and C / B = A
If the answers are not exact, round up

Please read and become familiar with this information prior to the class date.
This chapter may be done in any order with the remainder of the course. It is suggested to complete the math later in the course once you have become more familiar with the terms used. It is a good idea to keep your workout sheets for reference when we go over the answers in class or on the correspondence slides.

Work the math questions. The answers and workouts are provided. This section is practice so you will be able to handle the different types of math questions on the test. This part of the class will be taken correspondence. The remainder of the class may be taken correspondence or in the classroom.

If you have registered for the correspondence course, the test as well as the evaluation sheet must returned for grading and issuance of you graduation certificate. You may take the tests all at once or one chapter at a time. The test may be taken open book and the answer sheet must be sent back to:

AlaskaRealEstateSchool.com

Attn: Denny Wood, CRS
PO Box 241727
Anchorage, Alaska 99524-1727

10 Real Estate Mathematics

Almost one-fourth of the uniform section of the examination covers questions requiring basic arithmetic calculations. The test permits the use of a pocket calculator on the examination. The principal areas covered by the arithmetic problems are:

1. Commission
2. Interest
3. Investment or income
4. Profit and loss
5. Depreciation and appreciation
6. Taxes and insurance
7. Prorations
8. Ratio, proportion, and scale
9. Area

Commission

1. A 3-bedroom house sells for $124,000 and the broker's total commission is 6% of the selling price. The commission is:

A. $6,000
B. $20,667
C. $7,440
D. $744

2. On a $78,000 sale of a house, the rate of commission is 6%. The salesperson gets 40% of the commission and the broker gets the remainder. How much does the broker get?

A. $40,000
B. $2,808
C. $1,872
D. $4,680

3. The commission on a house that sells for $96,000 is $4,800. What was the rate of commission?

A. 20%
B. 2%
C. 50%
D. 5%

4. A salesperson received $2,880 for selling a house. This was 40% of the total commission on the sale of a $120,000 house. What was the commission rate on the sale?

A. 6%
B. 12%
C. 4%
D. 3%

5. A house sold for $110,000 and the rate of commission was 6%. If the salesperson got $1,980, what percentage of the commission did the salesperson get?

A. 70%
B. 30%
C. 66%
D. 3%

6. A broker charges a rental management fee of one-third of the first month's rent, and gets paid 2% of each month's rent thereafter. He must pay a $100 "finder's fee" to an agent. If the house rents for $600 per month, how much does the licensed broker make in one year?

A. $232 C. $332
B. $432 D. $100

7. A broker gets 6% of the first $100,000 and 3% of any amount over $100,000. What would be the loss to the broker if a house listed for $180,000 has to be reduced by 20%?

A. $8,400 C. $15,720
B. $7,320 D. $1,080

Interest

8. Find the interest on $32,000 at 12 1/4% per annum (year) for 6 months.

A. $326 C. $2640
B. $1,320 D. $1,960

9. If the interest on a loan at 13% per annum for 8 months was $5,400, what was the amount of the loan?

A. $72,900 C. $62,300
B. $81,000 D. $67,500

10. If the interest for 9 months on a loan of $80,000 was $7,200, what was the rate of interest per annum?

A. 13.5% C. 9.6%
B. 12% D. 10.5%

11. A purchase-money mortgage carried back by seller for $60,000 at 10 3/4% was made February 1 and paid November 1. What was the total outstanding amount due at the time of payment?

A. $64,837.50 C. $55,152.50
B. $48,375.00 D. $66,450.00

12. A loan is made for 90% of the $96,000 appraised value of a house. The annual rate of interest is 12%. What is the bi-monthly (every 2 months) interest payment?

A. $864 C. $684
B. $8,208 D. $1,728

13. On a simple interest loan of $15,000 that has an interest rate of 13% annum, what is the total interest payment for 2 years, 6 month and 10 days?

A. $3,033.33 C. $2,433.30
B. $2,403.30 D. $4,929.20

14. A woman receives a purchase-money $30,000 loan from the seller at a reduced rate of 9%. Assuming the loan interest is calculated on declining balance, if her payment is $250 per month, including interest, what is her balance after 3 payments?

A. $29,975 C. $29,924.43
B. $29,949.81 D. $29,898.86

Investment or Income

15. A property valued at $120,000 is earning an 8% return. What is the monthly return?

A. $9,600 C. $800
B. $4,800 D. $80

16. A property valued at $150,000 earns $750 per month. What is the annual percentage return?

A. 7.5% C. 9%
B. 6% D. 12%

17. A business shows a monthly profit of $1,050. If this is a 9% return, what is the value of the property?

A. $140,000 C. $14,000
B. $94,500 D. $9,450

18. A man owns a building with 6 apartments. Three of the apartments net him $200 each per month and the other 3 net him $150 per month. For what amount should he sell the building to net the same profit if he invests the money at 9%?

A. $126,000 C. $12,600
B. $105,000 D. $140,000

19. A man rents each of his 5 apartments for $600 per month and has a total amount of expenses of $1,000 per month. He has an investment of $50,000 at 8% a year in the bank. He decides to use the bank interest to pay for better and more frequent property maintenance. What percent increase in rent per apartment must be obtain to offset this additional expense?

A. 33.33%
B. 66.67%
C. 11.11%
D. 20%

20. A store in a shopping center under a percentage lease pays a monthly rent of $600 plus 4% of the annual gross over $150,000. The gross yearly income was $250,000. If the lessor's interest in the store was valued at $150,000, what is the percentage of return to the lesser?

A. 7.5%
B. 11.2%
C. 15%
D. 14%

21. A property is valued at $180,000 and is making an 8% annual net return on the investment. By what percentage must the monthly profit be increased to make a 10% annual return?

A. 15%
B. 20%
C. 30%
D. 25%

Profit and Loss

22. What percentage profit is made on a sale, if the selling price is $90,000 and the purchase price is $75,000?

A. 15%
B. 20%
C. 120%
D. 12%

23. If the purchase price of a property was $50,000, what should the selling price be to realize a 5% profit?

A. $47,500
B. $53,750
C. $52,500
D. $51,500

24. A man buys a house for $50,000. He sells it for $60,000 with a 6% broker's fee and closing costs of $400. What was his percentage profit?

A. 11.2%
B. 1.12%
C. 5.6%
D. 12%

25. A house sells for $92,000, a 15% increase over the purchase price paid one year before. The seller paid the 9% interest on a 90% loan, taxes of $350, insurance of $150, and a 6% commission on the sale. What was the seller's return?

A. gain of $500 C. gain of $250
B. loss of $500 D. loss of $250

26. A house sells for $80,000. The seller pays 3 discount points to the lender on a 90% FHA loan and a 6% commission. If she bought the house for $50,000 five years ago, what was the annual rate of her profit?

A. 9% C. 6%
B. 18% D. 12%

27. A man buys a house for $50,000 and wants to realize an 8% profit after paying a 6% real estate commission. What should the selling price be?

A. $50,760 C. $90,000
B. $53,191 D. $57,446

28. A house originally cost $30,000 to build. Over the next three years, costs went up 10% the first year, 20% the second year and went down 3% the next year. What would the construction cost of the same house be if building had been postponed three years?

A. $33,000 C. $38,412
B. $39,600 D. $25,608

Depreciation and Appreciation

29. A $90,000 house depreciates an average 3% each year. What is the house's value after seven years?

A. $60,000 C. $71,100
B. $61,100 D. $81,100

30. A house depreciates 2 1/2% per year for four years. If the house is now worth $108,000 what was it worth four years ago?

A. $106,930.69 C. $118,800
B. $120,000 D. $108,900

31. A house currently worth $153,000 was worth $180,000 five years ago. What was the depreciation per year?

A. 5% C. 2%
B. 3% D. 15%

32. A man has a $9,000 cottage that he depreciated using straight-line depreciation for 10 years. What is the dollar amount of depreciation each year?

A. $1,000 C. $900
B. $1,100 D. $1,800

33. It cost $40,000 to build a house on a $20,000 lot six years ago. If the house depreciates at 3% per year and the lot appreciates at 5% per year, what is the total value now?

A. $32,800 C. $6,800
B. $26,000 D. $58,800

34. If a $30,000 house depreciates at 3% per year for five years under straight-line depreciation, what is it worth now?

A. $15,000 C. $25,500
B. $2,550 D. $4,500

35. If 3% depreciation on a $30,000 house were computed each year on a remaining value, what would it be worth after five years?

A. $28,227 C. $26,558
B. $27,380 D. $25,762

Taxes and Insurance

36. The tax assessment ratio for a house valued at $90,000 is 40%. If the tax rate is $3.50 per $1,000, what is the quarterly tax?

A. $31.50 C. $63.00
B. $126.00 D. $42.00

37. If a man's semi-annual tax on a $120,000 home is $243 and the tax rate is $6.75 per $1,000 of assessed value, what is the tax assessment ratio?

A. 6% C. 40%
B. 60% D. 4%

38. A woman's semi-annual tax on her $90,000 home is $78.75 and is based on a tax assessment ratio of 50%. What is the tax rate per $1,000 for her home?

A. $1.57 C. $3.14
B. $3.50 D. $35

39. A $120,000 home carries fire insurance on 80% of its value. If the rate is $3.50 per $1,000 of insured value for a three-year policy, what is the annual premium?

A. $336 C. $112
B. $168 D. $224

40. A man pays $168.75 each year for fire and home insurance. The rate is $3 per $1,000 of insured value for a two-year period. If his house is worth $150,000, what percent of that value is covered by insurance?

A. 75% C. 85%
B. 7.5% D. 25%

41. A property was conveyed for $60,000. If the conveyance tax rate was $0.07 per $100 value, what was the conveyance tax paid by the seller?

A. $4.20 C. $420
B. $42 D. $4,200

42. A property conveyed for $110,000 was charged a conveyance tax of $38.50. What is the tax rate per $100?

A. $0.385 C. $0.035
B. $0.0385 D. $3.50

Prorations

43. The taxes of $390 have been paid for the entire calendar year. The seller sells on October 1. What is the amount of the remaining prepaid portion?

A. $32.50 C. $97.50
B. $325.00 D. $292.50

44. A house is sold on May 1. On January 1 of that year the three-year insurance was paid in an amount of $441 and semi-annual tax of $180 was paid. How much should be debited to buyer and credited to seller?

A. $392 C. $332
B. $452 D. $422

45. The taxes on a house for the fiscal year July 1 to June 30 are $900, to be paid in advance. If the house is sold February 15, what is the amount of the prepaid portion owed back to the seller?

A. $100.00 C. $562.50
B. $56,25 D. $337.50

46. A house sold March 15. The taxes the first six months of the year are $195 and have not been paid. How much of this does the buyer pay?

A. $81.25 C. $195
B. $113.75 D. $32.50

47. The seller has made the October 1 payment on his mortgage at 8 3/4%, leaving a balance of $32,400. What is the amount of accrued interest as of the closing on October 20?

A. $157.50 C. $86.62
C. $236.25 D. $83.40

48. A property was sold April 15 and the three-year insurance premium of $426 was paid January 1 of the preceding year. How much does the buyer owe the seller?

A. $11.83 C. $24.26
B. $118.30 D. $242.52

49. On January 1, taxes of $600 are paid for the year and $120 is paid on the semi-annual ground lease rent, both in advance. The house is sold April 10. How much is due the seller?

A. $433.50 C. $54.40
B. $486.90 D. $380.10

Ratio, Proportion, and Scale

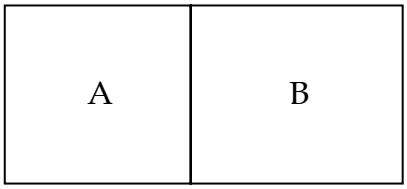
50. If 200 ft. Of fence costs $900, what would 350 ft of fence cost?

A.$1,575 C. $3,150
B.$1,800 D. $900

51. If a 9 by 12 ft. Rug costs $1,500, what would a 14 by 16 ft. Rug cost?

A.$2,240 C. $1,080
B.$3,111.11 D. $2,962.12

52. Lots A and B have the same depth. Lot A is 1/4 acre. How many acres are lot B?



A. 31 C. 0.31
B. 3.1 D. 0.031

53. If 10 men take 8 hours to complete a job, how many hours would it take 15 men?

A.80 C.6.5
B.15 D.5.33

54. If a salesperson claims to sell three out of every five prospects, how many sales would result from 120 prospects?

A. 120 C. 18
B. 36 D. 72

55. In scale, if 2 in. Represents a length of 6 ft., what would represent a length of 20 ft.?

A. 6 in. C. 3 1/3 in.
B. 6 2/3 in. D. 2 2/3 in.

56. A back yard is drawn on a plan 6 1/2 by 3 in. If the scale is 1/2 in.=5 ft. And sod costs $15 per square yard, how much would it cost to sod this lawn?

A.$2,160 C. $3,250
B.$1,625 D. $6,500

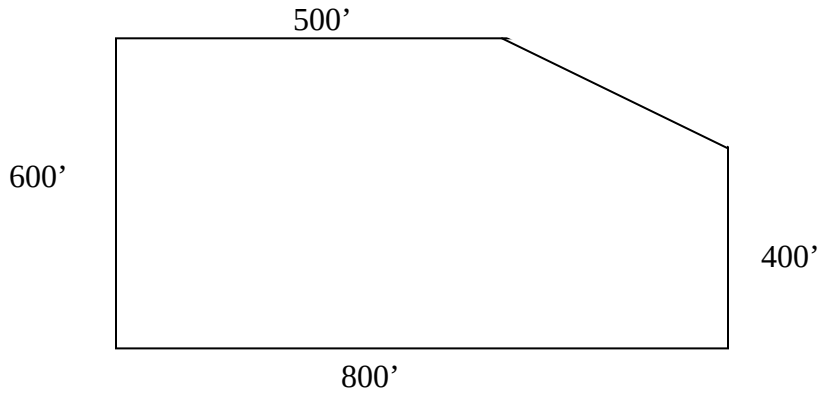
Area

57. A lot is 70 by 120 ft. What fraction of an acre is this?

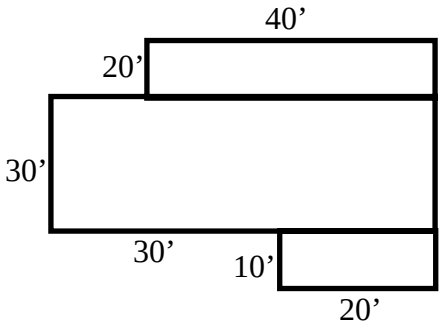
A. 1/4 C. 1/2
B. 1/5 D. 1/3

58. What is the cost of the lot in the following illustration if the cost is $2.50 per sq ft?

A. $4,500,000 C. $1,125,000
B. $2,500,000 D. $562,500



59. The house with the floor area shown below sells for $150,000.
What is the cost per sq. ft.?

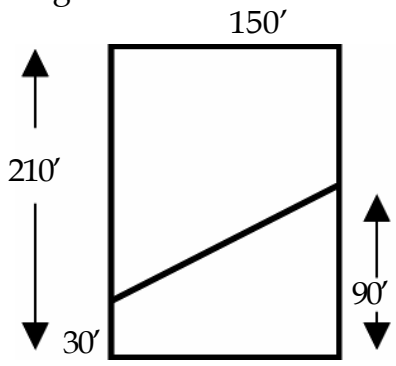


A. $250 C. $60
B. $120 D. $30

60. Compute the cost of ready-mixed concrete for a driveway of 70 ft. Long, 10 ft. Wide, 3 inches deep at a cost of $30 per cubic yard?

A. $194.40 C. $44.80
B. $82.20 D. $54.80

61. A man buys the lot shown below for $12,000. To make way for the freeway, the state condemns the bottom area. What would be the fair market value of the bottom portion, assuming a 10% increase in value?



A. $3,800
B. $3,150
C. $9,000
D. $3,762

62. A property is for sale at $120,000. If the cost of the land is $15,000 per acre and the lot is rectangular with a 500 ft. Frontage, what is the depth?

A. 696.9 ft.
B. 966.8 ft.
C. 869.6 ft.
D. 986.6 ft.

Miscellaneous

63. The owner of an apartment house with eight apartments spends $1,000 on improvements. How much should she increase each rent to recoup this expense in six months?

A. $125
B. $20.83
C. $12.50
D. $38.20

64. A man buys a parcel of land for $1 million, then subdivides it into eight lots to sell for $150,000 each. What percentage of return on the money is this?

A. 2%
B. 20%
C. 40%
D. 4%

65. A woman has six apartments that she rents for $500 per month including utilities. If the utilities average $450 total per month, what would be the rent without utilities?

A. $75
B. $425
C. $85
D. $415

66. A building with a net income of $10,000 was appraised at $100,000. What would be the value if the capitalization rate has decreased by one percentage point?

A. $100,000 C. $111,111
B. $ 90,909 D. $105,263

67. A salesperson is offered a straight salary of $2,000 per month or 40% of a 6% total commission. How much in monthly sales would make the two offers equal?

A. $83,333 C. $124,600
B. $50,000 D. $166,666

68. A salesperson gets $500 per month plus a 40% of the 6% commission on sales. If he wants to earn $1,200 this month, how much must his sales be?

A. $50,000 C. $20,833
B. $29,167 D. $100,000

69. A house appreciates each year by 10%. This is equivalent to what percent for five years?

A. 50% C. 71%
B. 61% D. 81%

70. Acme Savings and Loan Association suggests the buyer can buy a home valued at 3 1/2 times his yearly income. What should his minimum weekly salary be to buy a home worth $120,000?

A. $596.34 C. $659.34
B. $695.34 D. $634.59

71. On a quarter-acre of land, approximately what percentage is occupied by a 2,500 sq. Ft. House?

A. 43% C. 23%
B. 34% D. 32%

72. A 1/4-acre plot costs $5 per square foot. A house that is 60′ by 40′ will cost $30 per square foot. What is the total cost?

A. $87,120 C. $130,680
B. $126,450 D. $174,240

73. The gross income on a property is $7,920. If this is a 6% return on cost, what is the cost?

A. $47,520 C. $132,000
B. $74,448 D. $83,952

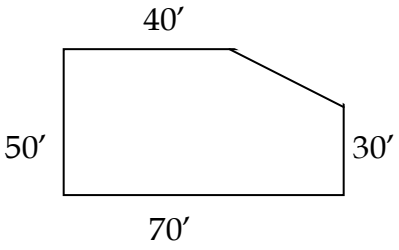
74. On a 30-year mortgage in the sum of $110,000 at 11%, the monthly payment is $1,047.56. On the first payment, how much is applied to reduce the principal?

A. $1,008.33 C. $39.23
B. $1,100 D. $3.92

75. If the price of a house rises 10% the first year and 12% the second year, what is the percentage rise over the two years?

A. 22% C. 120%
B. 13.2% D. 23.2%

76. Find the cost of the lot below at $100 per square yard?



A. $35,556 C. $106,667
B. $32,000 D. $28,800

77. A 35 by 40 ft. House is on a 1/3-acre of land. What percentage is not taken up by the house?

A. 14% C. 90%
B. 10% D. 86%

78. A house originally cost $35,000 to build and the lot was $20,000. Lot prices have increased by 300% and building costs have doubled. What percent did the entire property appreciate?

A. 136% C. 73%
B. 36% D. 500%

79. A man owns a house with a $32,000 mortgage and his payment is $260 per month. He rents the house for $600 per month, paying 10% to a broker and saving $75 per month for repairs. The annual profit he makes is what percent of his equity if the house would net $68,000 if he were to sell?

A. 13% C. 36%
B. 1.3% D. 3.6%

80. A house worth $90,000 is rented for a net profit of $400 per month. How much money invested at 12% would give the same net profit?

A. $40,000 C. $45,000
B. $80,000 D. $90,000

81. The mortgage payment on a house is $336 per month. How much money would have to be invested at 12.5% per annum to pay the monthly mortgage payment?

A. $33,562 C. $32,256
B. $33,600 D. $25,326

82. The building on a 150 by 220 ft. Lot cover 30% of the lot. How many square feet are not covered by buildings?

A. 33,000 C. 10,900
B. 23,100 D. 7,000

83. A buyer applies at a bank for a loan to purchase a $60,000 home. The bank requires an 18% down payment on the first $30,000 and a 14% down payment on the remaining $30,000. What will be the bank's loan fee if they charge 4 points on the balance?

A. $3,018 C. $2,184
B. $2,400 D. $2,016

84. George earns $22,500 per year as carpenter, and his wife, Sally, is a secretary earning $15,000. They a selling their present home for $70,000 and will receive their equity of $35,000 at closing. They contact a lender who uses a 2.5-times rule of thumb. The most expensive home they would be capable of purchasing would be:

A. $89,750 C. $75,000
B. $93,750 D. $128,750

85. A buyer contracts to purchase a $75,000 home and puts up a good faith deposit of $1,500. The commission is 6.5 percent paid by seller. The buyer gets a $260 credit for real property taxes paid in arrears. If buyer obtains an 80 percent conventional loan at 12 percent interest with three points, how much should he bring to the closing?

A. $15,040 C. $15,300
B. $19,915 D. $16,540

Math Workouts

Try to complete all the math problems before you look at the workouts to see how much you do not know. Then work the problems again following the workouts. This will help you understand the formulas used in real estate math.

Simple Algebra Formula

If	A X B = C	or	2 X 3 = 6
Then	C / B = A		6 / 3 = 2
And	C / A = B		6 / 2 = 3

MANY REAL ESTATE MATH PROBLEMS

USE THIS FORMULA

1. A 3-bedroom house sells for $124,000 and the broker's total commission is 6% of the selling price. The commission is:

A. $6,000 **C. $7,440**
B. $20,667 D. $744

$124,000 V = value
X .06 R = rate
$7440.00 I = income

2. On a $78,000 sale of a house, the rate of commission is 6%. The salesperson gets 40% of the commission and the broker gets the remainder. How much does the broker get?
A.$40,000 C. $1,872
B.$2,808 D. $4,680

$78,000 X .06 = $4680
$4680 X .60 = $2808

3. The commission on a house that sells for $96,000 is $4,800. What was the rate of commission?

A. 20% C. 50%
B. 2% D. 5%

$96,000 X ? = $4800
$4800 / $96,000 = .05 = 5%

4. A salesperson received $2,880 for selling a house. This was 40% of the total commission on the sale of a $120,000 house. What was the commission rate on the sale?

A. 6% C. 4%
B. 12% D. 3%

? X .40 = $2880

2880 / .40 = $7200

$120,000 X ? = $7200

7200 / 120,000=.06 = 6%

5. A house sold for $110,000 and the rate of commission was 6%. If the salesperson got $1,980, what percentage of the commission did the salesperson get?

A. 70% C. 66%

B. 30% D. 3%

$110, 000 X .06 = $6600

$6600 X ? = $1980

1980 / 6600 = .30 = 30%

6. A broker charges a rental management fee of one-third of the first month's rent, and gets paid 2% of each month's rent thereafter. He must pay a $100 "finder's fee" to an agent. If the house rents for $600 per month, how much does the licensed broker make in one year?

A. $232 C. $332

B. $432 D. $100

600 / 3 = $200

600 * .02=$12.00

11 months X $12.00 = $132.00

$200 + $132 = $332 - $100 = $232

7. A broker gets 6% of the first $100,000 and 3% of any amount over $100,000. What would be the loss to the broker if a house listed for $180,000 has to be reduced by 20%?

A. $8,400 C. $15,720
B. $7,320 **D. $1,080**

$100000 X .06 $6000 PLUS $80000 X .03 $2400 = $8400

Old Price $180,000 X .20 $36,000

New Price $180,000 - 36,000 $144,000

New Comm $100000 X .06 $6000 PLUS $44,000 X .03 $1320 = $7320

$8400 - $7320 = $1080

8. Find the interest on $32,000 at 12 1/4% per annum (year) for 6 months.

A. $326 C. $2640
B. $1,320 **D. $1,960**

$32,000 X.1225 =$3920

$326.67 X 6 = 1960.02

3920 / 12 = $326.67 per Month

9.If the interest on a loan at 13% per annum for 8 months was $5,400, what was the amount of the loan?

A.$72,900 **C. $62,300**
B.$81,000 D. $67,500

$5400 / 8 = $675.00
$675 X 12 = $8100
? X .13 = $8100
8100 13 = $62307.69

10.If the interest for 9 months on a loan of $80,000 was $7,200, what was the rate of interest per annum?

A.13.5% C. 9.6%
B.12% D. 10.5%

$7200 / 9 = $800800 X 12 = $9600
$80,000 X ? = $9600
9600 / 80,000 = .12 = 12%

11. A purchase-money mortgage carried back by seller for $60,000 at 10 3/4% was made February 1 and paid November 1. What was the total outstanding amount due at the time of payment?

A.$64,837.50 C. $55,152.50

B.$48,375.00 D. $66,450.00

$60,000 X .1075 = $6450
$6450 / 12 = $537.50
$537.50 X 9 =$4837.50
$60,000 + $4837.50 = $64,837.50

12. A loan is made for 90% of the $96,000 appraised value of a house. The annual rate of interest is 12%.
What is the bi-monthly (every 2 months) interest payment?

A. $864 C. $684
B. $8,208 D. **$1,728**

$96,000 X .90 = $86,400
$86,400 X.12 = $10,368
$10,368 / 12 = $864.00 X 2 = $1728.00

13. On a simple interest loan of $15,000 that has an interest rate of 13% per annum, what is the total interest payment for 2 years, 6 months and 10 days?

A. $3,033.33
B. $2,403.30
C. $2,433.30
D. **$4,929.20**

$15,000 X .13 = $1950 X 2= $3900.00
$1950 / 12 = $162.50 X 6 = $975.00
$162.50 / 30 = $5.42 X 10 = $54.20
$4929.20

14. A woman receives a purchase-money $30,000 loan from the seller at a reduced rate of 9%. Assuming the loan interest is calculated on declining balance, if her payment is $250 per month, including interest, what is her balance after 3 payments?

A. $29,975
B. $29,949.81
C. $29,924.43
D. **$29,898.86**

Pmt	Int	Prin	BALANCE
			30000.00
250	225.00	25.00	29975.00
250	224.81	25.19	29949.81
250	224. 62	25.38	29924.43

30000	29975	29949.81
X .09	X .09	X.09
2700	2697.75	2695.48
/ 12	/12	/12
225	224.81	224.62

15. A property valued at $120,000 is earning an 8% return. What is the monthly return?

A. $9,600 C. **$800**
B. $4,800 D. $80

$120, 000 X .08 = $9600
$9600 / 12 = $800.00

16. A property valued at $150,000 earns $750 per month. What is the annual percentage return?

A. 7.5% C. 9%
B. **6%** D. 12%

$750 X 12 = $9000 (annual earnings)

$150,000 X ? = $9000
$9000 / $1 50000= .06 = 6%

17. A business shows a monthly profit of $1,050. If this is a 9% return, what is the value of the property?

A. **$140,000** C. $14,000
B. $94,500 D. $9,450

$1050 X 12 = $12,600 (profit per year)
? X .09 = $12,600
$12600 / .09 = $140,000

18. A man owns a building with 6 apartments. Three of the apartments net him $200 each per month and the other 3 net him $150 per month. For what amount should he sell the building to net the same profit if he invests the money at 9%?

A. $126,000 C. $12,600
B. $105,000 D. **$140,000**

$200 X 3 = $600$150 X 3 = $450
$600 + $450 = $1050 per month
$1050 X 12 = $12,600
? X .09 = $12,600
$12,600 / .09 = $140000

19. A man rents each of his 5 apartments for $600 per month and has a total amount of expenses of $1,000 per month. He has an investment of $50,000 at 8% a year in the bank. He decides to use the bank interest to pay for better and more frequent property maintenance. What percent increase in rent per apartment must be obtained to offset this additional expense?

A. 33.33% C. **11.11 %**
B. 66.67% D. 20%

$50000 X .08 = 4000 per year
$4000 / 12 = $333.33 per month
$333.33 / 5 = $66.67 per unit increase
$600 X ? = $66.67
$66.67 / 600 = .1111 = 11.11%

20. A store in a shopping center under a percentage lease pays a monthly rent of $600 plus 4% of the annual gross over $150,000. The gross yearly income was $250,000. If the lessor's interest in the store was valued at $150,000, what is the percentage of return to the lessor?

A. **7.5%** C.15%
B. 11.2% D.14%

$600 X 12 = $7200 fixed rent
$250,000 - $150,000 = $100,000
$100,000 X .04 = $4000
$7200 + $4000 = $11200 yearly rent
$150,000 X ? = $11200
11200 / 150000 = .07466 = 7.5%

21. A property is valued at $180,000 and is making an 8% annual net return on the investment. By what percentage must the monthly profit be increased to make a 10% annual return?

A.15% C. 30%
B.20% D. **25%**

$180,000 X .08 = $14,400 (old rate)
$14,400 / 12 = $1200 per month
$180,000 X .10 = $18,000 (new rate)
$18,000 / 12 = $1500 per month
$1500 - $1200 = $300 gain
$1200 X ? = $300
300 / 1200 = .25 = 25%

22. What percentage profit is made on a sale, if the selling price is $90,000 and the purchase price is $75,000

A. 15% C. 120%
B. **20%** D. 12%

$90,000 - $75,000=$15,000 profit
$75,000 X ? = $15,000
15000 / 75000 = 20% profit

23. If the purchase price of a property was $50,000, what should the selling price be to realize a 5% profit?

A. $47,500 C. **$52,500**
B. $53,750 D. $51,500

$50,000 X 1.05 (105%) = $52,500

24. A man buys a house for $50,000. He sells it for $60,000 with a 6% broker's fee and closing costs of $400. What was his percentage profit?

A. 11.2%C. 5.6%
B. 1.12% D. **12%**

$60,000 X .94 = $56,400
$56,400 - $400 = $56,000
$50,000 X ? = $56,000
$56,000 / $50,000=1.12 = 112 % return or 12% gain

25. A house sells for $92,000, a 15% increase over the purchase price paid one year before. The seller paid the 9% interest on a 90% loan, taxes of $350, insurance of $150, and a 6% commission on the sale. What was the seller's return?

A. gain of $500 C. gain of $250
B. **loss of $500** D. loss of $250

? **X 1.15 = $92,000**
92,000 / 1.15 = $80,000 purchase price
$92,000 - $80,000 = $12,000 gross profit
$80,000 X .90 = $72,000 loan
$72,000 X .09 = $6480 interest
$92,000 X .06 = $5520 Commission
$6480 + $5520 + $350 + $150 = $12,500 expenses
$12,000 - $12,500 = -$500 LOSS

26. A house sells for $80,000. The seller pays 3 discount points to the lender on a 90% FHA loan and a 6% commission. If she bought the house for $50,000 five years ago, what was the annual rate of her profit?

A. **9%** C. 6%
B. 18% D. 12%

$80,000 X .90 = $72,000 loan
$72,000 X .03 = $2160 points
$80,000 X .06 = $4800 commission
Total Expenses $6960
$30000 profit - $6960 = $23040
$23040 / 5 = $4608 profit per year
$50,000 X ? = $4608
4608 / 50000 = .09 = 9%

27. A man buys a house for $50,000 and wants to realize an 8% profit after paying a 6% real estate commission. What should the selling price be?

A. $50,760 C. $90,000
B. $53,191 D. **$57,446**

$50,000 X .08 = $4000 profit = $54,000
54000/(100%-6%=94%)= SP
54000 / .94 = $57,446.81

28. A house originally cost $30,000 to build. Over the next three years, costs went up 10% the first year, 20% the second year and went down 3% the next year. What would the construction cost of the same house be if building had been postponed three years?

A. $33,000 C. **$38,412**
B. $39,600 D. $25,608

$30,000 X 1.10 = $33,000 year one
$33,000 X 1.20 = $39,600 year two
$39,600 X .97 = $38,412 year three

29. A $90,000 house depreciates an average 3% each year. What is the house's value after seven years?

A.$60,000 C.**$71,100**
B.$61,100 D.$81,100

3% X 7 years = 21%
100% -21% = 79%
$90,000 X .79 = $71,100

30. A house depreciates 2 1/2% per year for four years. If the house is now worth $108,000 what was it worth four years ago?

A. $106, 930.69 C. $118, 800
B. **$120,000** D. $108,900

2 1/2 % X 4 years = 10%
100% - 10% = 90%
? X .90 = $108,000
$108,000 / .90 = $120,000

31. A house currently worth $153,000 was worth $180,000 five years ago. What was the depreciation per year?

A. 5% C. 2%
B. **3%** D. 15%

$180,000 X ? = $153,000
153000 / 180000 = .85 = 85%
100% -85% = 15%
15 / 5 = 3% per year

32. A man has a $9,000 cottage that he depreciated using straight-line depreciation for 10 years. What is the dollar amount of depreciation each year?

A.$1,000 C. **$900**
B.$1,100 D. $1,800

100% in 10 years = 10% per year
.10 X $9000 = $900 per year

33. It cost $40,000 to build a house on a $20,000 lot six years ago. If the house depreciates at 3% per year and the lot appreciates at 5% per year, what is the total value now?

A. $32,800 C. $6,800
B. $26,000 D. **$58,800**

House 3% X 6 = 18% 100% -18% = 82%
$40,000 X .82 = $32,800
Lot 5% X 6 = 30% 100% + 30 % = 130%
$20,000 X 1.30 = $26,000
$32,800 + $26,000 = $58,800

34. If a $30,000 house depreciates at 3% per year for five years under straight-line depreciation, what is it worth now?

A. $15,000 C. $25,500

B. $2,550 D. $4,500

3% X 5 = 15%

100% -15% = 85%

$30,000 X 85% =$25,500

35. If 3% depreciation on a $30,000 house were computed each year on a remaining value, what would it be worth after five years?

A. $28,227 C. $26,558

B. $27,380 D. $25,762

$30,000 X .97 = $29,100 year 1
$29,100 X .97 = $28,227 year 2
$28,227 X .97 = $27,380.19 year 3
$27,380.19 X .97 = $26558.78 year 4
$26558.78 X .97 = $25,762.02 year 5

36. The tax assessment ratio for a house valued at $90,000 is 40%. If the tax rate is $3.50 per $1,000, what is the quarterly tax?
A. **$31.50** C. $63.00
B. $126.00 D. $42.00

$90,000 X .40 = $36,000 Assessment
36 X $3.50 = $126.00 annual tax
$126.00 / 4 = $31.50 Quarterly

37. If a man's semi-annual tax on a $120,000 home is $243 and the tax rate is $6.75 per $1,000 of assessed value, what is the tax assessment ratio?
A. 6 % C. 40 %
B. **60 %** D. 4 %

$243 X 2 = $486 per year
? X 6.75 = $486.00
486 / 6.75 = 72 X $1000 = $72,000
$120,000 X ? = $72,000
72,000 / 120,000 = .60 = 60%

38. A woman's semi-annual tax on her $90,000 home is $78.75 and is based on a tax assessment ratio of 50%. What is the tax rate per $1,000 for her home?

A. $1.57 C. $3.14
B.**$3.50** D. $35

$78.75 X 2 = $157.50
$90,000 X .50 = $45,000
45 X ? = $157.50
157.50 / 45 = $3.50

39. A $120,000 home carries fire insurance on 80 % of its value. If the rate is $3.50 per $1,000 of insured value for a three-year policy, what is the annual premium?

A. $336 C. **$112**
B. $168 D. $224

$120,000 X .80 = $96,000
96 X $3.50 = $336.00 (three years)
$336 / 3 = $112.00 per year

40. A man pays $168.75 each year for fire and home insurance. The rate is $3 per $1,000 of insured value for a two-year period. If his house is worth $150,000, what percent of that value is covered by insurance?

A. **75 %** C. 85 %
B.7.5 % D. 25 %

$168.75 X 2 = $337.50
? X $3.00 = $337.50
337.50 / 3 = $112.50
$150,000 X ? = $112,500
112,500 / 150,000 = .75 = 75 %

41. A property was conveyed for $60,000. If the conveyance tax rate was $0.07 per $100 value, what was the conveyance tax paid by the seller?

A. $4.20 C. $420
B. **$42** D. $4,200

$600 X .07 = $42.00

42. A property conveyed for $110,000 was charged a conveyance tax of $38.50. What is the tax rate per $100?

A.$0.385 C. **$0.035**
B.$0.0385 D. $3.50

$1,100 X ? = $38.50
$38.50 / 1,100 =$.035

43. The taxes of $390 have been paid for the entire calendar year. The seller sells on October 1. What is the amount of the remaining prepaid portion?

A. $32.50 C. **$97.50**
B. $325 D. $292.50

Time period 3 months
(Oct, Nov, Dec)
$390.00 / 12 = $32.50 per month
$32.50 X 3 = $97.50

44. A house is sold on May 1. On January 1 of that year the three-year insurance was paid in an amount of $441 and semi-annual tax of $180 was paid. How much should be debited to buyer and credited to seller?

A.$392 C. $332
B.**$452** D. $422

Ins: $441 / 36 = $12.25 per month
$12.25 X 32 = $392.00
Taxes: $180 / 6 = $30
$30 X 2 = $60
$392 + $60 = $452.00

45. The taxes on a house for the fiscal year July 1 to June 30 are $900, to be paid in advance. If the house is sold February 15, what is the amount of the prepaid portion owed back to the seller?

A. $100 C. $562.50
B. $56.25 D. **$337.50**

$900.00 / 12 = $75 per month
$75 X 4.5 = $337.50

46. A house sold March 15. The taxes the first six months of the year are $195 and have not been paid. How much of this does the buyer pay?

A.$81.25 C. $195

B.**$113.75** D. $32.50

$195 / 6 = $32.50

$32.50 X 3.5 = $113.75

47. The seller has made the October 1payment on his mortgage at 8 3/4%, leaving a balance of $32,400. What is the amount of accrued interest as of the closing on October 20?

A. **$157.50** C. $86.62

B. $236.25 D. $83.40

$32,400 X .0875 = $2835.00

$2835 / 12 = $236.25 / 30

= $7.88 per day

$7.88 X 20 = $157.50

48. A property was sold April 15 and the three-year insurance premium of $426 was paid January 1 of the preceding year. How much does the buyer owe the seller?

A.$11.83 C. $24.26

B.$118.30 D. **$242.52**

$426 / 36 = $11.83 per month

$11.83 X 20.5 = $242.52

49. On January 1, taxes of $600 are paid for the year and $120 is paid on the semi-annual ground lease rent, both in advance. The house is sold April 10. How much is due the seller?

A. $433.50 C. $54.40
B. **$486.90** D. $380.10

Taxes: $600 / 12 = $50
8 2/3 X $50 = $433.50
Lease $120 / 6 = $20
2 2/3 X $20 = $53.40
$433.50 + $53.40 = $486.90

50. If 200 ft. of fence costs $900, what would 350 ft of fence cost?

A. **$1,575** C. $3,150
B. $1,800 D. $900

200 = 350 **900 X 350 = 200 X ?**
900 ? **900 X 350 = 315000**
(Use a ratio) **315000 / 200 = $1575**

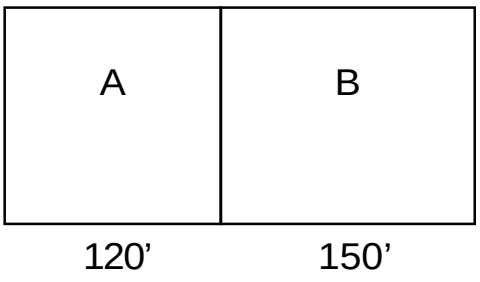
51. If a 9 by 12 ft. Rug costs $1,500, what would a 14 by 16 ft. Rug cost?

A. $2,240 C. $1,080
B. **$3,111.11** D. $2,962.12

9 X 12 = 108sf 14 X 16 = 224sf

108 = 224 $1500 X 224 = 108 X ?
1500 ? $1500 X 224 = $336,000
$336,000 = 108 X ?
$336,000 / 108 = $3111.11

52. Lots A and B have the same depth. Lot A is 1/4 acre. How many acres are lot B?



A. 31 C. **0.31**

B. 3.1 D. 0.031

120 = 150 150 X .25 = 120 X ?
.25 ? 37.5 / 120 = .31 acre

53. If 10 men take 8 hours to complete a job, how many hours would it take 15 men?

A.80 C.6.5

B.15 D.**5.33**

8 X 10 = 80 Man Hours

80 / 15 = 5.33 hours

54. If a salesperson claims to sell three out of every five prospects, how many sales would result from 120 prospects?

A. 120 C. 18

B. 36 D. **72**

$$\frac{3}{5} = \frac{?}{120}$$

3 X 120 = 5 X ?

360 + 5 X ?

360 / 5 = 72

55. In scale, if 2 in. Represents a length of 6 ft., what would represent a length of 20 ft.?

A. 6 in. C. 3 1/3 in.
B. **6 2/3 in.** D. 2 2/3 in.
C.

2 X 20 = 6 X ?
40 = 6 X ?
40 / 6 = 6 2/3

56. A back yard is drawn on a plan 6 1/2 by 3 in. If the scale is 1/2 in.=5 ft. And sod costs $15 per square yard, how much would it cost to sod this lawn?

A. $2,160 C. **$3,250**

B. $1,625 D. $6,500

Scale: 1/2" = 5' would be 1" = 10'

1 = 6.5 **1 = 3**
10 ? **10 ?**

1 X ? = 10 X 6.5 = 65 ft.

1 X ? = 3 X 10 = 30 ft

Yard = 30 X 65 = 1950sf

1950 / 9 = 216 2/3 sq yds

216 3 X $15 = $3250

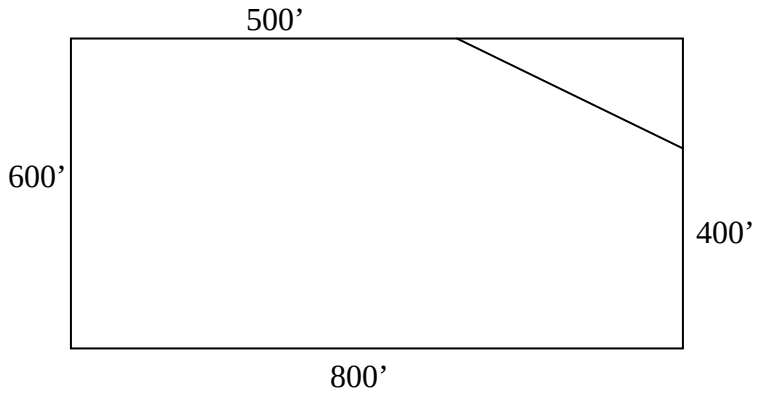
57. A lot is 70 by 120 ft. What fraction of an acre is this?

A. 1 / 4 C. 1/2
B. **1 / 5** D. 1/3

70 X 120 = 8400 sq ft
8400 / 43560 = .193 acres = 1/5

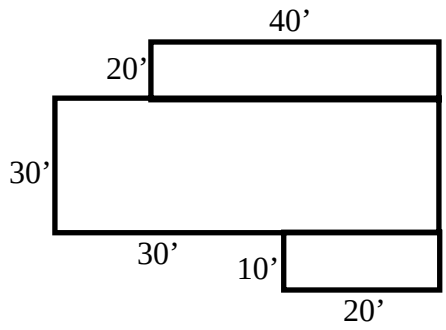
58. What is the cost of the lot in the following illustration if the cost is $2.50 per sq ft?

A. $4,500,000 C. **$1,125,000**
B. $2,500,000 D. $562,500



rectangle – triangle = Area
600 X 800 – 1/2 (300 X 200) = area
480,000-30,000 = 450,000
450,000 X $2.50 = $1,125,000

59. The house with the floor area shown below sells for $150,000. What is the cost per sq. ft.?



A = 40 X 20 = 800
B = 50 X 30= 1500
C = 10 X 20 = 200
2500 sf

$150,000 / 2500 sf = $60/SF

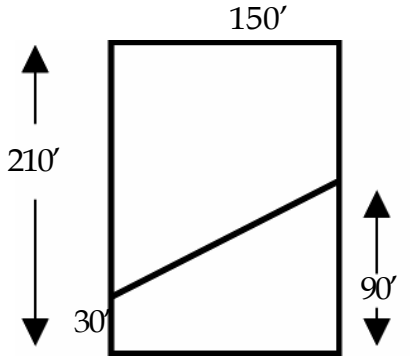
A.$250 C. **$60**
B.$120 D. $30

60. Compute the cost of ready-mixed concrete for a driveway of 70 ft. Long, 10 ft. Wide, 3 inches deep at a cost of $30 per cubic yard?

A. **$194.40** C. $44.80
B. $82.20 D. $54.80
C.

70’ X 10’ X .25’ (3” = .25’)= 175 cu ft
175 / 27 = 6.48 cu. yards
6.48 X $30 = $194.40

61. A man buys the lot shown below for $12,000. To make way for the freeway, the state condemns the bottom area. What would be the fair market value of the bottom portion, assuming a 10% increase in value?



C. $3,800 C. $9,000
D. $3,150 D. **$3,762**

Rectangle area
210 X 150 = 31,500 sf
Value =
$12,000 / 31,500 = $0.38 per

Shaded area 30 X 150 = 4500 sf plus
1/2 (60 X 1 50)= 4500 sf = 9000 sf
9000 X $0.38 = $3420 + 10% ($342) = $3762

62. A property is for sale at $120,000. If the cost of the land is $15,000 per acre and the lot is rectangular with a 500 ft. Frontage, what is the depth?

A.**696.9 ft**. C. 869.6 ft.
B.966.8 ft. D. 986.6 ft.

$120,000 / $15,000 = 8 acres
8 X 43560 = 348,480 sq ft
348,480 / 500 = 696.9 ft depth

63.The owner of an apartment house with eight apartments spends $1,000 on improvements. How much should she increase each rent to recoup this expense in six months?

A. $125 C. $12.50
B. **$20.83** D. $38.20

$1000 / 8 = $125 per apartment
$125 / 6 = $20.83

64.A man buys a parcel of land for $1 million, then subdivides it into eight lots to sell for $150,000 each. What percentage of return on the money is this?

A.2% C. 40%
B.**20%** D. 4%

8 X $150,000 = $1,200,000
$1,200,000 - $1,000,000 = $200,000 increase
$1,000,000 X ? = $200,000
200,000 / 1,000,000 = .20 = 20% return

65. A woman has six apartments that she rents for $500 per month including utilities. If the utilities average $450 total per month, what would be the rent without utilities?

A.$75 C. $85
B.**$425** D. $415

$450 / 6 = $75 per apartment
$500 - $75 =
$425 per month w/o utilities

66. A building with a net income of $10,000 was appraised at $100,000. What would be the value if the capitalization rate has decreased by one percentage point?

A. $100, 000 C. **$111,111**
B. $90,909 D. $105,263

$10,000 / $100,000 = .10 (10%Cap Rate)

$10,000 / .09 (9%) = $111,111

IRV Formula **I= R X V**
I / V = R
I / R = V

67. A salesperson is offered a straight salary of $2,000 per month or 40% of a 6% total commission. How much in monthly sales would make the two offers equal?

A. **$83,333** C. $124,600
B. $50,000 D. $166,666

40% of 6% = .0240
? X .0240 = $2000
$2000 / .0240 = $83,333.33

68.A salesperson gets $500 per month plus a 40% of the 6% commission on sales. If he wants to earn $1 ,200 this month, how much must his sales be?

A. $50,000 C. $20,833
B . **$29,167** D . $100,000

$700 Commission
40% of 6% = .0240
? X .0240 = $700
$700 / .0240 = $29,166.67

69. A house appreciates each year by 10%. This is equivalent to what percent for five years?

A. 50%
C. 71 %
B. **61%**
D. 81%

P(1.1) X (1.1) X (1.1) X (1.1) X (1.1) = P(1.61) = 61%

70. Acme Savings and Loan Association suggests the buyer can buy a home valued at 3 1/2 times his yearly income. What should his minimum weekly salary be to buy a home worth $120,000

A. $596.34
C. **$659.34**
B. $695.34
D. $634.59

$120,000 / 3.5 = $34,285.71 annual salary
$34,285.71 / 52 = $659.34 per week

71. On a quarter-acre of land, approximately what percentage is occupied by a 2,500 sq. ft. house?

A. 43%
C. **23%**
B. 34%
D. 32%

43,560 / 4 = 10,890
2500 / 10,890 = .229 = 23 %

72. A 1/4-acre plot costs $5 per square foot. A house that is 60' by 40' will cost $30 per square foot. What is the total cost?
A. $87,120 C. $130,680
B. **$126,450** D. $174,240

43,560 / 4 = 10,890 X $5.00 = $54,450
60' X 40' = 2400 sf X $30 = $72,000
Total Cost: 72,000 + 54,450 = $126,450

73. The gross income on a property is $7,920. If this is a 6% return on cost, what is the cost?
A. $47,520 C**. $132,000**
B. $74,448 D. $83,952

? X .06 = $7920
$7920 / .06 = $132,000

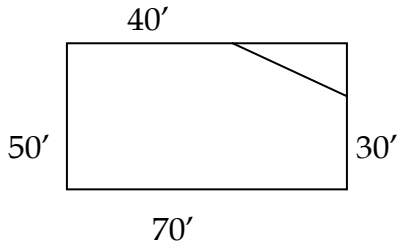
74. On a 30-year mortgage in the sum of $110,000 at 11 %, the monthly payment is $1,047.56. On the first payment, how much is applied to reduce the principal?
A. $1,008.33 C. **$39.23**
B. $1,100 D. $3.92

$110,000 X .11 = $12,100 int/yr
$12,100 / 12 = $1008.33 int/mo
$1047.56 - $1008.33 = $39.23

75.If the price of a house rises 10% the first year and 12% the second year, what is the percentage rise over the two years?
A. 22% C. 120%
B.13.2% D. **23.2%**

1st yr 100 + (.10 X 100)= 110
2nd yr 110 + (.12 X 110) =
123.2 – 100 = 23.2%

76.Find the cost of the lot below at $100 per square yard?
A. **$35,556** C. $106,667
B. $32,000 D. $28,800



70 X 50 – 1/2 (20 X 30) =
3500 sf – 300 sf = 3200 sf
3200 / 9 = 355.56 sq yd
355.56 X $100 = $35,556

77. A 35 by 40 ft. House is on a 1/3-acre of land. What percentage is not taken up by the house?
A. 14% C. **90%**
B. 10% D. 86%

43,560 / 3 = 14,520
35 x 40 = 1400 sf
1400 / 14,520 = .096
= 10 % house; 90 % yard

78. A house originally cost $35,000 to build and the lot was $20,000. Lot prices have increased by 300% and building costs have doubled. What percent did the entire property appreciate?

A.**136%** C. 73%
B.36% D. 500%

$35,000 X 2 = $70,000
$20,000 X 300% = $60,000
$55,000 $130,000

$130000 - $55000 = $75,000
$75000 / $55000 = 1.36 = 136%

79. A man owns a house with a $32,000 mortgage and his payment is $260 per month. He rents the house for $600 per month, paying 10% to a broker and saving $75 per month for repairs. The annual profit he makes is what percent of his equity if the house would net $68,000 if he were to sell?

A. 13% C. 36%
B.1.3% D. 3.6%

600 – 260 = 340; 340 – 60 = 280
280 – 75 = $205
($205 X 12)=$2460
$2460 / $68,000 = .03617 =3.6%

80. A house worth $90,000 is rented for a net profit of $400 per month. How much money invested at 12% would give the same net profit?

A. **$40,000** C. $45, 000
B. $80,000 D. $90,000

$400 X 12 = $4800
$4800 / .12 = $40,000

81. The mortgage payment on a house is $336 per month. How much money would have to be invested at 12.5% per annum to pay the monthly mortgage payment?

A. $33,562 C. **$32,256**
B. $33,600 D. $25,326

$336 X 12 = $4032
$4032 / .125 = $32,256

82. The building on a 150 by 220 ft. Lot covers 30% of the lot. How many square feet are not covered by buildings?

A. 33,000 C. 10,900
B**. 23,100** D. 7,000

150’ X 220’ = 33,000 sf
33,000 X .70 = 23,100 sf

83. A buyer applies at a bank for a loan to purchase a $60,000 home. The bank requires an 18% down payment on the first $30,000 and a 14% down payment on the remaining $30,000. What will be the bank's loan fee if they charge 4 points on the balance?

A. $3,018 C. $2,184
B. $2,400 D. **$2,016**

30,000 X .18 = 5400 30,000 X .14 = 4200
60,000 – (5400 + 4200) = 50,400
50,400 X .04 = $2016

- 84. George earns $22,500 per year as carpenter, and his wife, Sally, is a secretary earning $15,000. They are selling their present home for $70,000 and will receive their equity of $35,000 at closing. They contact a lender who uses a 2.5-times rule of thumb. The most expensive home they would be capable of purchasing would be:

A. $89,750 C. $75,000
B. $93,750 D. **$128,750**

$37,500 X 2.5 = $93,750
$93,750 + $35,000 = $128,750

85. A buyer contracts to purchase a $75,000 home and puts up a good faith deposit of $1,500. The commission is 6.5 percent paid by seller. The buyer gets a $260 credit for real property taxes paid in arrears. If buyer obtains an 80 percent conventional loan at 12 percent interest with three points, how much should he bring to the closing?

A. $15, 040 C. $15,300
B. $19,915 D. $16,540

$1500 + $260 = $1760 buyer credit
$75,000 X .80 = $60,000 loan
$60,000 X.03 = $1800 points
$75,000 X .20 = $15,000 down pmt

$15,000 – $1760 + $1800 = $15,040

Answer Sheet

	A	B	C	D		A	B	C	D		A	B	C	D
1.	❒	❒	❒	❒	29.	❒	❒	❒	❒	57.	❒	❒	❒	❒
2.	❒	❒	❒	❒	30.	❒	❒	❒	❒	58.	❒	❒	❒	❒
3.	❒	❒	❒	❒	31.	❒	❒	❒	❒	59.	❒	❒	❒	❒
4.	❒	❒	❒	❒	32.	❒	❒	❒	❒	60.	❒	❒	❒	❒
5.	❒	❒	❒	❒	33.	❒	❒	❒	❒	61.	❒	❒	❒	❒
6.	❒	❒	❒	❒	34.	❒	❒	❒	❒	62.	❒	❒	❒	❒
7.	❒	❒	❒	❒	35.	❒	❒	❒	❒	63.	❒	❒	❒	❒
8.	❒	❒	❒	❒	36.	❒	❒	❒	❒	64.	❒	❒	❒	❒
9.	❒	❒	❒	❒	37.	❒	❒	❒	❒	65.	❒	❒	❒	❒
10.	❒	❒	❒	❒	38.	❒	❒	❒	❒	66.	❒	❒	❒	❒
11.	❒	❒	❒	❒	39.	❒	❒	❒	❒	67.	❒	❒	❒	❒
12.	❒	❒	❒	❒	40.	❒	❒	❒	❒	68.	❒	❒	❒	❒
13.	❒	❒	❒	❒	41.	❒	❒	❒	❒	69.	❒	❒	❒	❒
14.	❒	❒	❒	❒	42.	❒	❒	❒	❒	70.	❒	❒	❒	❒
15.	❒	❒	❒	❒	43.	❒	❒	❒	❒	71.	❒	❒	❒	❒
16.	❒	❒	❒	❒	44.	❒	❒	❒	❒	72.	❒	❒	❒	❒
17.	❒	❒	❒	❒	45.	❒	❒	❒	❒	73.	❒	❒	❒	❒
18.	❒	❒	❒	❒	46.	❒	❒	❒	❒	74.	❒	❒	❒	❒
19.	❒	❒	❒	❒	47.	❒	❒	❒	❒	75.	❒	❒	❒	❒
20.	❒	❒	❒	❒	48.	❒	❒	❒	❒	76.	❒	❒	❒	❒
21.	❒	❒	❒	❒	49.	❒	❒	❒	❒	77.	❒	❒	❒	❒
22.	❒	❒	❒	❒	50.	❒	❒	❒	❒	78.	❒	❒	❒	❒
23.	❒	❒	❒	❒	51.	❒	❒	❒	❒	79.	❒	❒	❒	❒
24.	❒	❒	❒	❒	52.	❒	❒	❒	❒	80.	❒	❒	❒	❒
25.	❒	❒	❒	❒	53.	❒	❒	❒	❒	81.	❒	❒	❒	❒
26.	❒	❒	❒	❒	54.	❒	❒	❒	❒	82.	❒	❒	❒	❒
27.	❒	❒	❒	❒	55.	❒	❒	❒	❒	83.	❒	❒	❒	❒
28.	❒	❒	❒	❒	56.	❒	❒	❒	❒	84.	❒	❒	❒	❒
										85.	❒	❒	❒	❒