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RESEARCH ARTICLE

A COMPARATIVE FINANCIAL MODELING TO EVALUATE A REAL STATE PROPERTY WITH MORTGAGE LOAN VERSUS INVESTMENT FUNDS

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ABSTRACT

The aim of this paper is to show through a mathematical hypothetical scenario, the behavior of a mortgage loan, since the operation value and the real state property value. For this, the interest rate (*i*) the capitalization rate (*m*) and the lifetime of the loan (*n*) is set, all in a comparison conversely, where the value of each annuity now become a mutual fund that runs from zero time to time *n*, with the same interest rate, capitalization and time. Both results are compared each one with the actual value of the property, considering both the term of the mortgage, as the conclusion of the investment fund and at the end benefits are valued.

Key words: mortgage loan, net present value, future value, properties

2000 AMS Subject classification: 62P, 62P05, 97M, 97M30.

1. INTRODUCTION

To talk about mortgage loan in the Mexican context remind us the economic crises that have affected the country, remembering among others, the economic crisis at 1995. However, banking regulation in Mexico has significantly reduced the risk of mortgage loans and these have become a recurring source of financing to purchase a property.. The purpose of this essay is to evaluate, the mortgage loan granted to purchase a real state property. Data was provided by a financial institution and the period considered is from 2006 to 2015.

The purpose of comparing the cash flow corresponding to the amortization of mortgage loan, as well as the cash flow generated by the opening of an investment fund, is focuses on identifying if similar benefits could be obtained in both schemes.

In the cash flow generated by the amortization, each payment is determined and it is composed by the interest payments corresponding to the period and to amortization of capital. To compare the amount of each amortization is considered to make a series of deposits in an investment fund, in the modality of annuities. It is also important the real estate property value, at the date when the debt was incurred. Thus, the new value of the property shall be determined, i.e., it is valued at the present time.

Moreover, with the amount in the investment fund and the value of the property corresponding to the market price at the present time, the comparison is performed. Of course, the purchasing power is determined from the saved amount. Finally both financial schemes will be analyzed to identify the benefits offered by each of these schemes.

2. LITERATURE REVIEW

This study is trying to analyze the real state properties acquired through a mortgage loan or through an investment fund, and it is based on a work carried out by Guerra de Luna (1997), which addresses the subject of macroeconomic significance of real estate in Mexico. Real state corresponds to the wealth of the people and if we talk about a country, to the national wealth as well, because they are key actors which influence in the economy of Mexico.

We remember the financial crisis occurred in 2008 in the United States attributed to the mortgage sector. This economic phenomena had serious repercussions to Mexico, example of these repercussions were: decrease exports, a decrease in foreign exchange inflows, the depreciation of exchange rate, increase of inflation rate and the loss of value of real estate assets (Cuevas, 2013).

Changes in the value of real state are due to cyclical behaviors, which are important causes that determine movements in the price of ¿properties? Important causes of this drop in prices are the financial crisis, which may cause problems of nonperforming loans when a property is acquired through a mortgage loan (Guerra de Luna, 2007).

At present, Mexico has more stability in the real estate field, which makes it possible to generate: more housing construction; increased extending mortgage loans and decrease in the interest rates, leading to higher demand in the request for mortgage loans (Bancomer Research, 2014).

2.1. Development hypothetical case

Following the procedure which states Garcia-Santillán (2014), about the methodology to calculate the value of an annuity, we must remember that in the field of bank loans for the acquisition of real property, we must necessarily calculate the amount of amortization or pay periodical. This payment is derived from the debt incurred on the mortgage loan; hence, to calculate a priori the amount of regular installments, we should use the present value formula of an overdue payment (*Rp*) from the following formula:

$$NPV = Rp\frac{1-(1+i/m)^{-n/m}}{i/m} \quad (1)$$

Hence, to know the value of *Rp*, the value of debt goes to the factor obtained by dividing

$$\frac{1-(1+i/m)^{-n/m}}{i/m} \quad (1.1.)$$

Therefore, mathematical expression now becomes:

$$Rp = \frac{NPV}{\frac{1-(1+i/m)^{-n/m}}{i/m}} \quad (1.2.)$$

By substituting the data, we consider the case of a person acquiring a real estate property in August 1, 2006. The value of the operation and the debt are $463,500.00, which shall be paid in 180 equal payments overdue, considering a nominal interest rate of 11.75% compounded monthly.

From the formula:

$$NPV = Rp\frac{1-(1+i/m)^{-n/m}}{i/m} \qquad (1)$$

Where:

NPV = Net present value of debt
Rp= periodical payment
i = interest rate
m = capitalization (compounded)
-n= time (number of payment)*Year = 360 days (360*15=5,400)*

By substituting in (1.2.)

$$Rp = \frac{\$463,500.00}{\frac{1-(1+\left[\frac{.1175}{360}*30\right])^{-(5400/30)}}{\left[\frac{.1175}{360}*30\right]}} = Rp = \frac{\$463,500.00}{\frac{1-(1.00979166)^{-(5400/30)}}{.00979166}} = Rp = \frac{\$463,500.00}{\frac{1-(1.00979166)^{-(180)}}{.00979166}}$$

$$Rp = \frac{\$463,500.00}{\frac{1-(.17309307)}{.00979166}} = Rp = \frac{\$463,500.00}{\frac{.82690693}{.00979166}} = Rp = \frac{\$463,500.00}{84.45012694} = \$5,488.45 \qquad (1.2.1.)$$

Data: Value of operation, interest rate, time, amount of payment (annuity)

Presentvalue	$463,500.00
Monthlyinterestrate	0.98%
n=	180
Annuity overdue	$5,488.45

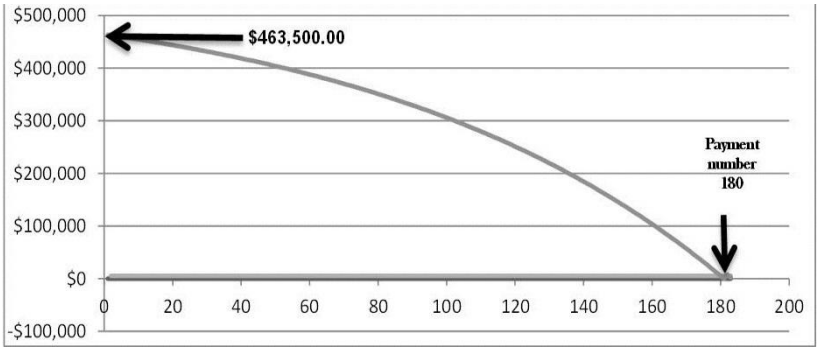
Behavior of the amortization schedule

Table 1. Amortization table (annuity overdue)

Deposit	Annuity	Interest payments	Capital	Balance owed
0				**$463,500.00**
1	$5,488.45	$4,538.44	$950.01	$462,549.99
2	5,488.45	4,529.14	959.31	461,590.68
3	5,488.45	4,519.74	968.71	460,621.97
4	5,488.45	4,510.26	978.19	459,643.78
5	5,488.45	4,500.68	987.77	***458,656.01***
…	…	…	…	…
175	5,488.45	311.68	5,176.77	26,654.19
176	5,488.45	260.99	5,227.46	21,426.73
177	5,488.45	209.80	5,278.65	16,148.09
178	5,488.45	158.12	5,330.33	10,817.75
179	5,488.45	105.92	5,382.53	5,435.23
180	5,488.45	53.22	5,435.23	**0.00**

Source: own

In graph 1, we can see how schedule amortization goes to the end, until to arrive to the balance $00.00 in the year 15 (n)



Graph 1. Amortization of debt (source: own)

In the graphic we may observe from start to end, the behavior of the debt i.e. since mortgage loan is contracted whose amount is $ 463,500.00 with equal payments of $5,488.45, until the month number 180 (in year fifteen).

As additional information, if we want to know the balance due at a certain time, it has developed a formula to calculate such amount; hence, following the methodology proposed by García-Santillán (2014) as an example, we calculate the balance until July 2015.

The formula is:

$$S_{do}I = NPV(1+\frac{i}{m})^{n} - Rp\frac{(1+\frac{i}{m})^{n}-1}{i/m} \quad (1.3)$$

Where:

NPV = Net present value of debt
Rp= periodical payment
i = interest rate
m = capitalization (compounded)
n= time (number of payment)
$S_{do}I$ = balance due

To corroborate, we have to calculate the balance due until July 2015. From August 1st, 2006 to August 1st, 2014 that is equal to 96 months. From August 1, 2014 to July 1, 2015 are 11 months, giving a total of 107 months

$$S_{do}I = \$463,500.00(1+\frac{.1175}{12})^{107} - \$5,488.45\frac{(1+\frac{.1175}{12})^{107}-1}{.1175/12} \quad (1.3.1)$$

$$S_{do}I = \$463,500.00(1+0.00979167)^{107} - \$5,488.45\frac{(1+0.00979167)^{107}-1}{0.00979167}$$

$$S_{do}I = \$463,500.00(2.83661806) - \$5,488.45(187.5694408)$$

$$S_{do}I = \$1'314,772.471 - \$1'029,465.497$$

$$S_{do}I = \$285,306.9738$$

According to schedule amortization, the balance is:

Month	Payment	Interest payment	Payment to capital	Balance owed
107	$5,488.45	$2,819.76	$2,668.69	$285,306.94
			According formula	$285,306.97
			difference	0.03

Until July of 2015, the balance is $ 285,306.94 (see table 1 in the annexes).

With the same data, now we calculate an investment scheme, with deposits of $5,488.45 with nominal interest rate 11.75% (0.98% monthly), to fifteen years (180 monthly deposits), the outcomes is as follow:

Annuity	$5,488.45
i=	0.98%
n=	180.00
Future amount=	$2,680,286.61

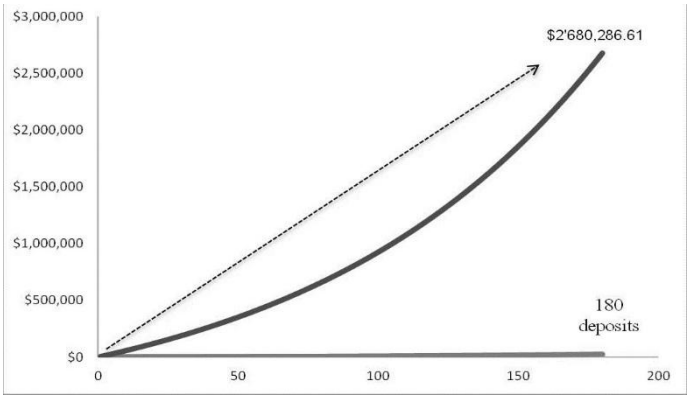
Behavior of the investment scheme

Table 2. Investment scheme

Deposit	Annuity	Interest earned	Balance
1	$5,488.45		$5,488.45
2	5,488.45	53.79	11,030.69
3	5,488.45	108.10	16,627.24
4	5,488.45	162.95	22,278.63
5	5,488.45	218.33	27,985.42
…	…	…	…
175	5,488.45	24,462.01	2,526,073.66
176	5,488.45	24,755.52	2,556,317.63
177	5,488.45	25,051.91	2,586,857.99
178	5,488.45	25,351.21	2,617,697.65
179	5,488.45	25,653.44	2,648,839.54
180	5,488.45	25,958.63	**2,680,286.61**

Source: own

In the graphic 2, we may see how investment start in zero, i.e. with the first deposit of $5,488.45 we constitute an investment scheme, which run from the moment 1 to 180, considering that are 180 deposits (15 years=180 equal deposits monthly), which are reinvestment.



Graph 2. Investment scheme

RESULTS

The main findings are focused on the following points:

The first step was to analyze the purchase of the real estate property in 2006, whose value of mortgage loans was $463,500.00 to 15 years. The amount of each payment to be made for 180 months corresponding to the 15 years of the mortgage loan was calculated, the amount of each payment was $ 5,488.45

Subsequently an investment scheme was designed, considering the same amount of $5,488.45, which is paid monthly in the amortization of the credit, but now as a deposit in the

investment scheme. In both schemes, the focal date for analysis is focused to July 1st, 2015, equivalent to 107 months.

The results were:

The repayment plan to pay the mortgage loan, to July 2015, still an outstanding balance of $285,306.94 is owed. It has paid a total amount of $581,775.58 of which the amount of $406,251.20 corresponded to accrued interest paid and the remaining amount of $175,524.38 corresponded to payment of capital.

In the focal date of July 2015, from the amount of $ 463,500.00 only was paid $175,524.38 which gives a difference in this time of $287,975.62

Updated the value of the real property acquired with mortgage loans in 2006, on the date of July 2015, the property has an estimated value of $ 800,000.00 according to the Book of AMPI, which corresponds to the Mexican Association of Real Estate.

With regard to the investment fund and taking as a focal dated July 2015 (107 months), it is possible to obtain a saving of $ 1'029,993.30, which shows that can purchase a real estate property with the same value estimated by AMPI.

Conclusions

It is common to see that the real estate market frequently is affected by the economic and financial crises. Additional to this, the low purchasing power of most people in Mexico makes difficult to get a property that is why people need to find a scheme of mortgage credit, which is granted by a financial institution.

Into the scheme of amortization for a mortgage loan at any institutions of the Mexican financial system, first, interest is paid, that is, a large percentage of the monthly payment is to pay interest and the remaining amount is to pay capital. This behavior usually occurs across the early years of the loan. As an example we can see the table.

Deposit number	Annuity	Interest payments	Capital	Balance
0				463,500.00
1	5,488.45	4,538.44	950.01	462,549.99
2	5,488.45	4,529.14	959.31	461,590.68
3	5,488.45	4,519.74	968.71	460,621.97
4	5,488.45	4,510.26	978.19	459,643.78
5	5,488.45	4,500.68	987.77	*458,656.01*

As we can see the greater percentage of each payment is used to pay overdue interest.

From month 106 until the end, interest decreases and the large percentage of payment is to capital, i.e (see next table).

Deposit number	Annuity	Interest payments	Capital	Balance
…	…	…	…	…
109	5,488.45	2,767.24	2,721.21	279,890.91
110	5,488.45	2,740.60	2,747.85	277,143.06
111	5,488.45	2,713.69	2,774.76	274,368.31
112	5,488.45	2,686.52	2,801.93	271,566.38
113	5,488.45	2,659.09	2,829.36	268,737.02
…	…	…	...	…
176	5,488.45	260.99	5,227.46	21,426.73
177	5,488.45	209.80	5,278.65	16,148.09
178	5,488.45	158.12	5,330.33	10,817.75
179	5,488.45	105.92	5,382.53	5,435.23
180	5,488.45	53.22	5,435.23	0.00

To acquire a property through mortgage loan, perhaps covers a basic need for housing of people. However, if we look for speculate or perhaps want to get profit on the value of the property at the same time that the loan is paid, this could not be possible.

This limiting about property value is due to the debt amortization. The customer pays a high interest for credit, which impacts on payments, and makes these payments are increased for including the interests plus borrowed capital. Thus, debtors pay up twice the value of the loan; however, the value of the property does not increase in the same proportion their value.

In contrast to the investment fund where the savings accumulated over a certain time, makes possible acquire a property with greater value. However, the limitation of this kind of purchase is, it has to be passed some time, perhaps years, after having saved up enough.

Finally we can say that both schemes for acquiring a real estate property should be used depending on the situation of the person. Mortgage loan is more suitable for people who wish to acquire a property at the moment. Another exception is that they have not the financial capacity to buy it with cash.

The savings fund schemes recommended to those people who have the ability to save part of their income over time, which will allow them to acquire a property with more added value that if they had bought on credit. All this, as part of a knowledge in the financial field as Moreno, García-Santillán and Munguía (2013) say.

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Appendix

Table 1. Amortization table

Deposit number	Annuity	Interest payments	Capital	Balance
0				**463,500.00**
1	5,488.45	4,538.44	950.01	462,549.99
2	5,488.45	4,529.14	959.31	461,590.68
3	5,488.45	4,519.74	968.71	460,621.97
4	5,488.45	4,510.26	978.19	459,643.78
5	5,488.45	4,500.68	987.77	***458,656.01***

Table 2. Investment scheme

Deposit number	Annuity	Interest earned	Balance
1	$5,488.45	$0.00	$5,488.45
2	5,488.45	53.79	11,030.69
3	5,488.45	108.10	16,627.24
4	5,488.45	162.95	22,278.63
5	5,488.45	218.33	27,985.42
6	5,488.45	274.26	33,748.12

6	5,488.45	4,491.01	997.44	457,658.56
7	5,488.45	4,481.24	1,007.21	456,651.36
8	5,488.45	4,471.38	1,017.07	455,634.28
9	5,488.45	4,461.42	1,027.03	454,607.25
10	5,488.45	4,451.36	1,037.09	453,570.17
11	5,488.45	4,441.21	1,047.24	452,522.93
12	5,488.45	4,430.95	1,057.50	451,465.43
13	5,488.45	4,420.60	1,067.85	450,397.58
14	5,488.45	4,410.14	1,078.31	449,319.28
15	5,488.45	4,399.58	1,088.86	448,230.41
16	5,488.45	4,388.92	1,099.53	447,130.89
17	5,488.45	4,378.16	1,110.29	446,020.59
18	5,488.45	4,367.28	1,121.16	444,899.43
19	5,488.45	4,356.31	1,132.14	443,767.29
20	5,488.45	4,345.22	1,143.23	442,624.06
21	5,488.45	4,334.03	1,154.42	441,469.64
22	5,488.45	4,322.72	1,165.73	440,303.91
23	5,488.45	4,311.31	1,177.14	439,126.77
24	5,488.45	4,299.78	1,188.67	437,938.11
25	5,488.45	4,288.14	1,200.30	436,737.80
26	5,488.45	4,276.39	1,212.06	435,525.74
27	5,488.45	4,264.52	1,223.93	434,301.82
28	5,488.45	4,252.54	1,235.91	433,065.91
29	5,488.45	4,240.44	1,248.01	431,817.90
30	5,488.45	4,228.22	1,260.23	430,557.66
31	5,488.45	4,215.88	1,272.57	429,285.09
32	5,488.45	4,203.42	1,285.03	428,000.06
33	5,488.45	4,190.83	1,297.61	426,702.45
34	5,488.45	4,178.13	1,310.32	425,392.13
35	5,488.45	4,165.30	1,323.15	424,068.97
36	5,488.45	4,152.34	1,336.11	422,732.87
37	5,488.45	4,139.26	1,349.19	421,383.68
38	5,488.45	4,126.05	1,362.40	420,021.28
39	5,488.45	4,112.71	1,375.74	418,645.54
40	5,488.45	4,099.24	1,389.21	417,256.33
41	5,488.45	4,085.63	1,402.81	415,853.51
42	5,488.45	4,071.90	1,416.55	414,436.96
43	5,488.45	4,058.03	1,430.42	413,006.54
44	5,488.45	4,044.02	1,444.43	411,562.12
45	5,488.45	4,029.88	1,458.57	410,103.55
46	5,488.45	4,015.60	1,472.85	408,630.69
47	5,488.45	4,001.18	1,487.27	407,143.42
48	5,488.45	3,986.61	1,501.84	405,641.58
49	5,488.45	3,971.91	1,516.54	404,125.04
50	5,488.45	3,957.06	1,531.39	402,593.65
51	5,488.45	3,942.06	1,546.39	401,047.27
52	5,488.45	3,926.92	1,561.53	399,485.74
53	5,488.45	3,911.63	1,576.82	397,908.92
54	5,488.45	3,896.19	1,592.26	396,316.66
55	5,488.45	3,880.60	1,607.85	394,708.81
56	5,488.45	3,864.86	1,623.59	393,085.22
57	5,488.45	3,848.96	1,639.49	391,445.73
58	5,488.45	3,832.91	1,655.54	389,790.19
59	5,488.45	3,816.70	1,671.75	388,118.44
60	5,488.45	3,800.33	1,688.12	386,430.31
61	5,488.45	3,783.80	1,704.65	384,725.66
62	5,488.45	3,767.11	1,721.34	383,004.32
63	5,488.45	3,750.25	1,738.20	381,266.12
64	5,488.45	3,733.23	1,755.22	379,510.90
65	5,488.45	3,716.04	1,772.40	377,738.50
66	5,488.45	3,698.69	1,789.76	375,948.74
67	5,488.45	3,681.16	1,807.28	374,141.45
68	5,488.45	3,663.47	1,824.98	372,316.47
69	5,488.45	3,645.60	1,842.85	370,473.62
70	5,488.45	3,627.55	1,860.89	368,612.73
71	5,488.45	3,609.33	1,879.12	366,733.61
72	5,488.45	3,590.93	1,897.52	364,836.10
73	5,488.45	3,572.35	1,916.10	362,920.00
74	5,488.45	3,553.59	1,934.86	360,985.15

7	5,488.45	330.73	39,567.30
8	5,488.45	387.76	45,443.51
9	5,488.45	445.35	51,377.31
10	5,488.45	503.50	57,369.26
11	5,488.45	562.22	63,419.93
12	5,488.45	621.52	69,529.89
13	5,488.45	681.39	75,699.73
14	5,488.45	741.86	81,930.04
15	5,488.45	802.91	88,221.41
16	5,488.45	864.57	94,574.43
17	5,488.45	926.83	100,989.71
18	5,488.45	989.70	107,467.85
19	5,488.45	1,053.18	114,009.49
20	5,488.45	1,117.29	120,615.23
21	5,488.45	1,182.03	127,285.71
22	5,488.45	1,247.40	134,021.56
23	5,488.45	1,313.41	140,823.42
24	5,488.45	1,380.07	147,691.94
25	5,488.45	1,447.38	154,627.77
26	5,488.45	1,515.35	161,631.58
27	5,488.45	1,583.99	168,704.02
28	5,488.45	1,653.30	175,845.76
29	5,488.45	1,723.29	183,057.50
30	5,488.45	1,793.96	190,339.92
31	5,488.45	1,865.33	197,693.70
32	5,488.45	1,937.40	205,119.55
33	5,488.45	2,010.17	212,618.17
34	5,488.45	2,083.66	220,190.28
35	5,488.45	2,157.86	227,836.59
36	5,488.45	2,232.80	235,557.84
37	5,488.45	2,308.47	243,354.76
38	5,488.45	2,384.88	251,228.08
39	5,488.45	2,462.04	259,178.57
40	5,488.45	2,539.95	267,206.97
41	5,488.45	2,618.63	275,314.05
42	5,488.45	2,698.08	283,500.57
43	5,488.45	2,778.31	291,767.33
44	5,488.45	2,859.32	300,115.10
45	5,488.45	2,941.13	308,544.68
46	5,488.45	3,023.74	317,056.86
47	5,488.45	3,107.16	325,652.47
48	5,488.45	3,191.39	334,332.32
49	5,488.45	3,276.46	343,097.22
50	5,488.45	3,362.35	351,948.03
51	5,488.45	3,449.09	360,885.57
52	5,488.45	3,536.68	369,910.69
53	5,488.45	3,625.12	379,024.27
54	5,488.45	3,714.44	388,227.16
55	5,488.45	3,804.63	397,520.23
56	5,488.45	3,895.70	406,904.38
57	5,488.45	3,987.66	416,380.49
58	5,488.45	4,080.53	425,949.47
59	5,488.45	4,174.30	435,612.23
60	5,488.45	4,269.00	445,369.68
61	5,488.45	4,364.62	455,222.75
62	5,488.45	4,461.18	465,172.38
63	5,488.45	4,558.69	475,219.52
64	5,488.45	4,657.15	485,365.12
65	5,488.45	4,756.58	495,610.15
66	5,488.45	4,856.98	505,955.58
67	5,488.45	4,958.36	516,402.40
68	5,488.45	5,060.74	526,951.59
69	5,488.45	5,164.13	537,604.17
70	5,488.45	5,268.52	548,361.14
71	5,488.45	5,373.94	559,223.53
72	5,488.45	5,480.39	570,192.37
73	5,488.45	5,587.89	581,268.70
74	5,488.45	5,696.43	592,453.59
75	5,488.45	5,806.05	603,748.08

75	5,488.45	3,534.65	1,953.80	359,031.34
76	5,488.45	3,515.52	1,972.93	357,058.41
77	5,488.45	3,496.20	1,992.25	355,066.16
78	5,488.45	3,476.69	2,011.76	353,054.40
79	5,488.45	3,456.99	2,031.46	351,022.94
80	5,488.45	3,437.10	2,051.35	348,971.59
81	5,488.45	3,417.01	2,071.44	346,900.16
82	5,488.45	3,396.73	2,091.72	344,808.44
83	5,488.45	3,376.25	2,112.20	342,696.24
84	5,488.45	3,355.57	2,132.88	340,563.36
85	5,488.45	3,334.68	2,153.77	338,409.59
86	5,488.45	3,313.59	2,174.85	336,234.74
87	5,488.45	3,292.30	2,196.15	334,038.58
88	5,488.45	3,270.79	2,217.65	331,820.93
89	5,488.45	3,249.08	2,239.37	329,581.56
90	5,488.45	3,227.15	2,261.30	327,320.27
91	5,488.45	3,205.01	2,283.44	325,036.83
92	5,488.45	3,182.65	2,305.80	322,731.03
93	5,488.45	3,160.07	2,328.37	320,402.66
94	5,488.45	3,137.28	2,351.17	318,051.48
95	5,488.45	3,114.25	2,374.19	315,677.29
96	5,488.45	3,091.01	2,397.44	313,279.85
97	5,488.45	3,067.53	2,420.92	310,858.93
98	5,488.45	3,043.83	2,444.62	308,414.31
99	5,488.45	3,019.89	2,468.56	305,945.75
100	5,488.45	2,995.72	2,492.73	303,453.02
101	5,488.45	2,971.31	2,517.14	300,935.88
102	5,488.45	2,946.66	2,541.79	298,394.10
103	5,488.45	2,921.78	2,566.67	295,827.42
104	5,488.45	2,896.64	2,591.81	293,235.62
105	5,488.45	2,871.27	2,617.18	290,618.43
106	5,488.45	2,845.64	2,642.81	287,975.62
107	5,488.45	2,819.76	2,668.69	**285,306.94**
108	5,488.45	2,793.63	2,694.82	282,612.12
109	5,488.45	2,767.24	2,721.21	279,890.91
110	5,488.45	2,740.60	2,747.85	277,143.06
111	5,488.45	2,713.69	2,774.76	274,368.31
112	5,488.45	2,686.52	2,801.93	271,566.38
113	5,488.45	2,659.09	2,829.36	268,737.02
114	5,488.45	2,631.38	2,857.07	265,879.95
115	5,488.45	2,603.41	2,885.04	262,994.91
116	5,488.45	2,575.16	2,913.29	260,081.62
117	5,488.45	2,546.63	2,941.82	257,139.81
118	5,488.45	2,517.83	2,970.62	254,169.18
119	5,488.45	2,488.74	2,999.71	251,169.48
120	5,488.45	2,459.37	3,029.08	248,140.39
121	5,488.45	2,429.71	3,058.74	245,081.65
122	5,488.45	2,399.76	3,088.69	241,992.96
123	5,488.45	2,369.51	3,118.93	238,874.03
124	5,488.45	2,338.97	3,149.47	235,724.55
125	5,488.45	2,308.14	3,180.31	232,544.24
126	5,488.45	2,277.00	3,211.45	229,332.79
127	5,488.45	2,245.55	3,242.90	226,089.89
128	5,488.45	2,213.80	3,274.65	222,815.24
129	5,488.45	2,181.73	3,306.72	219,508.52
130	5,488.45	2,149.35	3,339.09	216,169.43
131	5,488.45	2,116.66	3,371.79	212,797.64
132	5,488.45	2,083.64	3,404.81	209,392.83
133	5,488.45	2,050.30	3,438.14	205,954.69
134	5,488.45	2,016.64	3,471.81	202,482.88
135	5,488.45	1,982.64	3,505.80	198,977.07
136	5,488.45	1,948.32	3,540.13	195,436.94
137	5,488.45	1,913.65	3,574.80	191,862.15
138	5,488.45	1,878.65	3,609.80	188,252.35
139	5,488.45	1,843.30	3,645.14	184,607.20
140	5,488.45	1,807.61	3,680.84	180,926.37
141	5,488.45	1,771.57	3,716.88	177,209.49
142	5,488.45	1,735.18	3,753.27	173,456.22
143	5,488.45	1,698.43	3,790.02	169,666.19

76	5,488.45	5,916.73	615,153.26
77	5,488.45	6,028.50	626,670.21
78	5,488.45	6,141.37	638,300.03
79	5,488.45	6,255.34	650,043.82
80	5,488.45	6,370.43	661,902.70
81	5,488.45	6,486.65	673,877.80
82	5,488.45	6,604.00	685,970.25
83	5,488.45	6,722.51	698,181.21
84	5,488.45	6,842.18	710,511.83
85	5,488.45	6,963.02	722,963.30
86	5,488.45	7,085.04	735,536.79
87	5,488.45	7,208.26	748,233.50
88	5,488.45	7,332.69	761,054.64
89	5,488.45	7,458.34	774,001.43
90	5,488.45	7,585.21	787,075.09
91	5,488.45	7,713.34	800,276.88
92	5,488.45	7,842.71	813,608.04
93	5,488.45	7,973.36	827,069.85
94	5,488.45	8,105.28	840,663.58
95	5,488.45	8,238.50	854,390.53
96	5,488.45	8,373.03	868,252.01
97	5,488.45	8,508.87	882,249.33
98	5,488.45	8,646.04	896,383.83
99	5,488.45	8,784.56	910,656.84
100	5,488.45	8,924.44	925,069.72
101	5,488.45	9,065.68	939,623.86
102	5,488.45	9,208.31	954,320.62
103	5,488.45	9,352.34	969,161.41
104	5,488.45	9,497.78	984,147.64
105	5,488.45	9,644.65	999,280.74
106	5,488.45	9,792.95	1,014,562.14
107	5,488.45	9,942.71	1,029,993.30
108	5,488.45	10,093.93	1,045,575.69
109	5,488.45	10,246.64	1,061,310.78
110	5,488.45	10,400.85	1,077,200.07
111	5,488.45	10,556.56	1,093,245.08
112	5,488.45	10,713.80	1,109,447.34
113	5,488.45	10,872.58	1,125,808.37
114	5,488.45	11,032.92	1,142,329.74
115	5,488.45	11,194.83	1,159,013.02
116	5,488.45	11,358.33	1,175,859.80
117	5,488.45	11,523.43	1,192,871.68
118	5,488.45	11,690.14	1,210,050.27
119	5,488.45	11,858.49	1,227,397.21
120	5,488.45	12,028.49	1,244,914.16
121	5,488.45	12,200.16	1,262,602.76
122	5,488.45	12,373.51	1,280,464.72
123	5,488.45	12,548.55	1,298,501.73
124	5,488.45	12,725.32	1,316,715.49
125	5,488.45	12,903.81	1,335,107.75
126	5,488.45	13,084.06	1,353,680.26
127	5,488.45	13,266.07	1,372,434.78
128	5,488.45	13,449.86	1,391,373.09
129	5,488.45	13,635.46	1,410,496.99
130	5,488.45	13,822.87	1,429,808.31
131	5,488.45	14,012.12	1,449,308.89
132	5,488.45	14,203.23	1,469,000.56
133	5,488.45	14,396.21	1,488,885.22
134	5,488.45	14,591.08	1,508,964.74
135	5,488.45	14,787.85	1,529,241.05
136	5,488.45	14,986.56	1,549,716.06
137	5,488.45	15,187.22	1,570,391.73
138	5,488.45	15,389.84	1,591,270.02
139	5,488.45	15,594.45	1,612,352.91
140	5,488.45	15,801.06	1,633,642.42
141	5,488.45	16,009.70	1,655,140.57
142	5,488.45	16,220.38	1,676,849.39
143	5,488.45	16,433.12	1,698,770.97
144	5,488.45	16,647.96	1,720,907.37

144	5,488.45	1,661.31	3,827.13	165,839.06
145	5,488.45	1,623.84	3,864.61	161,974.45
146	5,488.45	1,586.00	3,902.45	158,072.00
147	5,488.45	1,547.79	3,940.66	154,131.34
148	5,488.45	1,509.20	3,979.25	150,152.09
149	5,488.45	1,470.24	4,018.21	146,133.89
150	5,488.45	1,430.89	4,057.55	142,076.33
151	5,488.45	1,391.16	4,097.28	137,979.05
152	5,488.45	1,351.04	4,137.40	133,841.64
153	5,488.45	1,310.53	4,177.92	129,663.73
154	5,488.45	1,269.62	4,218.82	125,444.90
155	5,488.45	1,228.31	4,260.13	121,184.77
156	5,488.45	1,186.60	4,301.85	116,882.92
157	5,488.45	1,144.48	4,343.97	112,538.95
158	5,488.45	1,101.94	4,386.50	108,152.44
159	5,488.45	1,058.99	4,429.46	103,722.99
160	5,488.45	1,015.62	4,472.83	99,250.16
161	5,488.45	971.82	4,516.62	94,733.53
162	5,488.45	927.60	4,560.85	90,172.69
163	5,488.45	882.94	4,605.51	85,567.18
164	5,488.45	837.85	4,650.60	80,916.57
165	5,488.45	792.31	4,696.14	76,220.43
166	5,488.45	746.33	4,742.12	71,478.31
167	5,488.45	699.89	4,788.56	66,689.75
168	5,488.45	653.00	4,835.45	61,854.31
169	5,488.45	605.66	4,882.79	56,971.51
170	5,488.45	557.85	4,930.60	52,040.91
171	5,488.45	509.57	4,978.88	47,062.03
172	5,488.45	460.82	5,027.63	42,034.40
173	5,488.45	411.59	5,076.86	36,957.54
174	5,488.45	361.88	5,126.57	31,830.96
175	5,488.45	311.68	5,176.77	26,654.19
176	5,488.45	260.99	5,227.46	21,426.73
177	5,488.45	209.80	5,278.65	16,148.09
178	5,488.45	158.12	5,330.33	10,817.75
179	5,488.45	105.92	5,382.53	5,435.23
180	5,488.45	53.22	5,435.23	**0.00**

145	5,488.45	16,864.89	1,743,260.72
146	5,488.45	17,083.96	1,765,833.12
147	5,488.45	17,305.16	1,788,626.74
148	5,488.45	17,528.54	1,811,643.73
149	5,488.45	17,754.11	1,834,886.29
150	5,488.45	17,981.89	1,858,356.62
151	5,488.45	18,211.89	1,882,056.97
152	5,488.45	18,444.16	1,905,989.58
153	5,488.45	18,678.70	1,930,156.72
154	5,488.45	18,915.54	1,954,560.71
155	5,488.45	19,154.69	1,979,203.85
156	5,488.45	19,396.20	2,004,088.50
157	5,488.45	19,640.07	2,029,217.02
158	5,488.45	19,886.33	2,054,591.80
159	5,488.45	20,135.00	2,080,215.25
160	5,488.45	20,386.11	2,106,089.80
161	5,488.45	20,639.68	2,132,217.93
162	5,488.45	20,895.74	2,158,602.12
163	5,488.45	21,154.30	2,185,244.87
164	5,488.45	21,415.40	2,212,148.72
165	5,488.45	21,679.06	2,239,316.23
166	5,488.45	21,945.30	2,266,749.98
167	5,488.45	22,214.15	2,294,452.58
168	5,488.45	22,485.64	2,322,426.66
169	5,488.45	22,759.78	2,350,674.89
170	5,488.45	23,036.61	2,379,199.96
171	5,488.45	23,316.16	2,408,004.57
172	5,488.45	23,598.44	2,437,091.46
173	5,488.45	23,883.50	2,466,463.41
174	5,488.45	24,171.34	2,496,123.20
175	5,488.45	24,462.01	2,526,073.66
176	5,488.45	24,755.52	2,556,317.63
177	5,488.45	25,051.91	2,586,857.99
178	5,488.45	25,351.21	2,617,697.65
179	5,488.45	25,653.44	2,648,839.54
180	5,488.45	25,958.63	**2,680,286.61**

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