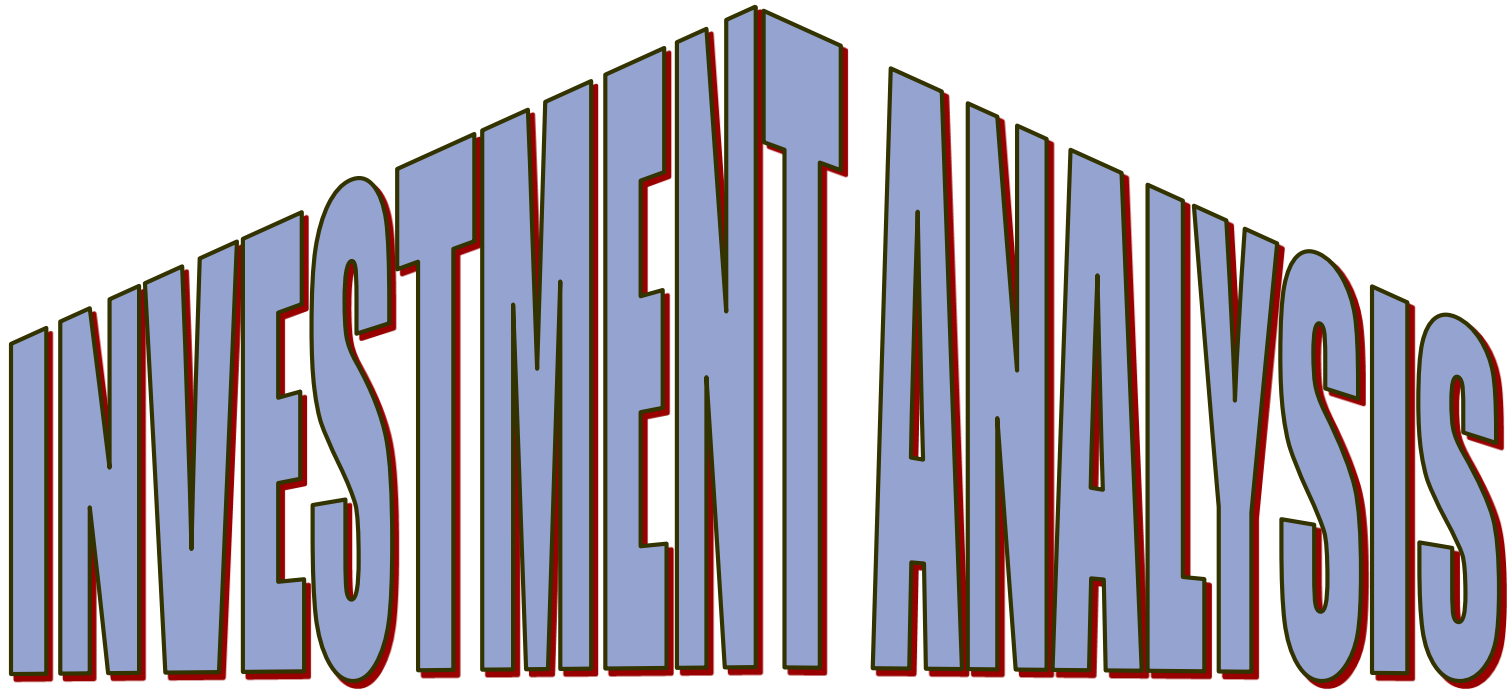

INVESTMENT ANALYSIS

INVESTMENT ANALYSIS

Evaluating the Profitability of Capital Investments in Machinery, Improvement and/or Expansion Plans (Capital Budgeting)

INVESTMENT ANALYSIS

(Making the best use of capital)

- **INVESTMENTS**
- **DISINVESTMENTS**
- **FINANCING**

How Does Time Affect Economic Analysis

- Present and Future Value of Money
- Net Present Value Income and/or Expenses in the Future
- Internal Rate of Return of Income and Expenses in the Future

3 MAJOR PROBLEMS CONCERNING CAPITAL

❶HOW TO GET IT

❷HOW TO USE IT

❸HOW TO KEEP DOING IT

INVESTMENT IS:

Trading known dinars today for expected (but unknown) additional dinars in the future

INVESTMENT IS ADDING DURABLE ASSETS TO YOUR BUSINESS TO:

- Maintain and/or replace Depreciated Capital Items
- Reduce production costs
- Expand production
- Other

GETTING CONTROL OF ASSETS

- Lease
- Custom Hire
- Purchase

CHARACTERISTICS OF INVESTMENT DECISION

1. **Large outlay of money today that results in flow of returns over time in future**

   EXAMPLE -- investments in machinery and equipment

2. **Investment decision made INFREQUENTLY**

3. **Can result in either LARGE PROFITS OR LOSSES**

4. **After decision is made there may be no going back -- INFLEXIBILITY**

THE TIME VALUE OF MONEY

One dinar today is worth more than one dinar tomorrow!

WHY?

INFLATION & I N T E R E S T

COMPOUNDING IS:

Procedure for determining

☆ FUTURE VALUE ☆

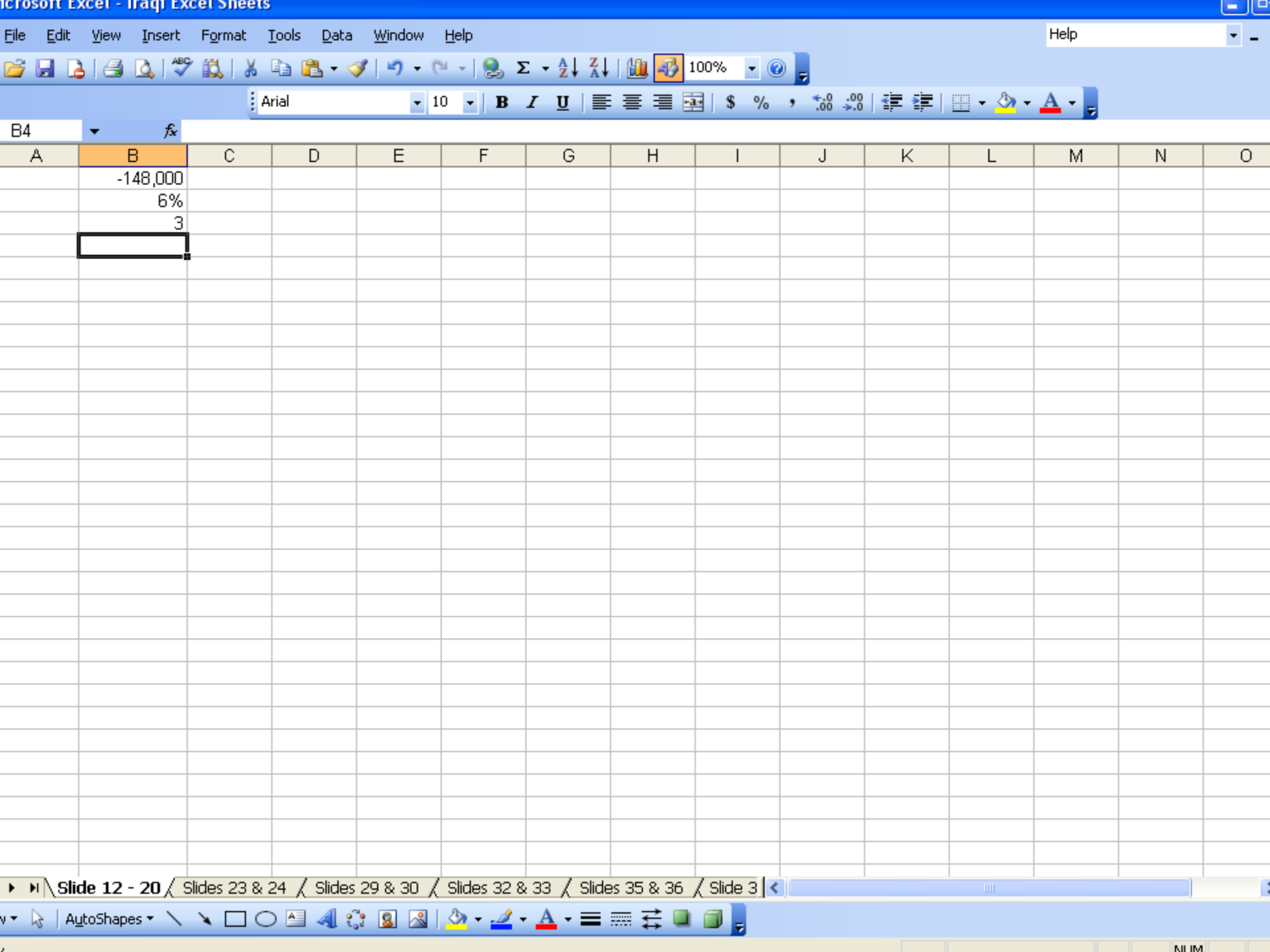
Compounding is procedure for determining future value

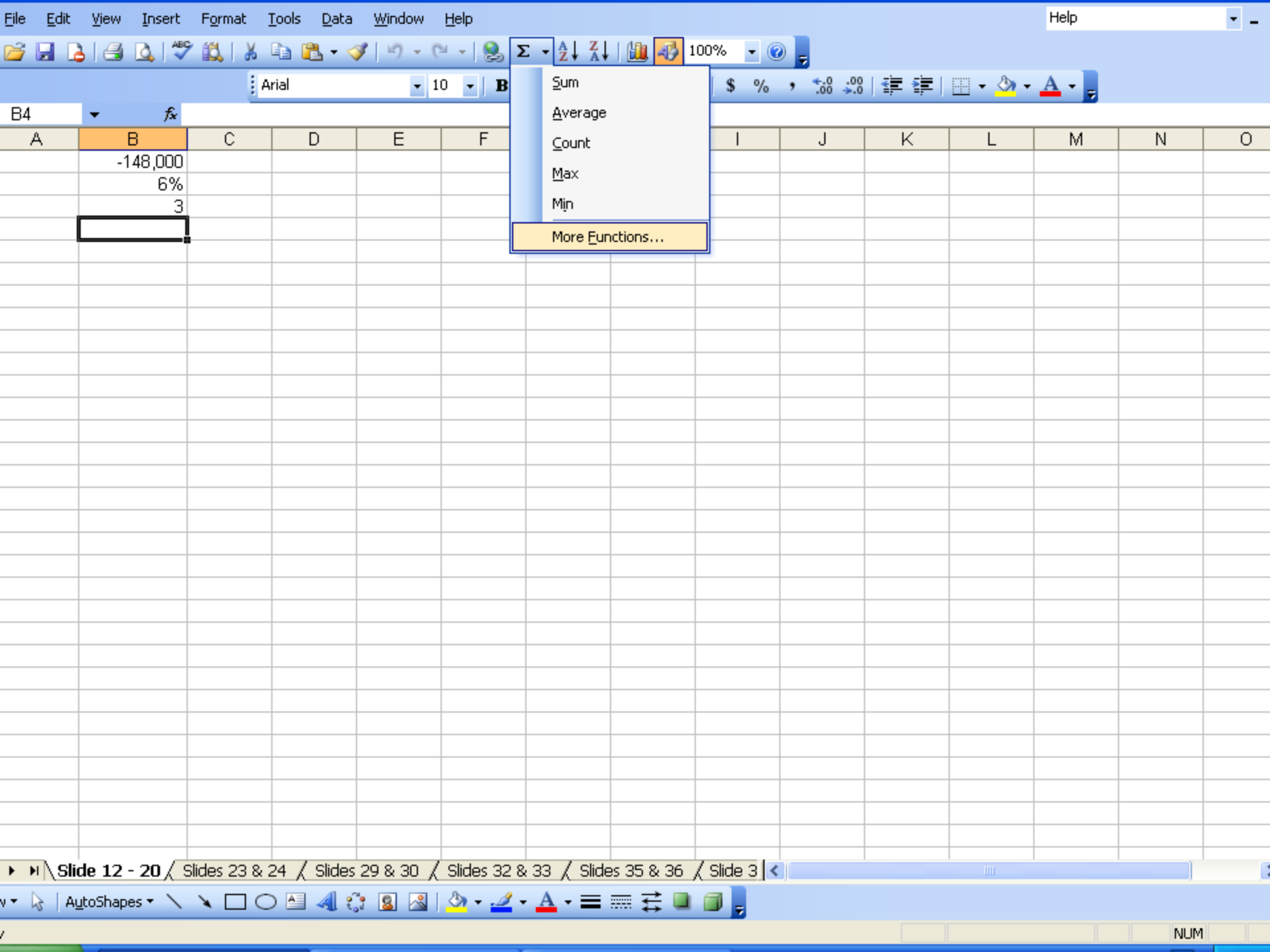
Example:

- **Put ID 148,000 in a bank at 6% for 3 years.**
- **What will it accumulate to?**
- **$Vn = Po\ (1 + i)^3$**
- **$V^3 = ID\ 148{,}000\ (1 + .06)^3$**
- **From Table 1 in Appendix A we find that: $(1 + .06)^3 = 1.191$**
- **Therefore:**

  V3 = ID 148,000 (1.191)

- **= ID 176,268**
- **Our account will have ID 176,268 in it at the end of 3 years.**


Microsoft Excel - Iraqi Excel Sheets
File Edit View Insert Format Tools Data Window Help
Help
100%
Arial
10
B4
A B C D E F G H I J K L M N O
-148,000
6%
3
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes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100%
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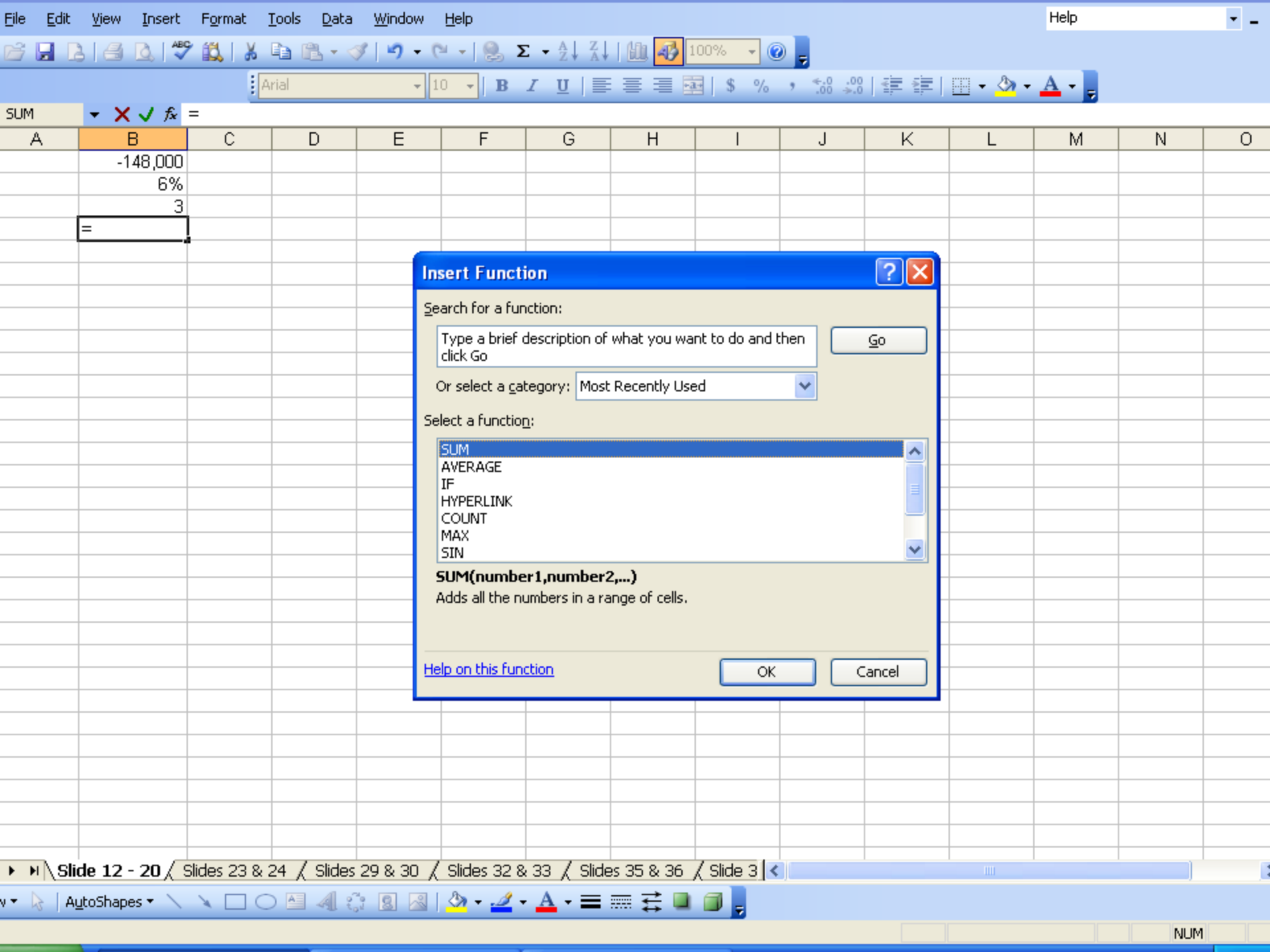
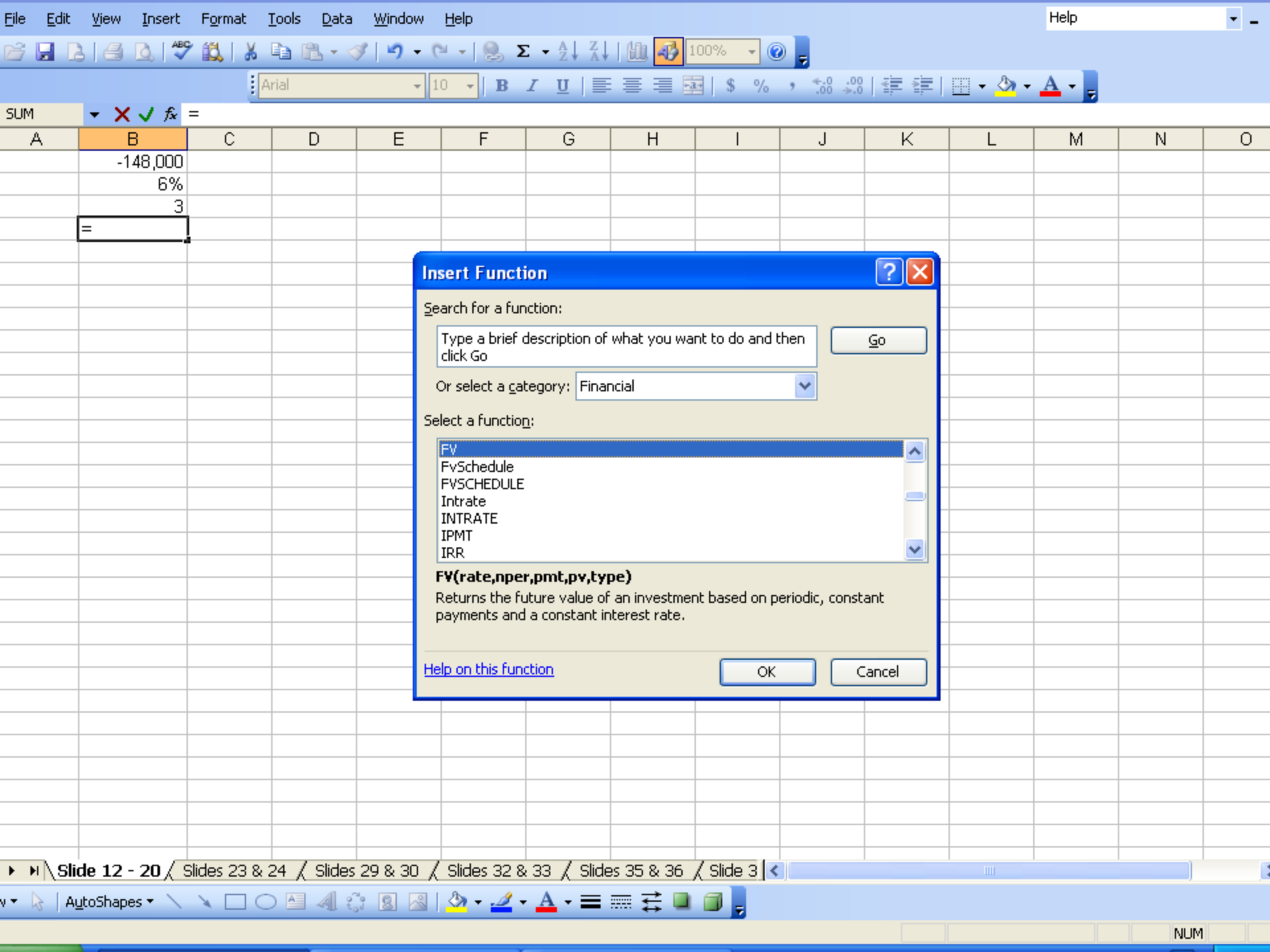
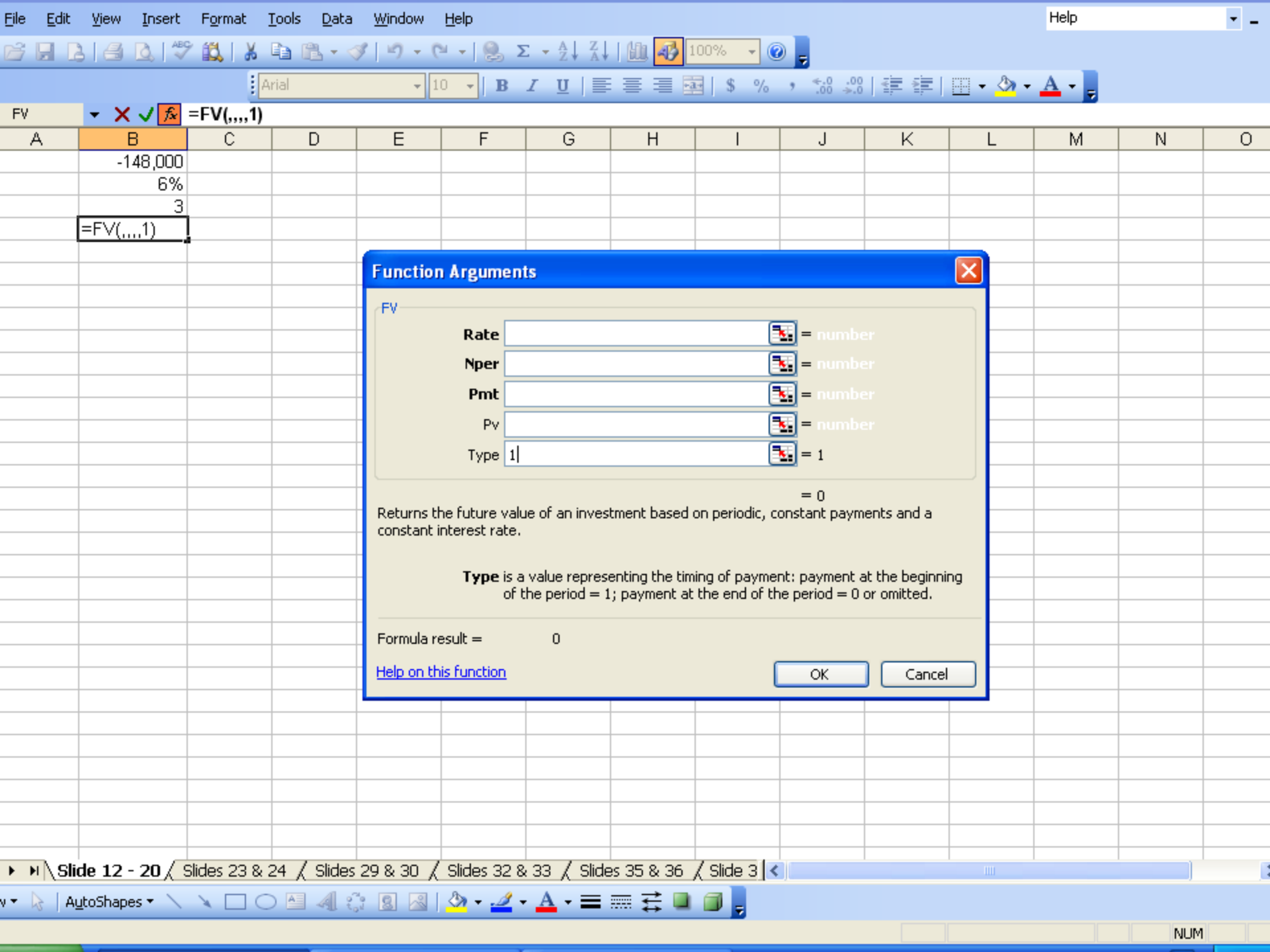
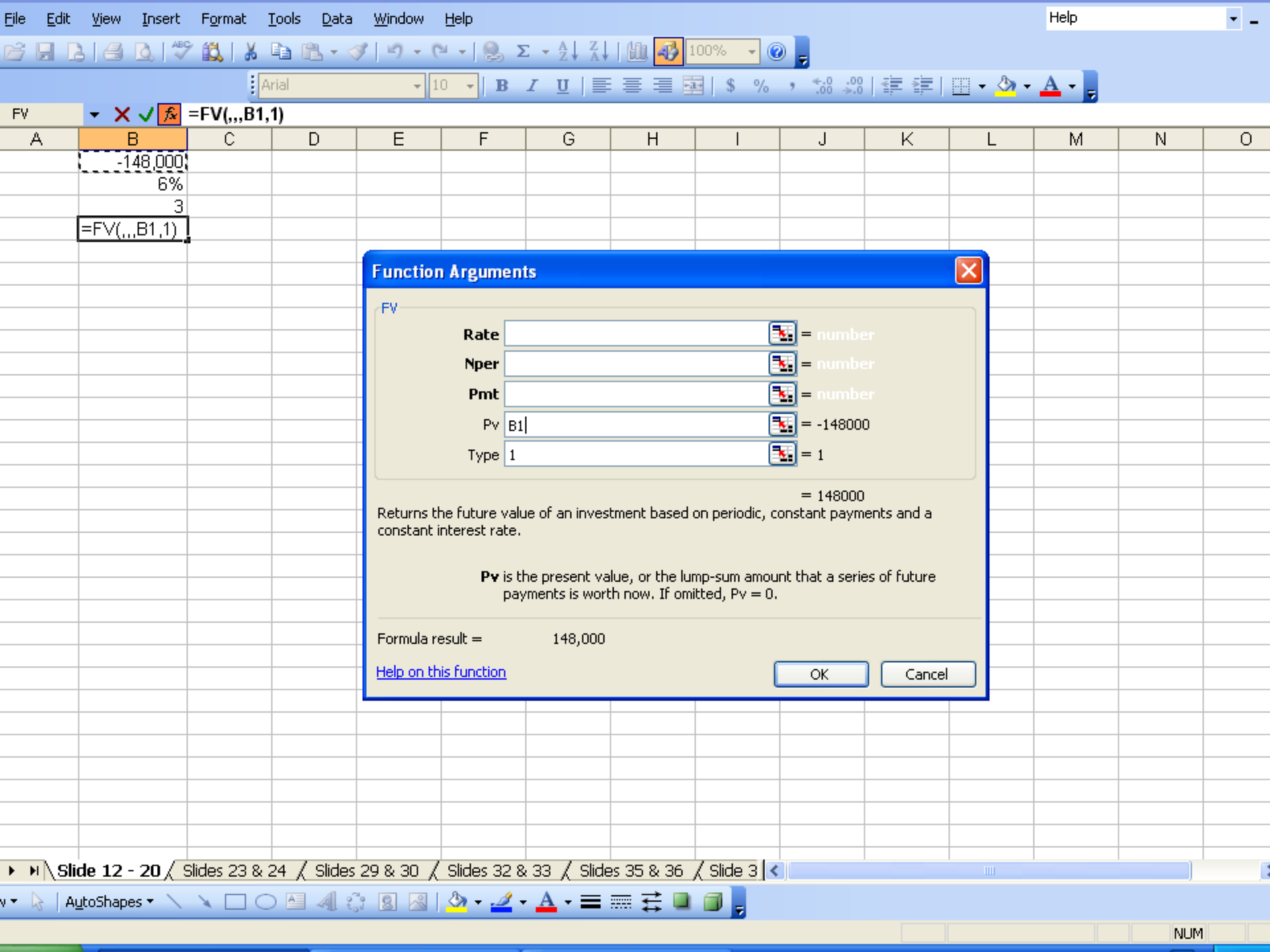
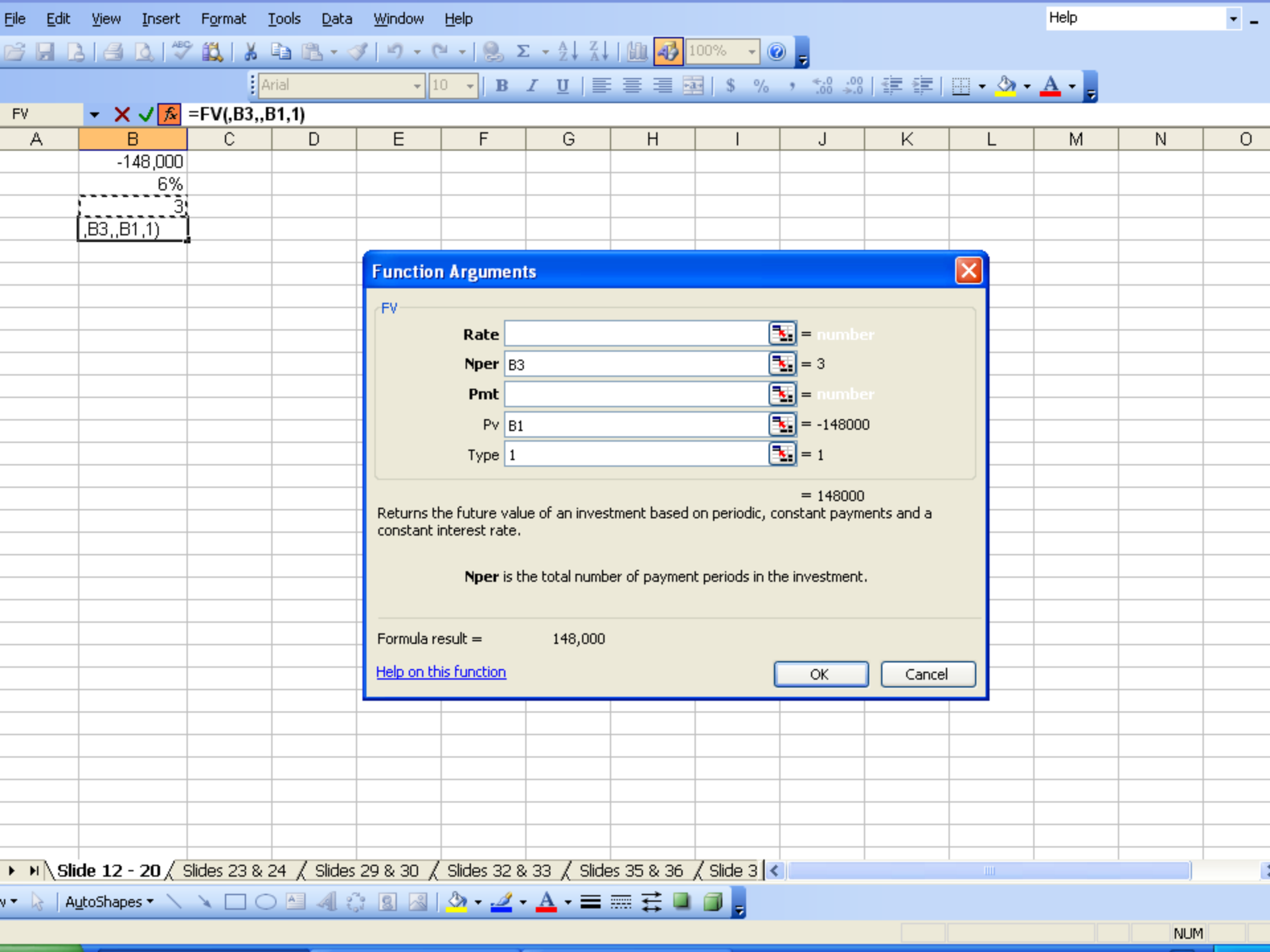
Sum
Average
Count
Max
Min
More Functions...
B4
A B C D E F I J K L M N O
-148,000
6%
3
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM

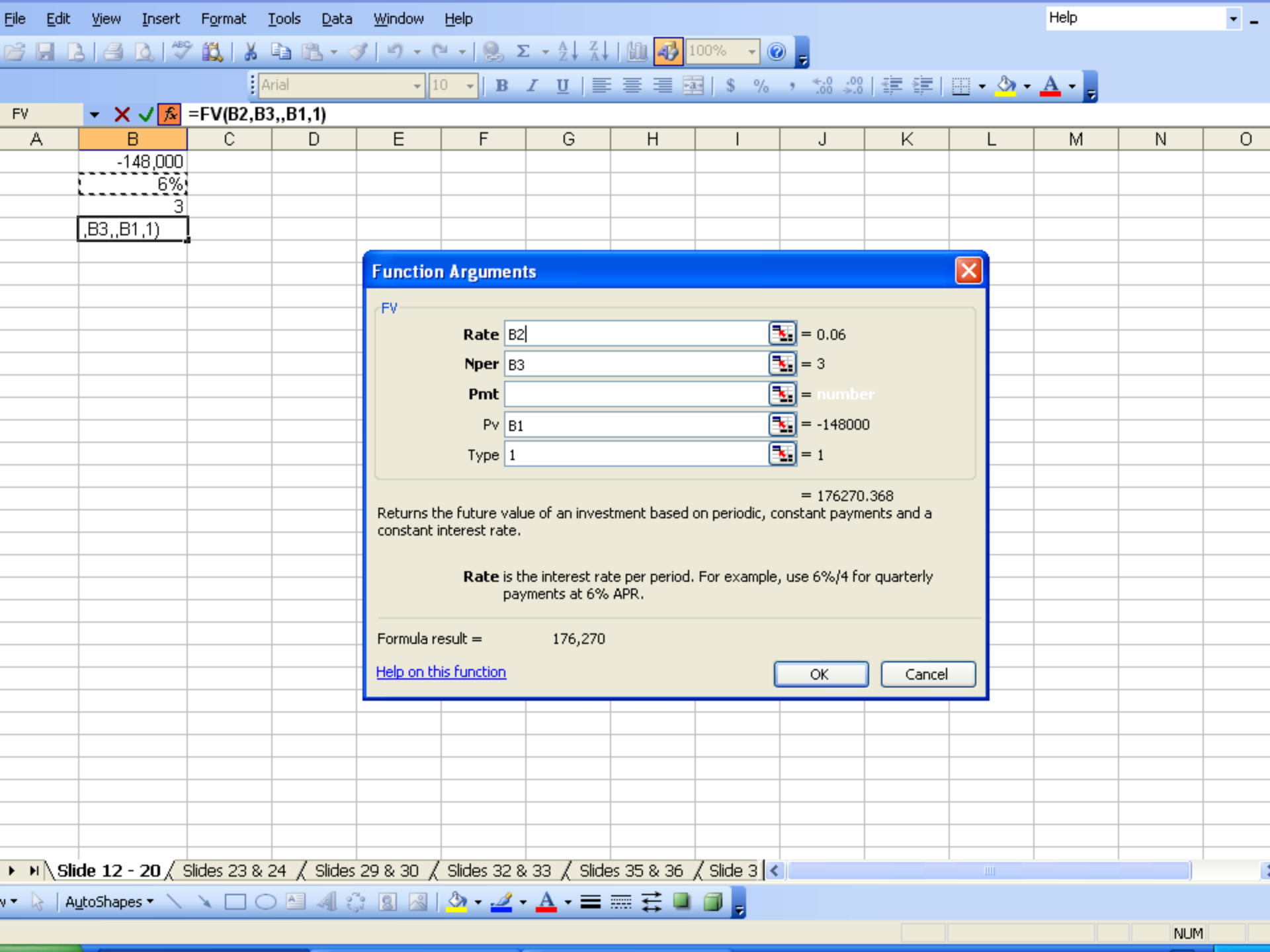

File Edit View Insert Format Tools Data Window Help
Help
SUM
=
A B C D E F G H I J K L M N O
-148,000
6%
3
=
Insert Function
Search for a function:
Type a brief description of what you want to do and then click Go
Go
Or select a category: Most Recently Used
Select a function:
SUM
AVERAGE
IF
HYPERLINK
COUNT
MAX
SIN
SUM(number1,number2,...)
Adds all the numbers in a range of cells.
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM

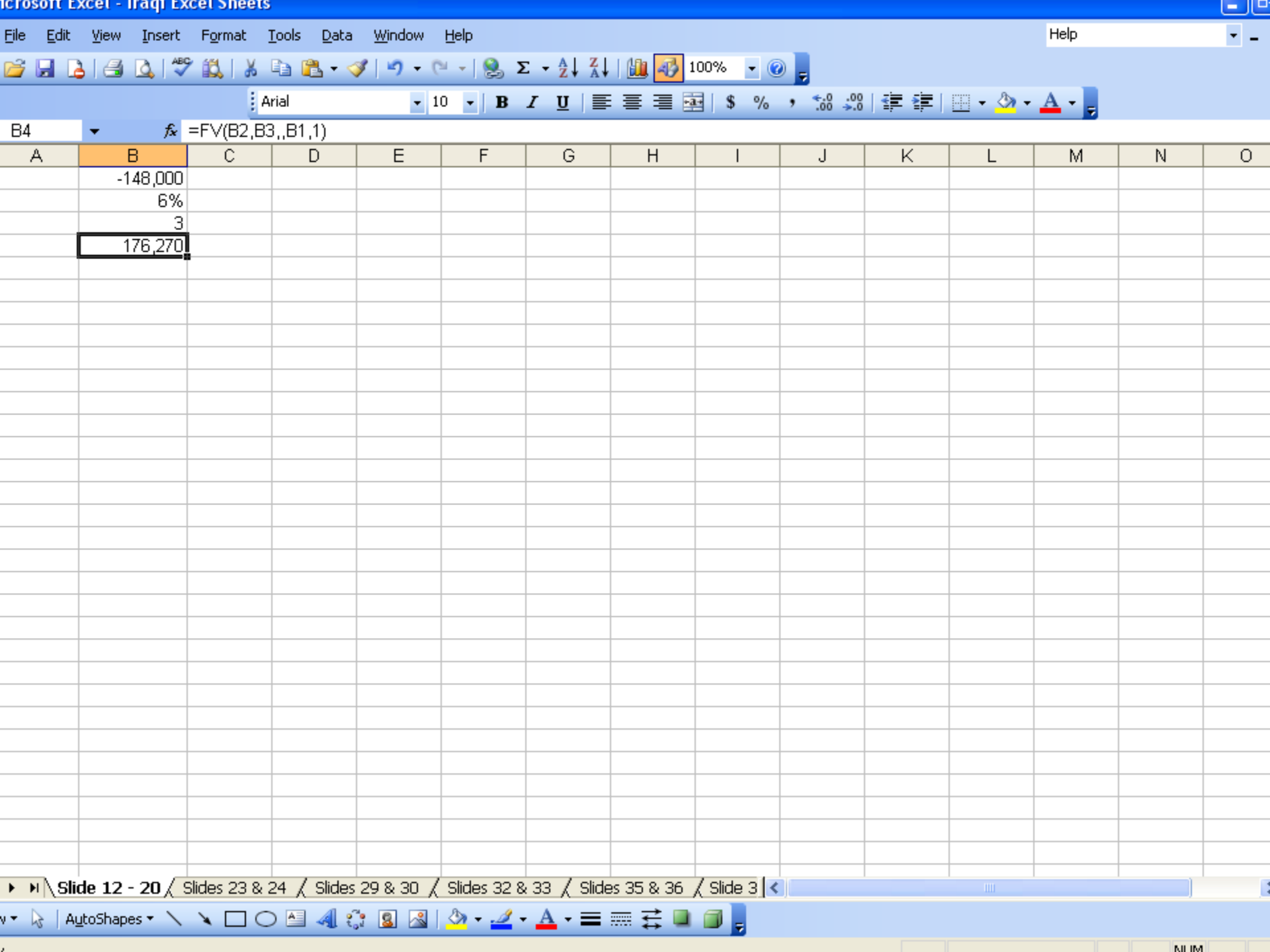

File Edit View Insert Format Tools Data Window Help
Help
SUM
=
A B C D E F G H I J K L M N O
-148,000
6%
3
=
Insert Function
Search for a function:
Type a brief description of what you want to do and then click Go
Go
Or select a category: Financial
Select a function:
FV
FvSchedule
FVSCHEDULE
Intrate
INTRATE
IPMT
IRR
FV(rate,nper,pmt,pv,type)
Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


File Edit View Insert Format Tools Data Window Help
Help
FV
=FV(,,,1)
A B C D E F G H I J K L M N O
-148,000
6%
3
=FV(,,,1)
Function Arguments
FV
Rate = number
Nper = number
Pmt = number
Pv = number
Type 1 = 1
= 0
Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Type is a value representing the timing of payment: payment at the beginning of the period = 1; payment at the end of the period = 0 or omitted.
Formula result = 0
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


File Edit View Insert Format Tools Data Window Help
Help
100%
Arial
10
FV
=FV(,,B1,1)
A B C D E F G H I J K L M N O
-148,000
6%
3
=FV(,,B1,1)
Function Arguments
FV
Rate
= number
Nper
= number
Pmt
= number
Pv B1
= -148000
Type 1
= 1
= 148000
Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Pv is the present value, or the lump-sum amount that a series of future payments is worth now. If omitted, Pv = 0.
Formula result = 148,000
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


File Edit View Insert Format Tools Data Window Help
Help
FV
=FV(,B3,,B1,1)
A B C D E F G H I J K L M N O
-148,000
6%
3
,B3,,B1,1)
Function Arguments
FV
Rate
= number
Nper B3
= 3
Pmt
= number
Pv B1
= -148000
Type 1
= 1
= 148000
Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Nper is the total number of payment periods in the investment.
Formula result = 148,000
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


File Edit View Insert Format Tools Data Window Help
Help
FV
=FV(B2,B3,,B1,1)
A B C D E F G H I J K L M N O
-148,000
6%
3
,B3,,B1,1)
Function Arguments
FV
Rate B2 = 0.06
Nper B3 = 3
Pmt = number
Pv B1 = -148000
Type 1 = 1
= 176270.368
Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Rate is the interest rate per period. For example, use 6%/4 for quarterly payments at 6% APR.
Formula result = 176,270
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


Microsoft Excel - Iraqi Excel Sheets
File Edit View Insert Format Tools Data Window Help
Help
100%
Arial 10
B4 =FV(B2,B3,,B1,1)
A B C D E F G H I J K L M N O
-148,000
6%
3
176,270
Slide 12 - 20 Slides 23 & 24 Slides 29 & 30 Slides 32 & 33 Slides 35 & 36 Slide 3
AutoShapes

DISCOUNTING IS:

Procedure for determining

☆ PRESENT VALUE ☆

Discounting is procedure for determining present value of sum of money to be received in future.

Example:

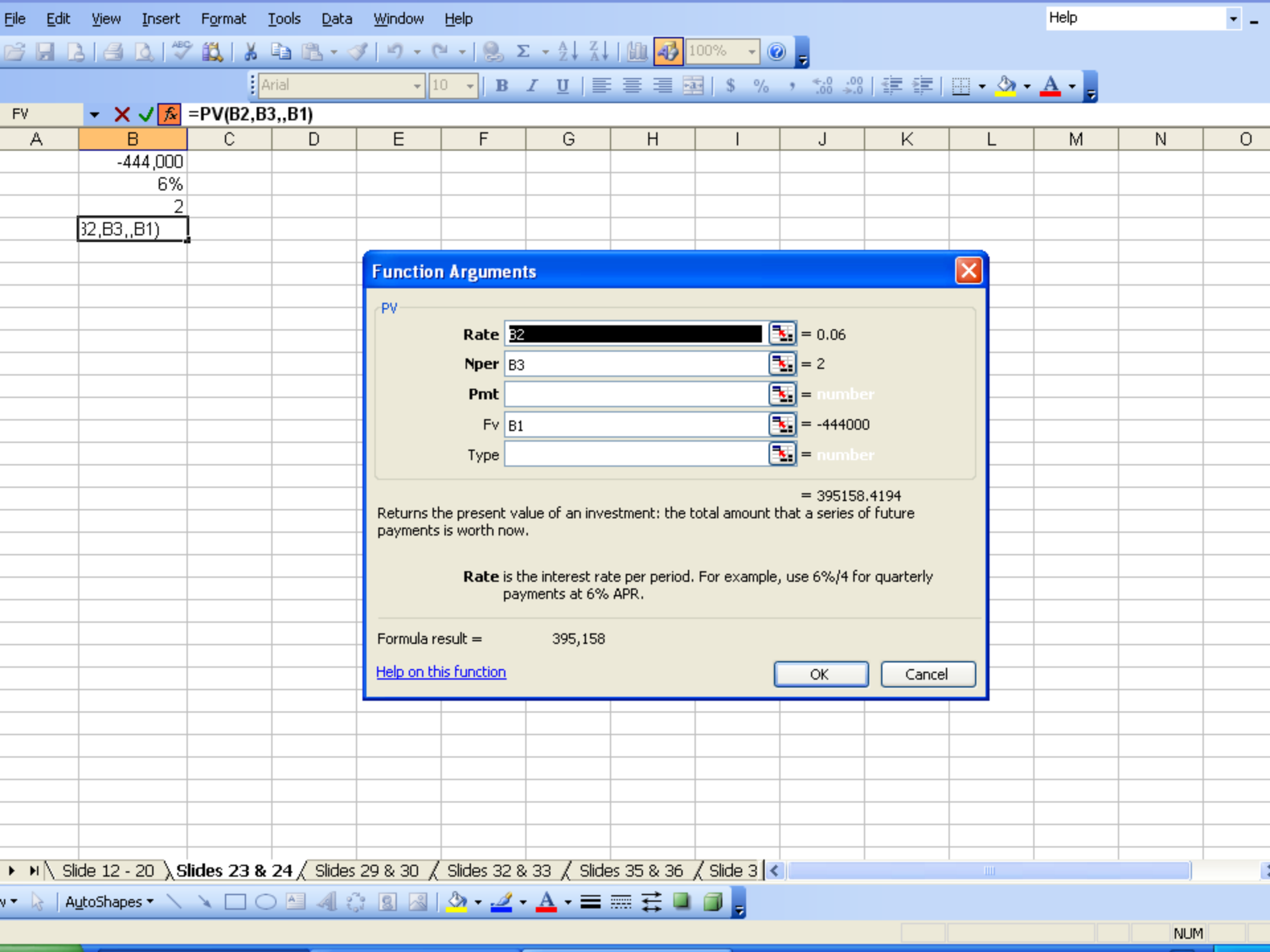
How much would you be willing to pay for ID 444,000 to be received in 2 years?

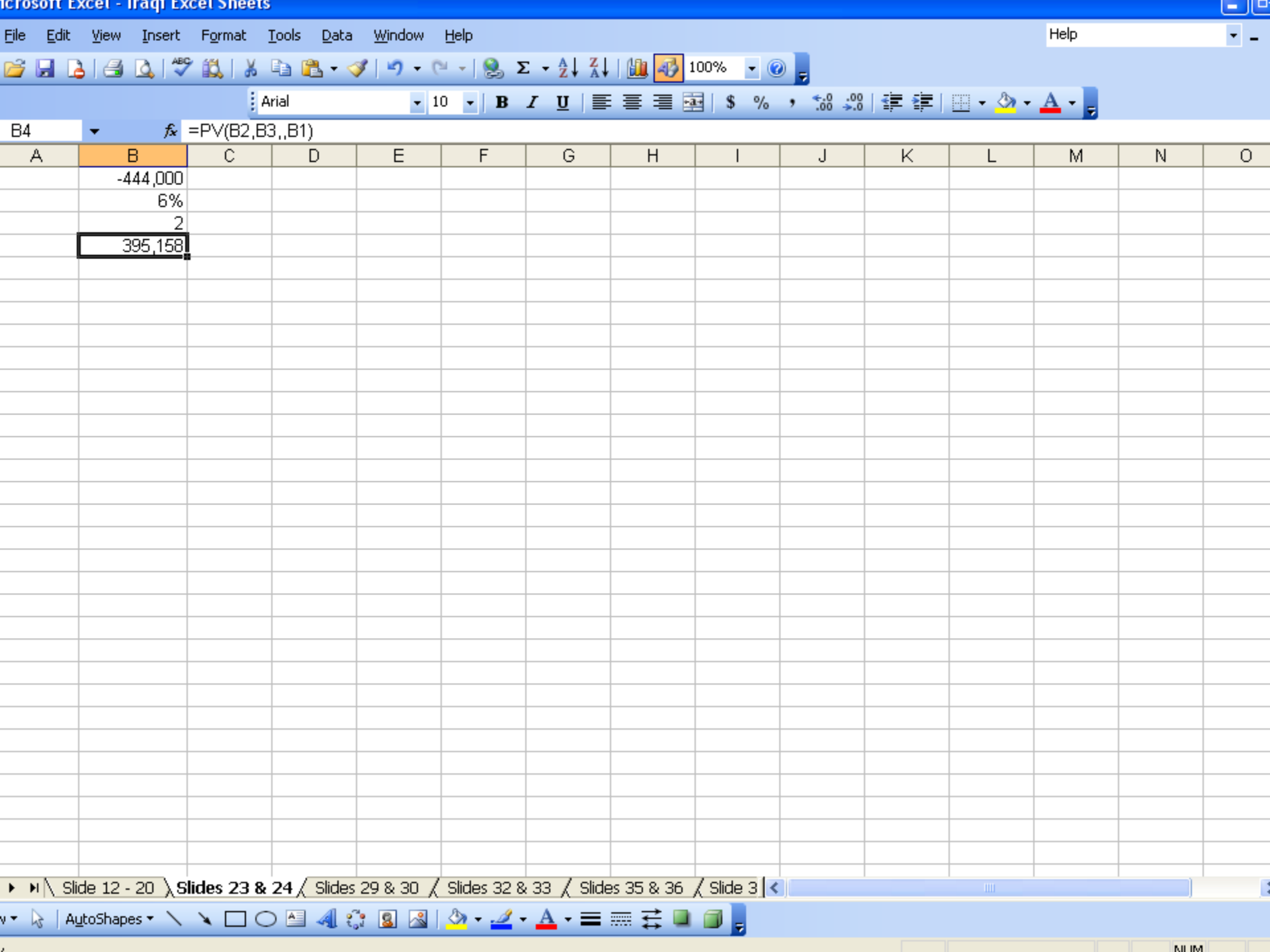
$$Vo = Pn \left(1 / (1 + i)^n\right)$$

$$Vo = ID\ 444{,}000 \left(1 / (1 + .06)^n\right)$$

(Note: 6% was assumed as discount rate, or cost of capital, or required rate of return.)

$$Vo = ID\ 395{,}158$$


File Edit View Insert Format Tools Data Window Help
Help
FV
=PV(B2,B3,,B1)
A B C D E F G H I J K L M N O
-444,000
6%
2
32,B3,,B1)
Function Arguments
PV
Rate B2 = 0.06
Nper B3 = 2
Pmt = number
Fv B1 = -444000
Type = number
= 395158.4194
Returns the present value of an investment: the total amount that a series of future payments is worth now.
Rate is the interest rate per period. For example, use 6%/4 for quarterly payments at 6% APR.
Formula result = 395,158
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


Microsoft Excel - Iraqi Excel Sheets
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Help
100%
Arial 10
B4 =PV(B2,B3,,B1)
A B C D E F G H I J K L M N O
-444,000
6%
2
395,158
Slide 12 - 20 Slides 23 & 24 Slides 29 & 30 Slides 32 & 33 Slides 35 & 36 Slide 3
AutoShapes

WHAT IS CAPITAL BUDGETING

It is an orderly series of steps that produces information to aid you in making

A GOOD INVESTMENT DECISION

(Better)

(The Best)

Capital Budgeting and the Time Value of Money

1. **Investments give off flows of returns/costs over time.**

2. **Compounding and discounting used for valuing these returns/costs at common point in time.**

3. **Objective of Capital Budgeting Investment Analysis is to:**

   a. **Maximize present value of return flow**

   b. **Minimize present value of cost flow**

   c. **Maximize present value of difference between returns and costs**

THE CAPITAL BUDGETING PROCESS

(A RECIPE)

1. **Identify Investments**
2. **Choose a Capital Budgeting Criteria (Net Present Value)**
3. **Get Needed Data**
4. **Do Capital Budgeting Calculations**
5. **Apply Decision Rules**
6. **Do 4 and 5 again with different returns/costs**
7. **Identify Sources of Risk**
8. **Check Financial Feasibility**
9. **★★ MAKE THE DECISION! ★★**
10. **Follow up to check actual results**

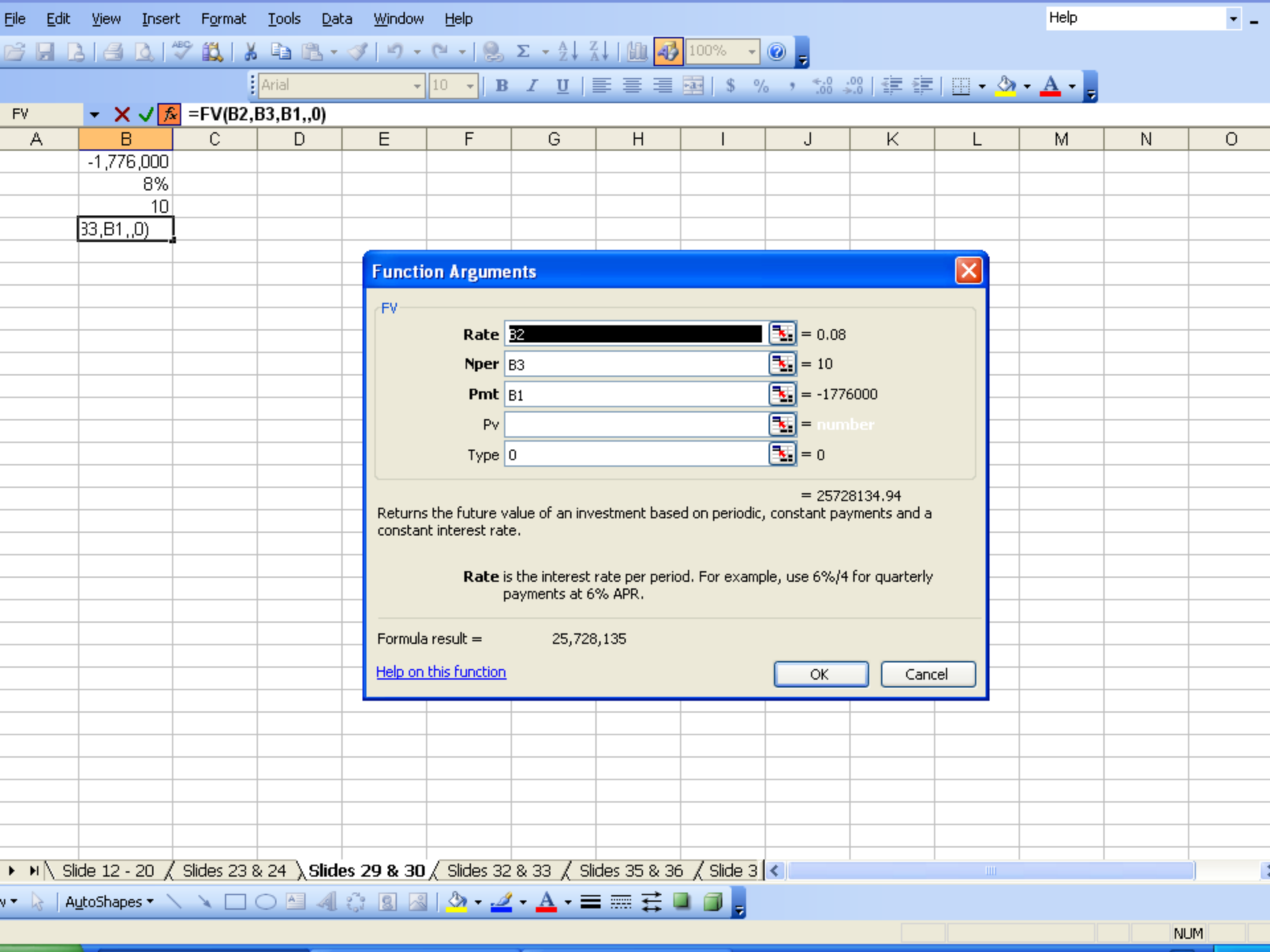
ANNUITIES

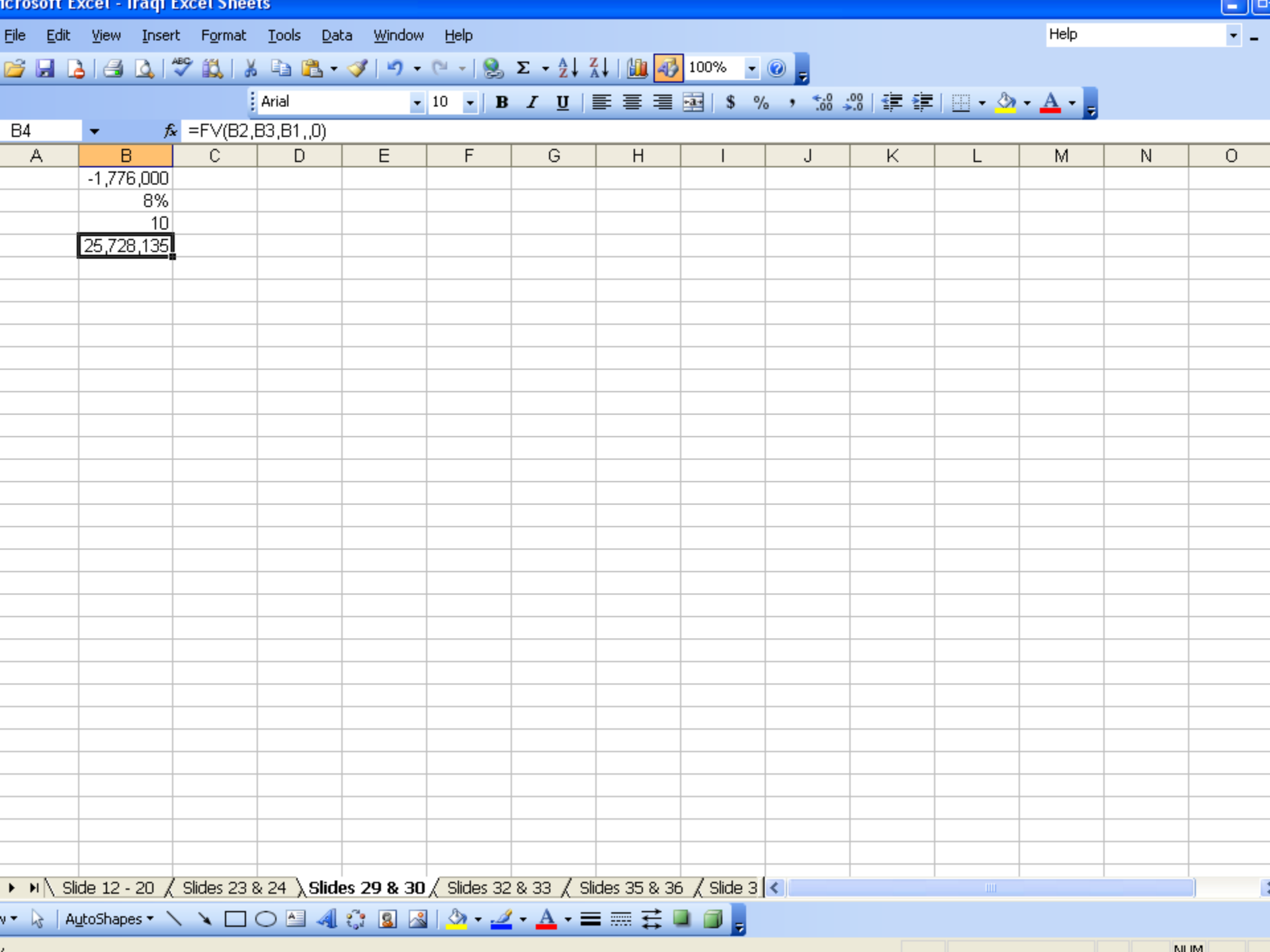
Example

How much will I accumulate in a savings account if I deposit ID 1,776,000/year for 10 years at 8% interest rate compounded annually?

Solution

ID 25,728,135


File Edit View Insert Format Tools Data Window Help
Help
Arial 10
FV
=FV(B2,B3,B1,,0)
A B C D E F G H I J K L M N O
-1,776,000
8%
10
33,B1,,0)
Function Arguments
FV
Rate B2 = 0.08
Nper B3 = 10
Pmt B1 = -1776000
Pv = number
Type 0 = 0
= 25728134.94
Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Rate is the interest rate per period. For example, use 6%/4 for quarterly payments at 6% APR.
Formula result = 25,728,135
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM


Microsoft Excel - Iraqi Excel Sheets
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100%
Arial
10
B4
=FV(B2,B3,B1,,0)
A B C D E F G H I J K L M N O
-1,776,000
8%
10
25,728,135
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes

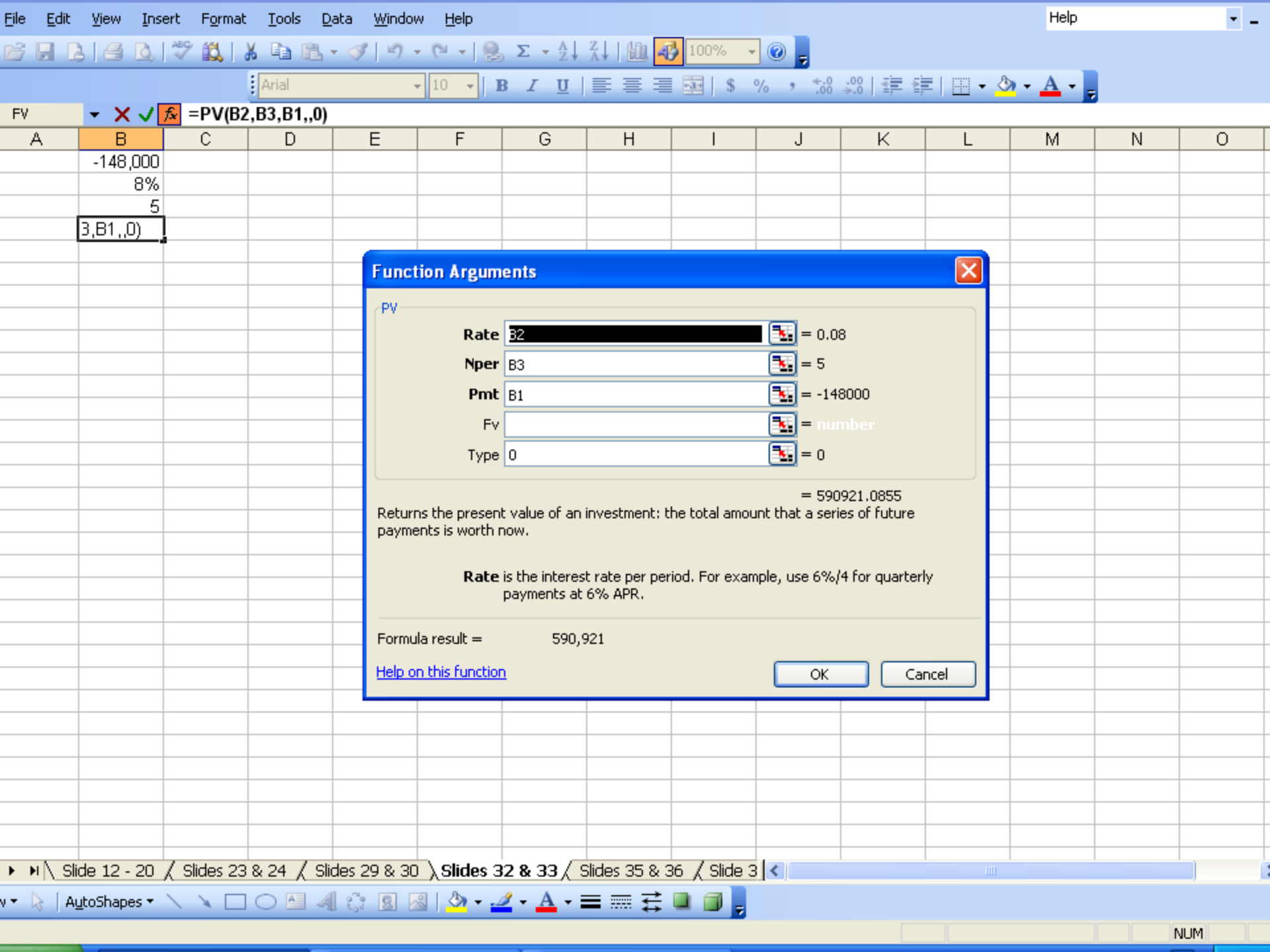
ANNUITIES

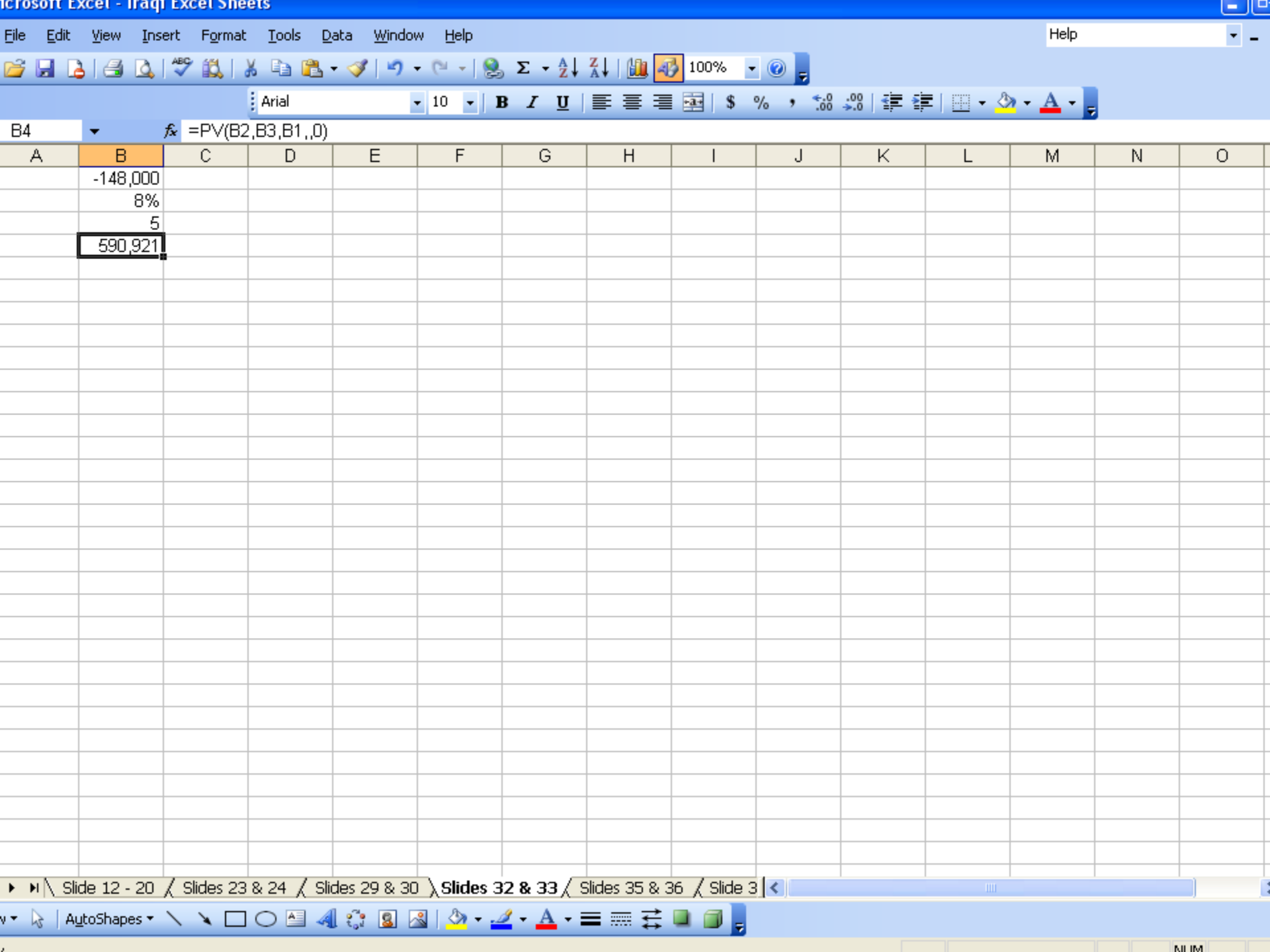
Example

What is the present value of an investment which will generate ID 148,000 of returns for each year for 5 years assuming a discount factor of 8%?

Solution

ID 590,921


File Edit View Insert Format Tools Data Window Help
Help
Arial
10
FV
=PV(B2,B3,B1,,0)
A B C D E F G H I J K L M N O
-148,000
8%
5
3,B1,,0)
Function Arguments
PV
Rate B2 = 0.08
Nper B3 = 5
Pmt B1 = -148000
Fv = number
Type 0 = 0
= 590921.0855
Returns the present value of an investment: the total amount that a series of future payments is worth now.
Rate is the interest rate per period. For example, use 6%/4 for quarterly payments at 6% APR.
Formula result = 590,921
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM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Help
100%
Arial
10
B4
=PV(B2,B3,B1,,0)
A B C D E F G H I J K L M N O
-148,000
8%
5
590,921
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes

EXERCISE

Repayment Capacity

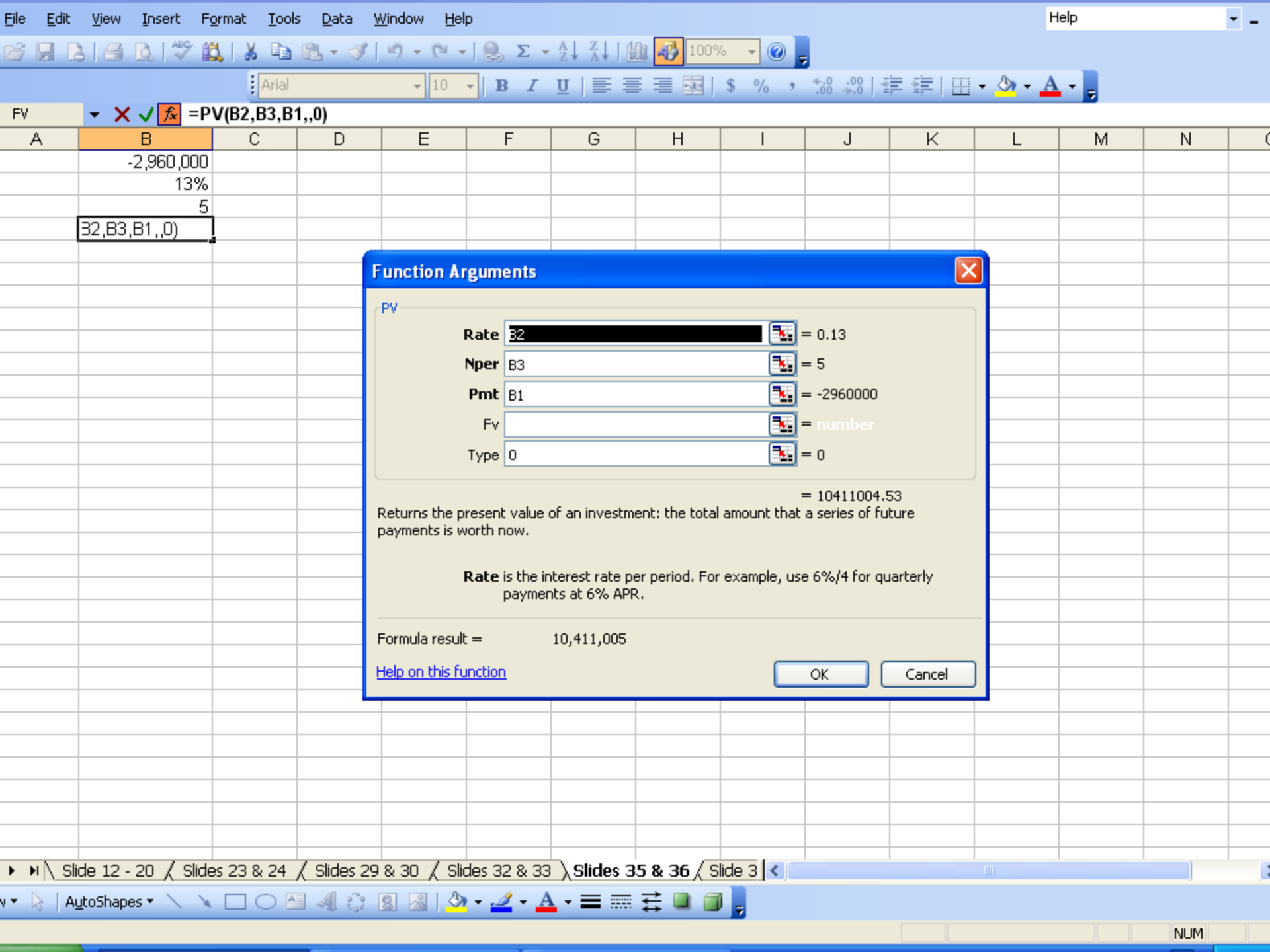
You have several years of historical records. After reviewing your income generating capacity, you have determined that you could pay ID 2,960,000 per year without creating undue hardship or increasing your risk.

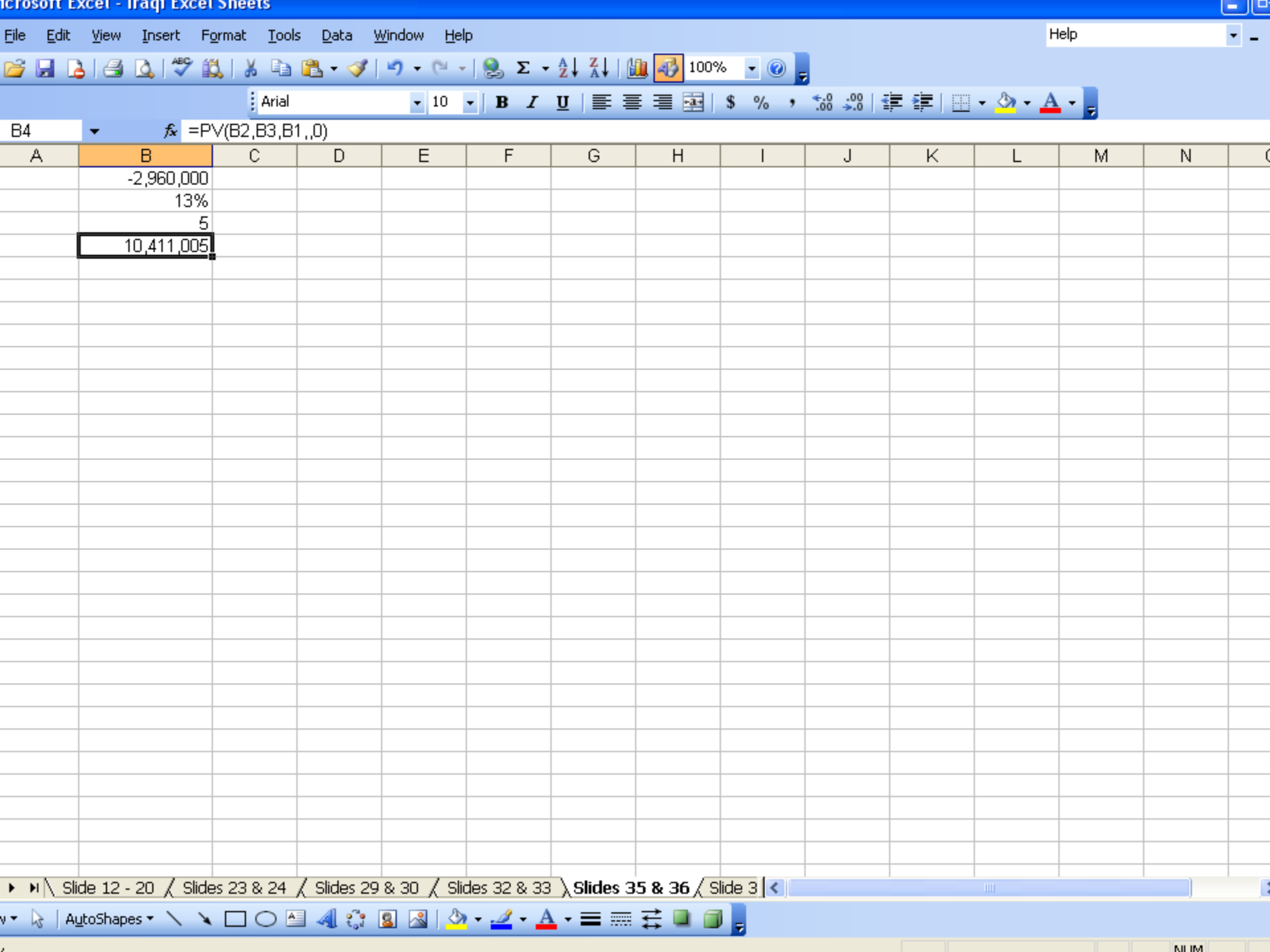
A. How much can you afford to borrow on a 5 year note assuming an interest rate of 13%?

ID 10,411,005

B. How much can you afford to borrow on a 10 year note assuming an interest rate of 13%?

ID 16,061,681


File Edit View Insert Format Tools Data Window Help
Help
Arial
10
FV
=PV(B2,B3,B1,,0)
A B C D E F G H I J K L M N
-2,960,000
13%
5
32,B3,B1,,0)
Function Arguments
PV
Rate B2 = 0.13
Nper B3 = 5
Pmt B1 = -2960000
Fv = number
Type 0 = 0
= 10411004.53
Returns the present value of an investment: the total amount that a series of future payments is worth now.
Rate is the interest rate per period. For example, use 6%/4 for quarterly payments at 6% APR.
Formula result = 10,411,005
Help on this function
OK
Cancel
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes
NUM

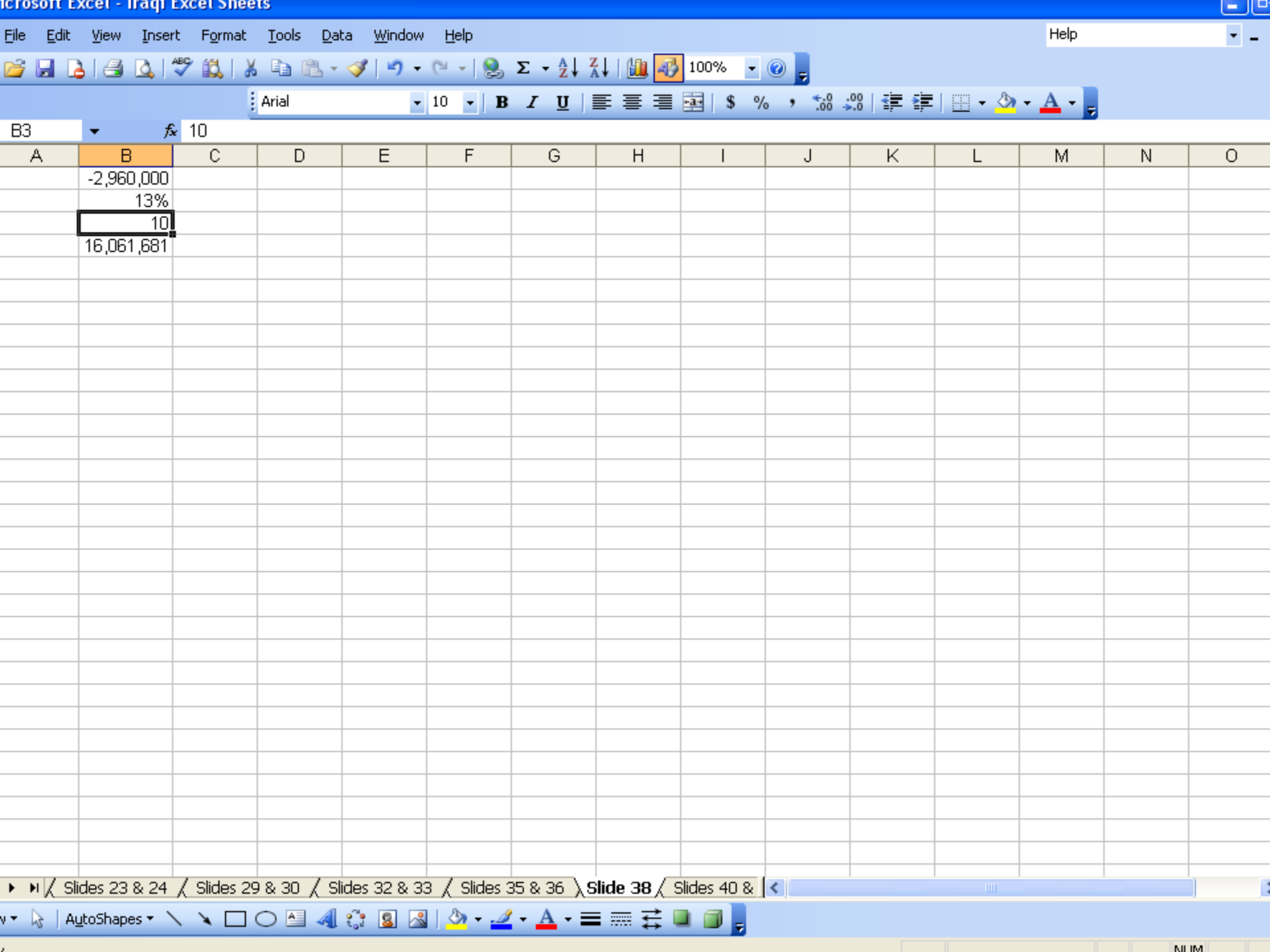

Microsoft Excel - Iraqi Excel Sheets
File Edit View Insert Format Tools Data Window Help
Help
100%
Arial
10
B4
=PV(B2,B3,B1,,0)
A B C D E F G H I J K L M N
-2,960,000
13%
5
10,411,005
Slide 12 - 20
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 3
AutoShapes

EXERCISE

Repayment Capacity (continued)

B. How much can you afford to borrow on a 10 year note assuming an interest rate of 13%?

ID 16,061,681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100%
Arial
10
B3
10
A B C D E F G H I J K L M N O
-2,960,000
13%
10
16,061,681
Slides 23 & 24
Slides 29 & 30
Slides 32 & 33
Slides 35 & 36
Slide 38
Slides 40 &
AutoShapes
NUM

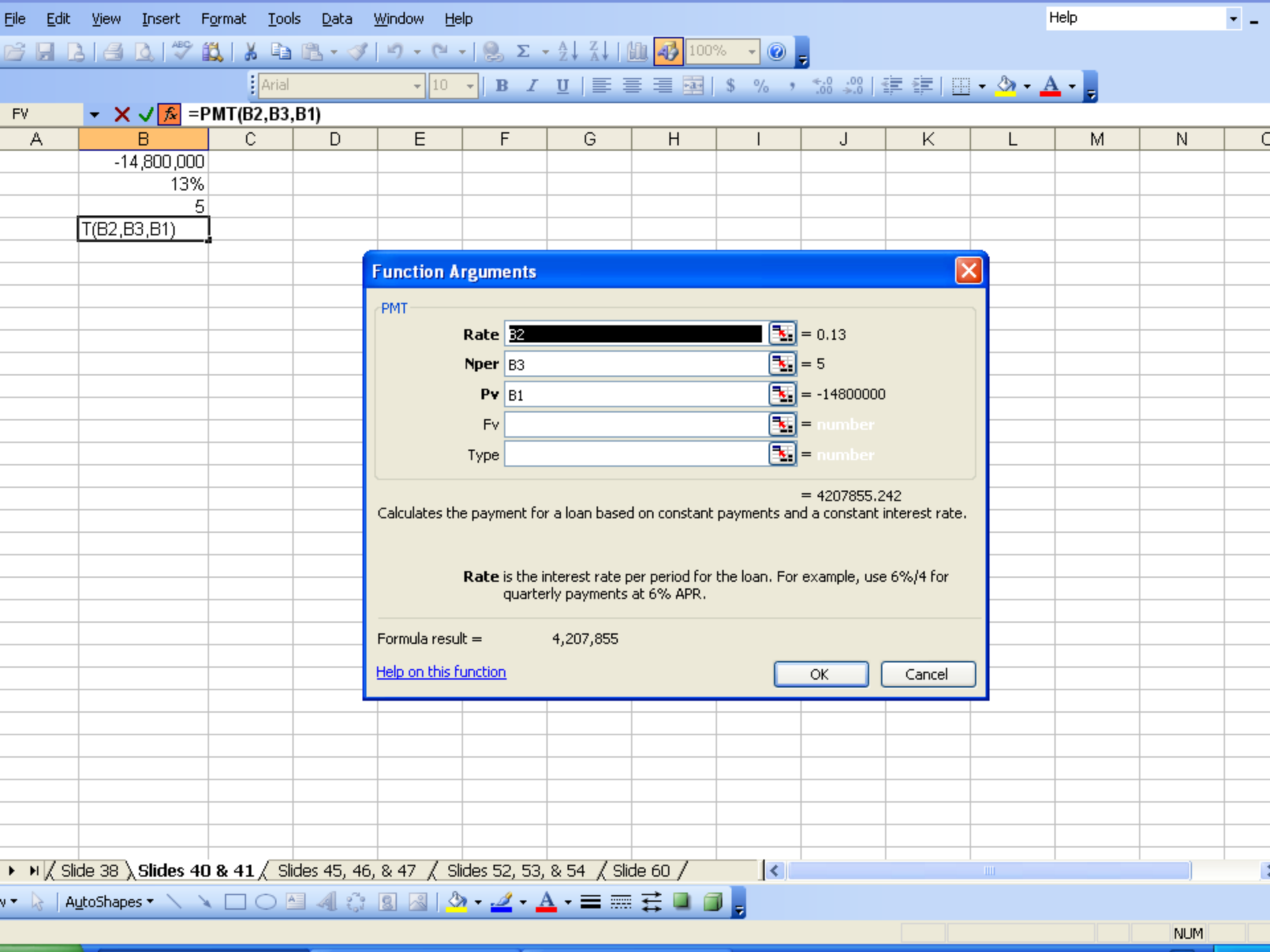
AMORTIZATION

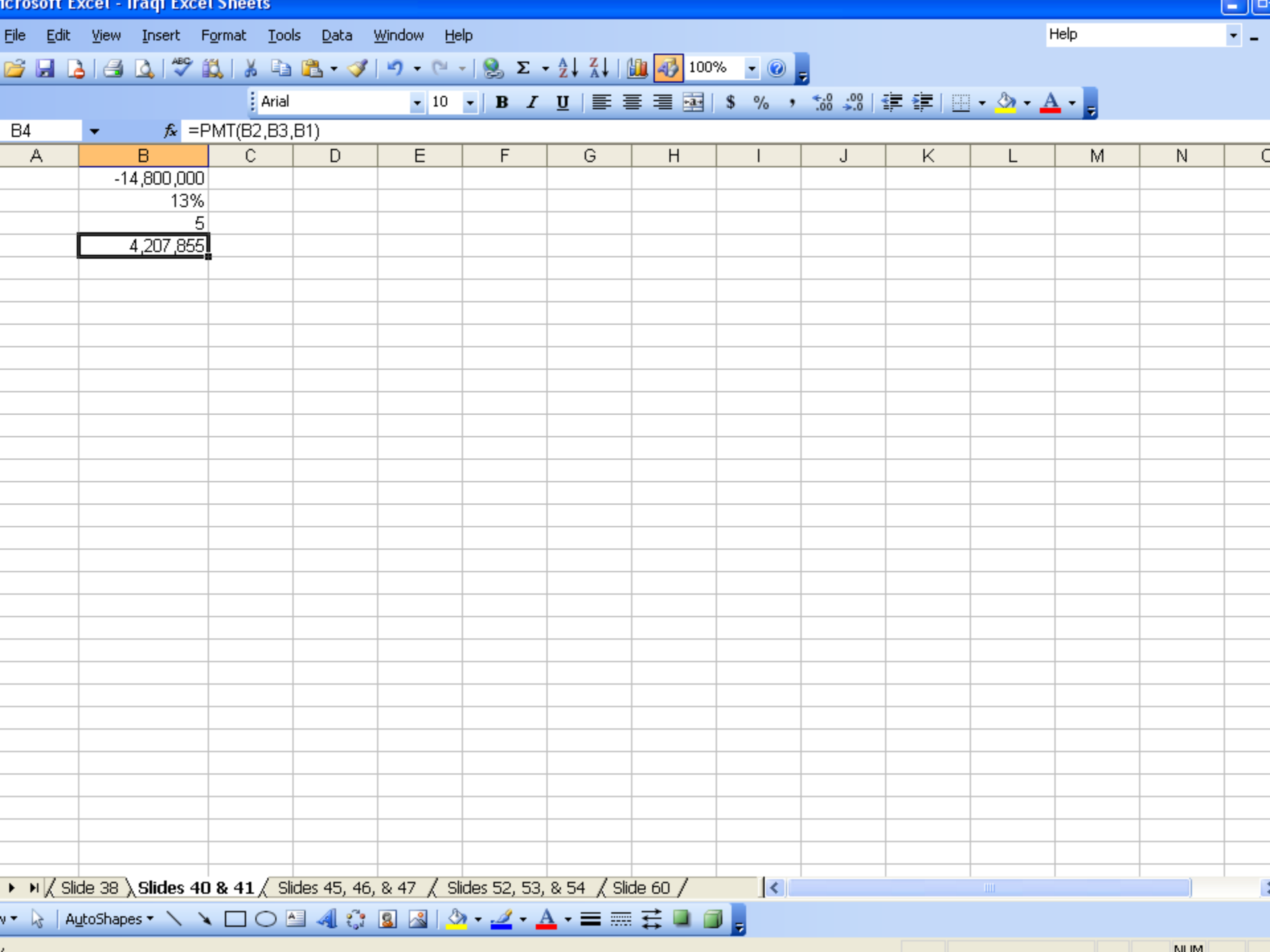
The process by which the level of debt is reduced when equal periodic debt payments that cover interest and principal are made.

EXAMPLE

A. If you borrow ID 14,800,000 on a 5 year note at 13%, what are your annual principal and interest payments?

ID 4,207,855


File Edit View Insert Format Tools Data Window Help
Help
FV
=PMT(B2,B3,B1)
-14,800,000
13%
5
T(B2,B3,B1)
Function Arguments
PMT
Rate B2 = 0.13
Nper B3 = 5
Pv B1 = -14800000
Fv = number
Type = number
= 4207855.242
Calculates the payment for a loan based on constant payments and a constant interest rate.
Rate is the interest rate per period for the loan. For example, use 6%/4 for quarterly payments at 6% APR.
Formula result = 4,207,855
Help on this function
OK
Cancel
Slide 38
Slides 40 & 41
Slides 45, 46, & 47
Slides 52, 53, & 54
Slide 60
AutoShapes
NUM


Microsoft Excel - Iraqi Excel Sheets
File Edit View Insert Format Tools Data Window Help
Help
100%
Arial
10
B4
=PMT(B2,B3,B1)
A B C D E F G H I J K L M N
-14,800,000
13%
5
4,207,855
Slide 38 Slides 40 & 41 Slides 45, 46, & 47 Slides 52, 53, & 54 Slide 60
AutoShapes

Investment Analysis Exercise

1. **You plan to replace a buffalo herd bull and are considering the purchase of one of the two following alternatives:**
   a. **Regular: Bull** **ID 1,776,000**
   b. **High Performance tested bull** **ID 2,960,000**

2. **Other information:**
   a. **You plan to use this bull to service 25 buffalo cows and you have been averaging an 85% calf crop.**
   b. **You are convinced that, with all other things being equal, the performance tested bull will wean buffalo calves averaging 9 kg heavier than the commercial bull but are concerned whether this benefit is worth the extra ID 1,184,000.**
   c. **Either bull will have a useful life of 5 years.**

Investment Analysis Exercise (continued)

d. **Your banker is offering a 10% rate of return on Certificates of Deposits and you are wondering if this is a better investment alternative for the ID 1,184,000.**

e. **In addition, the Certificates of Deposits are safe whereas the bull purchase carries risk so you want a 2% compensation for risk.**

f. **Assume buffalo calves sold @ ID 2,302 / kg.**

g. **Assume the salvage value of both bulls is the same.**

REQUIREMENT

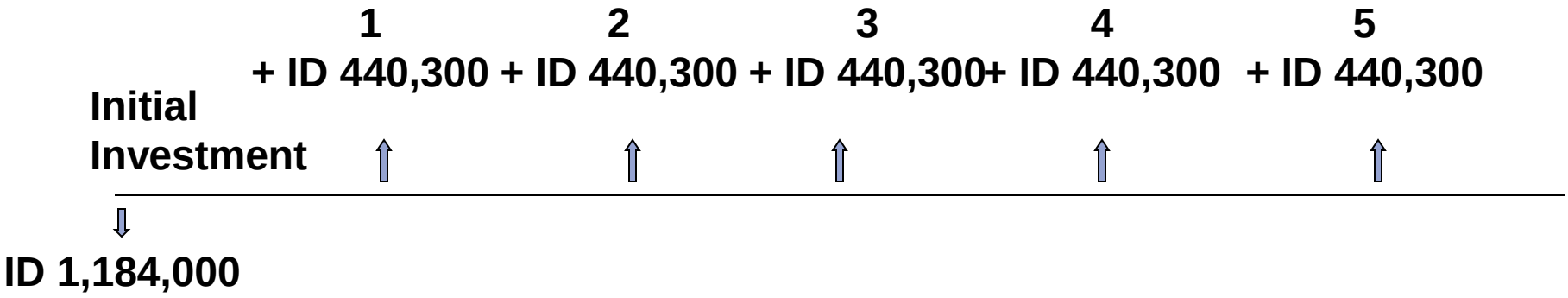
Complete an investment analysis of this investment.

Solution

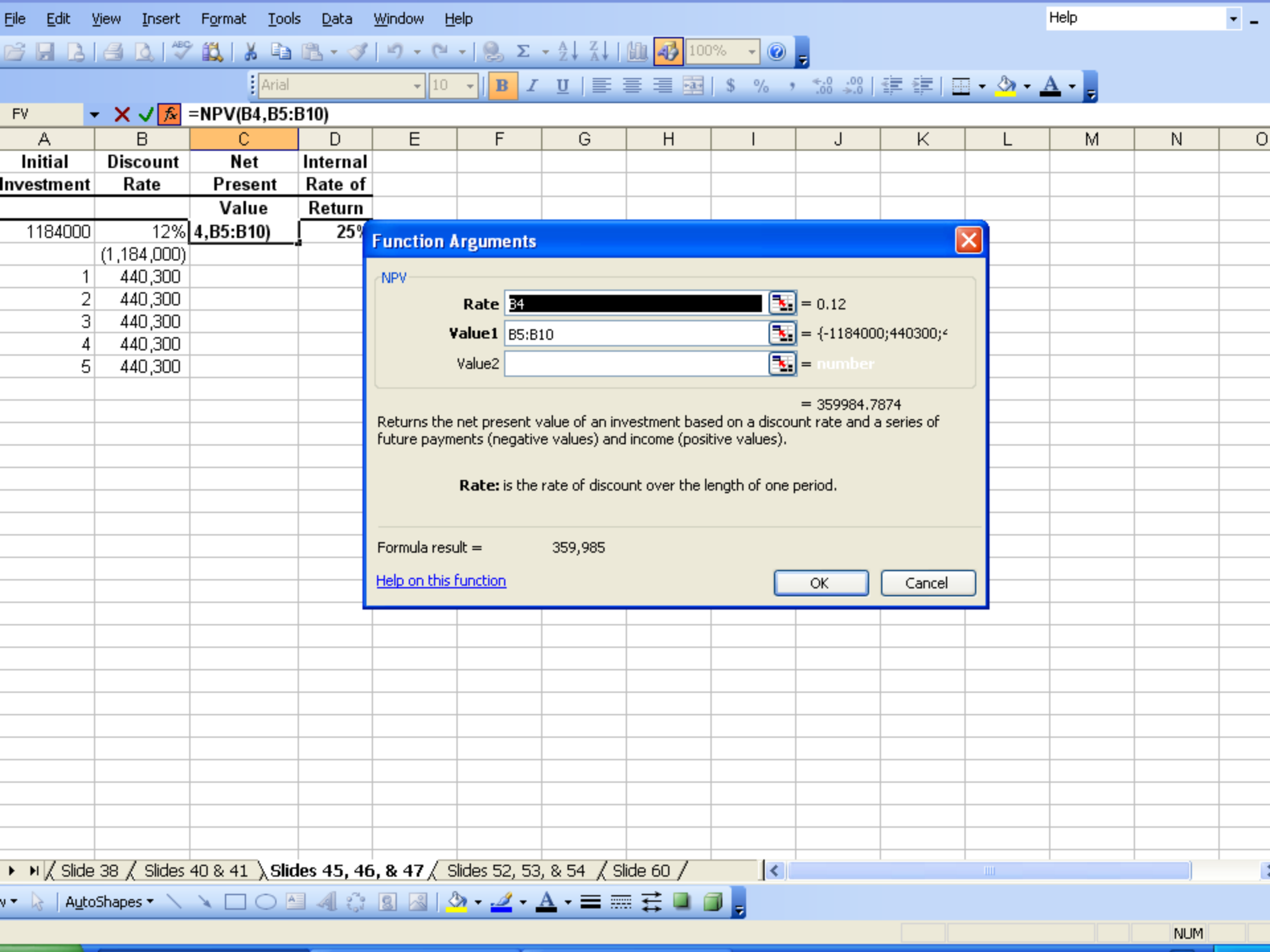
25 cows x 85% calf crop x 9 kg extra = 191.26 kg additional annual production

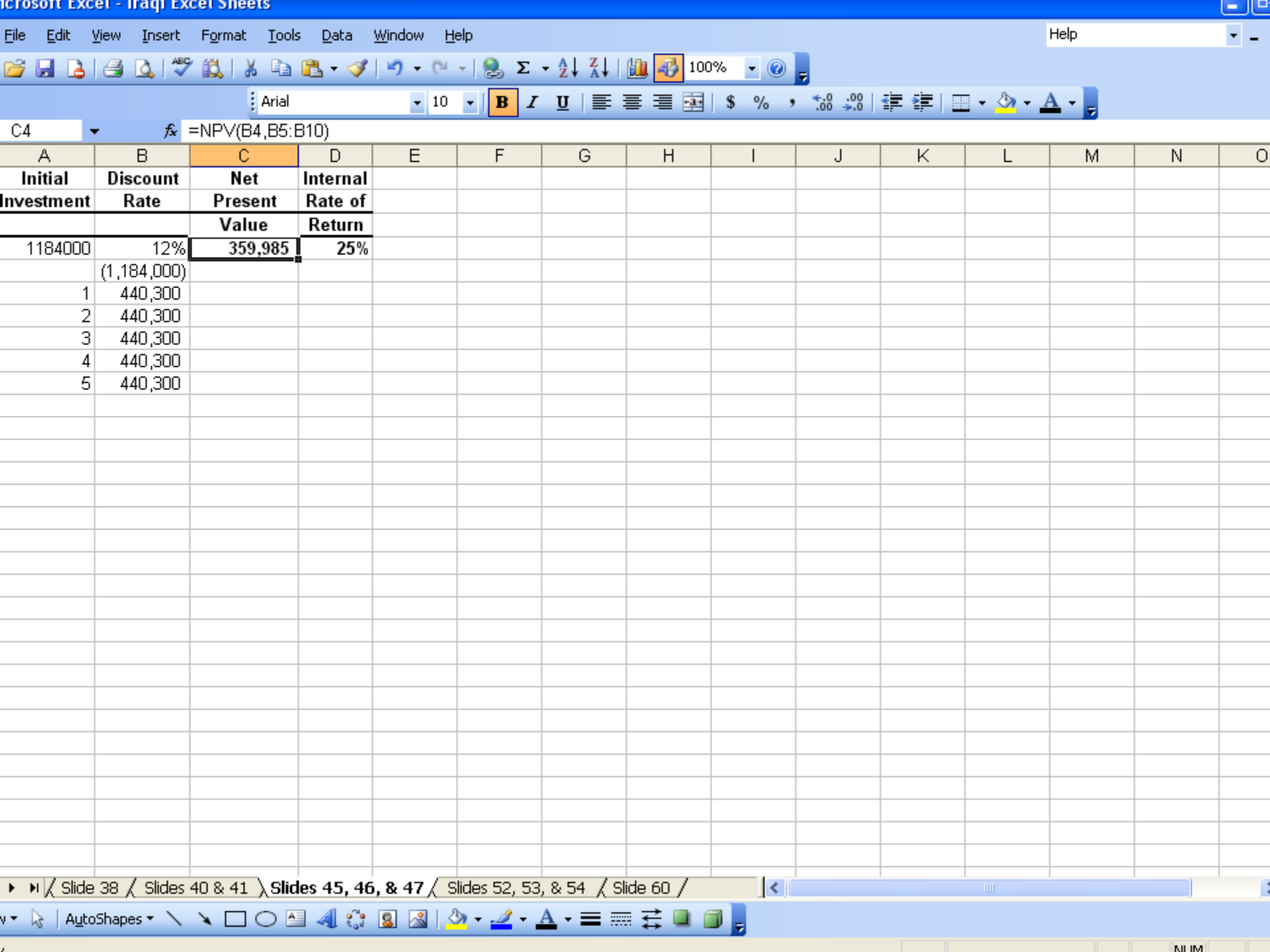
191.26 kg x ID 2,302 = ID 440,300

Cash Flow

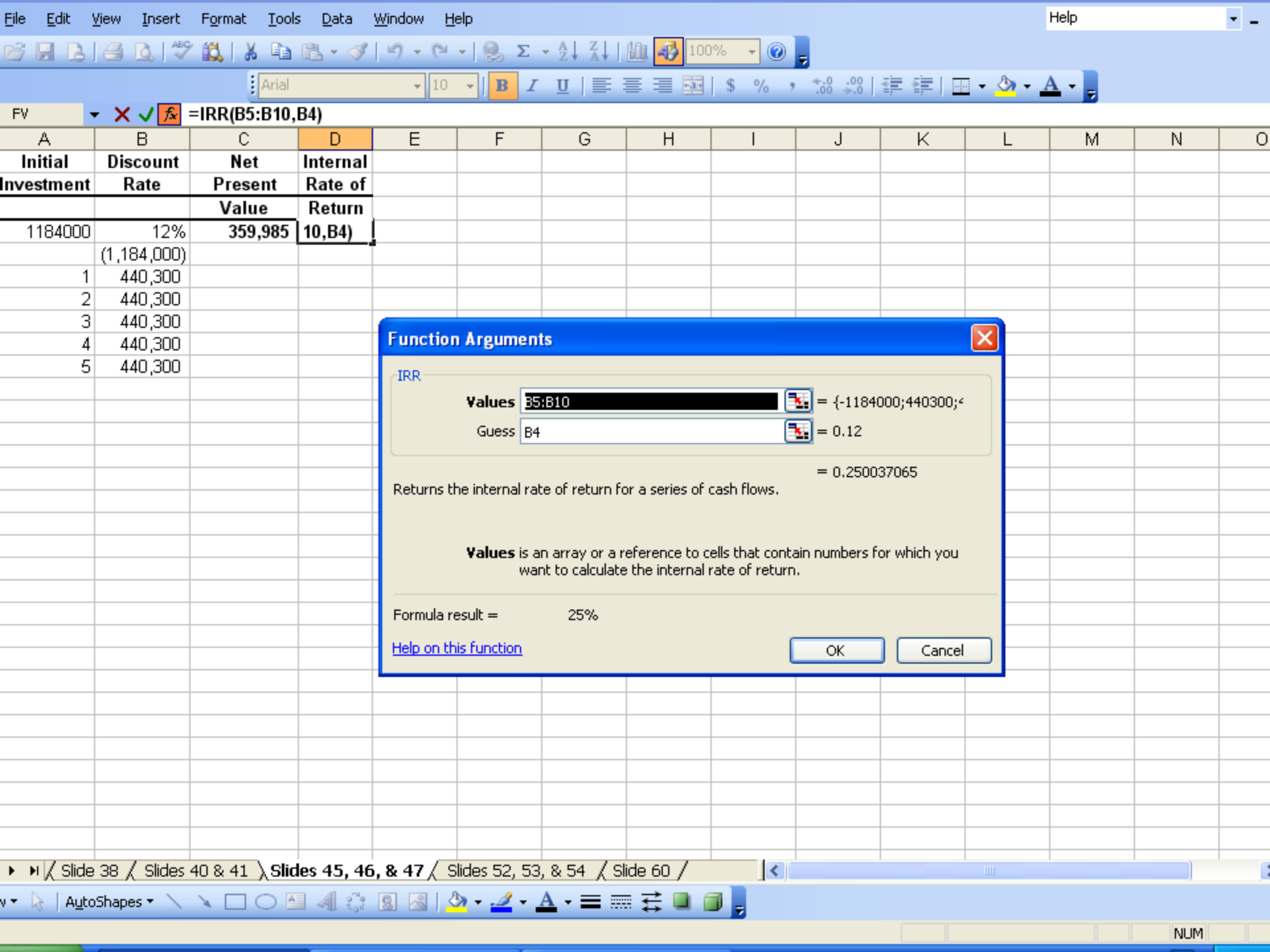


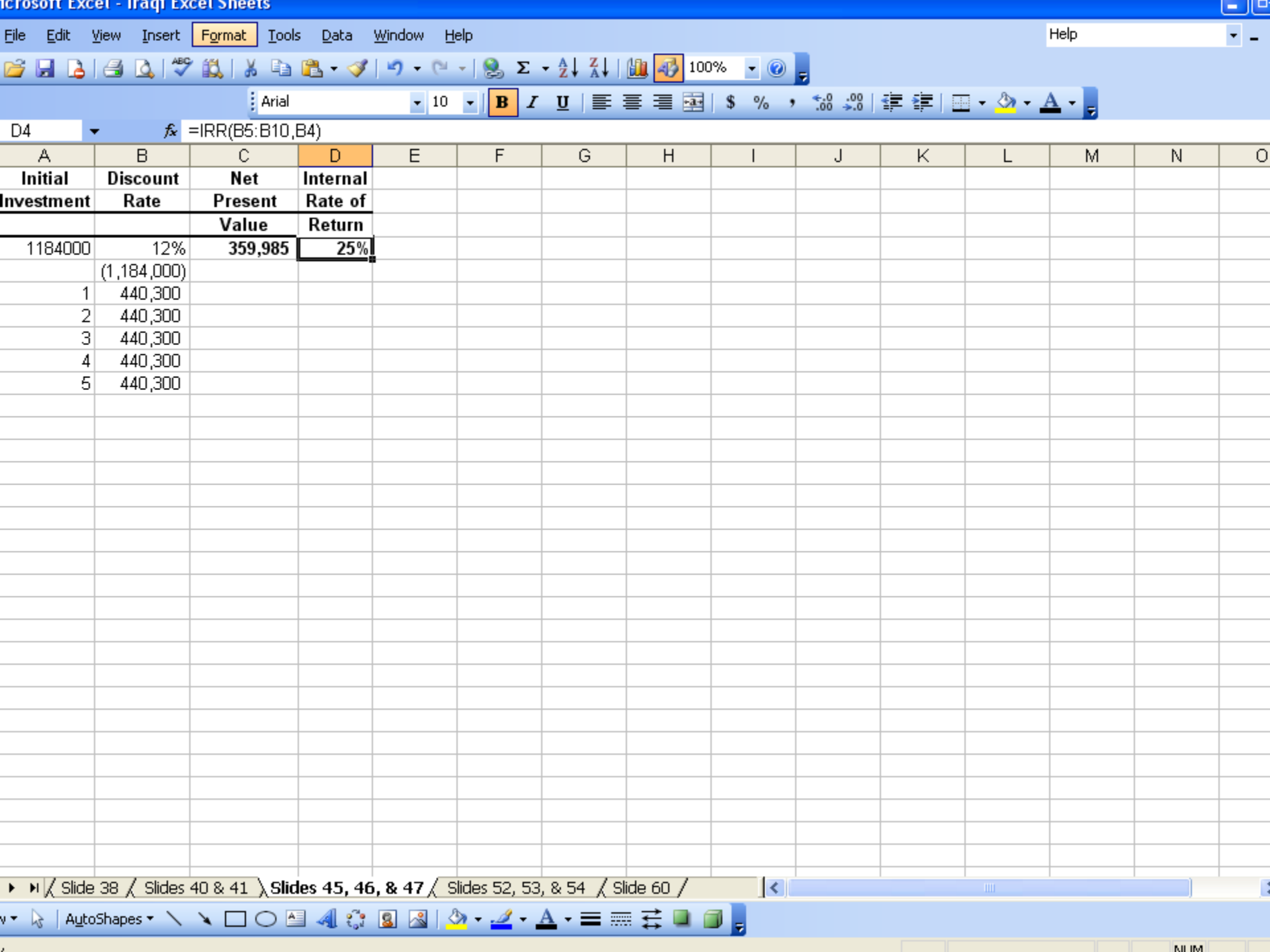
ID 359,985 present value of investment


File Edit View Insert Format Tools Data Window Help
Help
FV
=NPV(B4,B5:B10)
A Initial Investment
B Discount Rate
C Net Present Value
D Internal Rate of Return
1184000
12%
4,B5:B10)
25%
(1,184,000)
1 440,300
2 440,300
3 440,300
4 440,300
5 440,300
Function Arguments
NPV
Rate B4 = 0.12
Value1 B5:B10 = {-1184000;440300;
Value2 = number
= 359984.7874
Returns the net present value of an investment based on a discount rate and a series of future payments (negative values) and income (positive values).
Rate: is the rate of discount over the length of one period.
Formula result = 359,985
Help on this function
OK
Cancel
Slide 38
Slides 40 & 41
Slides 45, 46, & 47
Slides 52, 53, & 54
Slide 60
AutoShapes
NUM



A	B	C	D
Initial Investment	**Discount Rate**	**Net Present Value**	**Internal Rate of Return**
1184000	12%	**359,985**	**25%**
	(1,184,000)		
1	440,300		
2	440,300		
3	440,300		
4	440,300		
5	440,300		


File Edit View Insert Format Tools Data Window Help
Help
FV
=IRR(B5:B10,B4)
A Initial Investment
B Discount Rate
C Net Present Value
D Internal Rate of Return
1184000 12% 359,985 10,B4)
(1,184,000)
1 440,300
2 440,300
3 440,300
4 440,300
5 440,300
Function Arguments
IRR
Values 35:B10 = {-1184000;440300;
Guess B4 = 0.12
= 0.250037065
Returns the internal rate of return for a series of cash flows.
Values is an array or a reference to cells that contain numbers for which you want to calculate the internal rate of return.
Formula result = 25%
Help on this function
OK
Cancel
Slide 38
Slides 40 & 41
Slides 45, 46, & 47
Slides 52, 53, & 54
Slide 60
AutoShapes
NUM


Microsoft Excel - Iraqi Excel Sheets
File Edit View Insert Format Tools Data Window Help
Help
100%
Arial 10
D4
=IRR(B5:B10,B4)
Initial Investment
Discount Rate
Net Present Value
Internal Rate of Return
1184000
12%
359,985
25%
(1,184,000)
1 440,300
2 440,300
3 440,300
4 440,300
5 440,300
Slide 38
Slides 40 & 41
Slides 45, 46, & 47
Slides 52, 53, & 54
Slide 60
AutoShapes

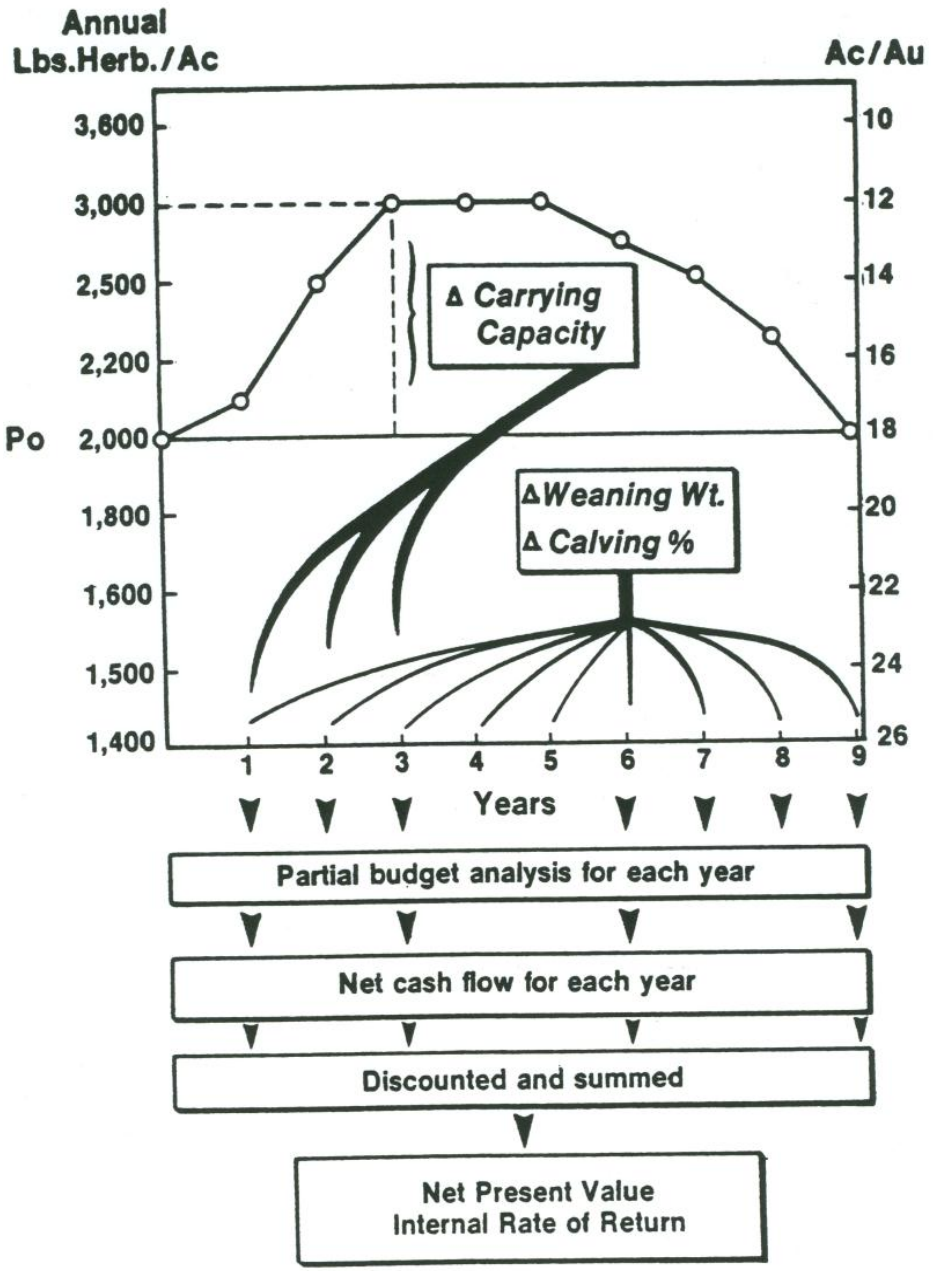
EXERCISE

Range Improvement Investment

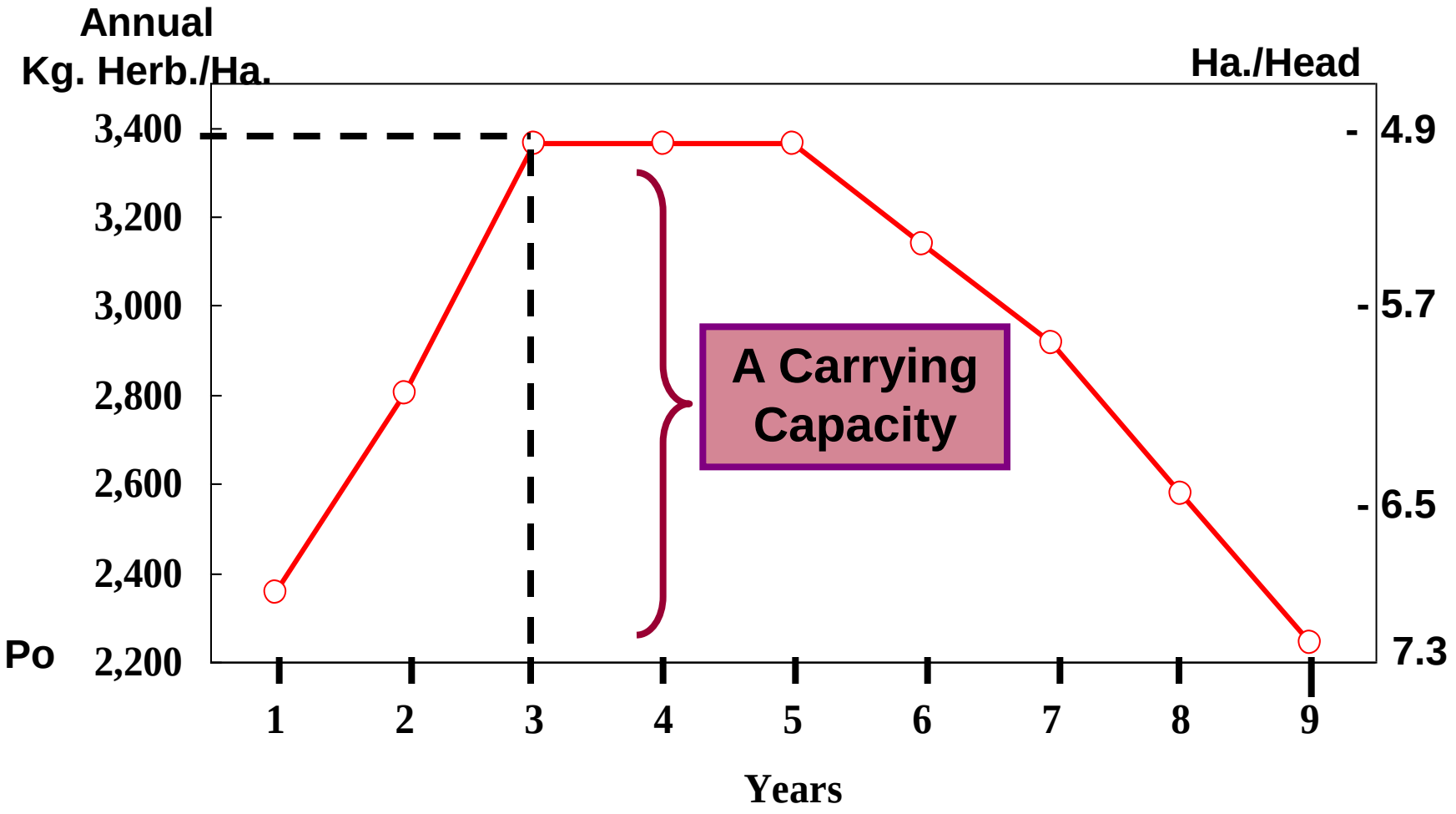
You are producing about 907.2 kilograms of forage per acre to produce cattle. You are contemplating investing in a treatment of the range which will cost ID 73,143/hectare to reduce woody species. Data shows that by removing woody species, the treatment will allow you to gradually increase forage production to 3,362.4 kg/hectare and gradually decline over nine years to the current level.

You want to know if the ID 73,143/acre investment will be profitable.

RANGE IMPROVEMENT INVESTMENTS

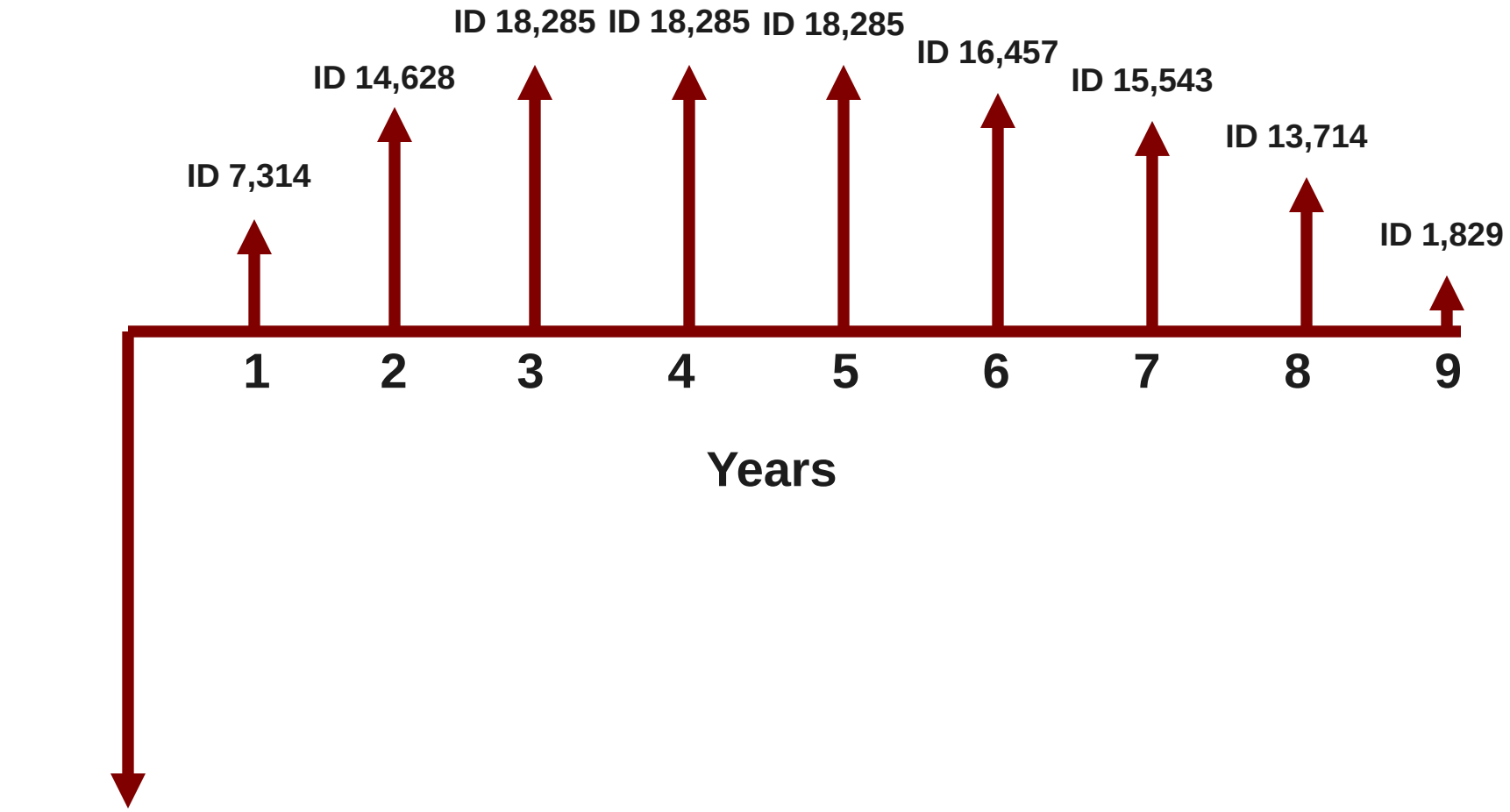


RANGE IMPROVEMENT INVESTMENTS



RANGE IMPROVEMENT INVESTMENTS (continued)

Revenue/Hectare



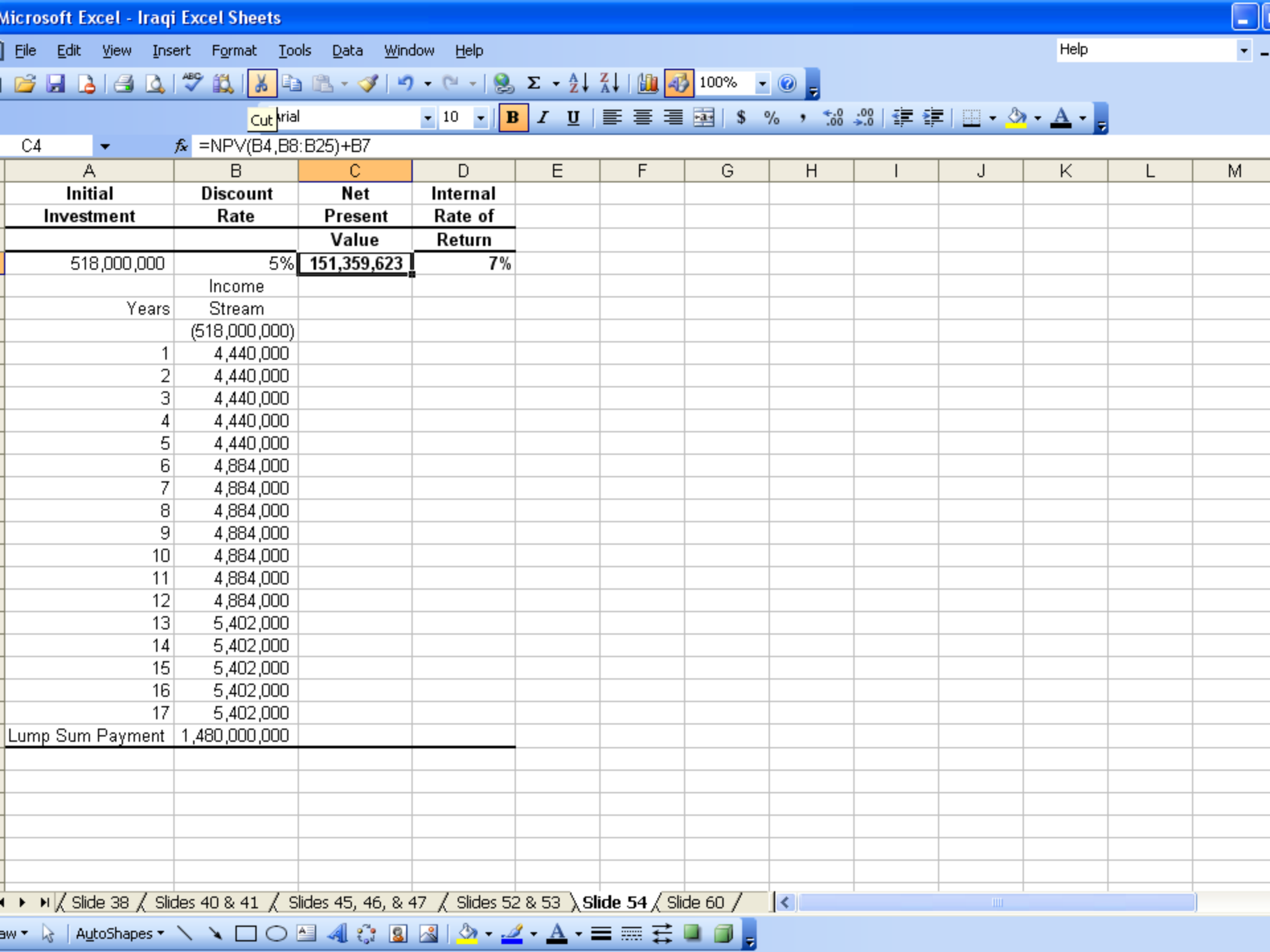
Initial Investment	Discount Rate	Net Present Value	Internal Rate of Return
73,142	8%	**13,274**	**13%**
	(73,142)		
1	7,314		
2	14,628		
3	18,285		
4	18,285		
5	18,285		
6	16,457		
7	15,543		
8	13,714		
9	1,829		

Practical Application

A buyer is offering you ID 518,000,000 for property you own.

Another buyer offers to pay you ID 4,440,000/year in rent for 17 years and a lump sum payment of ID 1.48 billion at the end of the 17 year period. You select to use a 5% discount rate.

What are the financial consequences of selling your property to the second buyer?


Microsoft Excel - Iraqi Excel Sheets
File Edit View Insert Format Tools Data Window Help
Help
Cut
100%
Arial
10
C4
=NPV(B4,B8:B25)+B7
Initial Investment
Discount Rate
Net Present Value
Internal Rate of Return
518,000,000
5%
151,359,623
7%
Years
Income Stream
(518,000,000)
1 4,440,000
2 4,440,000
3 4,440,000
4 4,440,000
5 4,440,000
6 4,884,000
7 4,884,000
8 4,884,000
9 4,884,000
10 4,884,000
11 4,884,000
12 4,884,000
13 5,402,000
14 5,402,000
15 5,402,000
16 5,402,000
17 5,402,000
Lump Sum Payment 1,480,000,000
Slide 38
Slides 40 & 41
Slides 45, 46, & 47
Slides 52 & 53
Slide 54
Slide 60
AutoShapes

Evaluating Comparative Investments Cash Flows

Cash Flows for Three Investments

Year	Investment A	Investment B	Investment C
0 - present	- ID 29,600,000	- ID 29,600,000	- ID 29,600,000
1	2,960,000	8,584,000	14,800,000
2	5,920,000	8,584,000	11,840,000
3	8,880,000	8,584,000	8,880,000
4	11,840,000	8,584,000	4,440,000
5	14,800,000	8,584,000	1,480,000

- **Simple Rate of Return**
- **Back Pay Period**
- **Net Present Value**
- **Internal Rate of Return**

Evaluating Comparative Investments Cash Flows

Cash Flows for Three Investments

Year	Investment A	Investment B	Investment C
0 - present	- ID 29,600,000	- ID 29,600,000	- ID 29,600,000
1	2,960,000	8,584,000	14,800,000
2	5,920,000	8,584,000	11,840,000
3	8,880,000	8,584,000	8,880,000
4	11,840,000	8,584,000	4,440,000
5	14,800,000	8,584,000	1,480,000

- **Simple Rate of Return (SRR)**

$$SRR = \frac{Y}{I}$$

Where Y = average annual profits (depreciation has already been subtracted)

and I = initial or average investments over the investment's life

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Type a question for help

Arial 10

A1

	A	B	C	D	E	F	G	H	I	J	K	L	M
		Simple Rate of Return											
	Year	(29,600,000)	(29,600,000)	(29,600,000)									
	1	2,960,000	8,584,000	14,800,000									
	2	5,920,000	8,584,000	11,840,000									
	3	8,880,000	8,584,000	8,880,000									
	4	11,840,000	8,584,000	4,440,000									
	5	14,800,000	8,584,000	1,480,000									
	Sum	**14,800,000**	**13,320,000**	**11,840,000**									
	Avg. over 5 years	**2,960,000**	**2,664,000**	**2,368,000**									
	Divided by initial inv.	**29,600,000**	**29,600,000**	**29,600,000**									
	Simple Rate of Return	**10.0%**	**9.0%**	**8.0%**									

Slides 52 & 53 | Slide 55 | **Sheet4** | Sheet3 | Sheet2 | Sheet1 | Slide 60

AutoShapes

NUM

Evaluating Comparative Investments Cash Flows

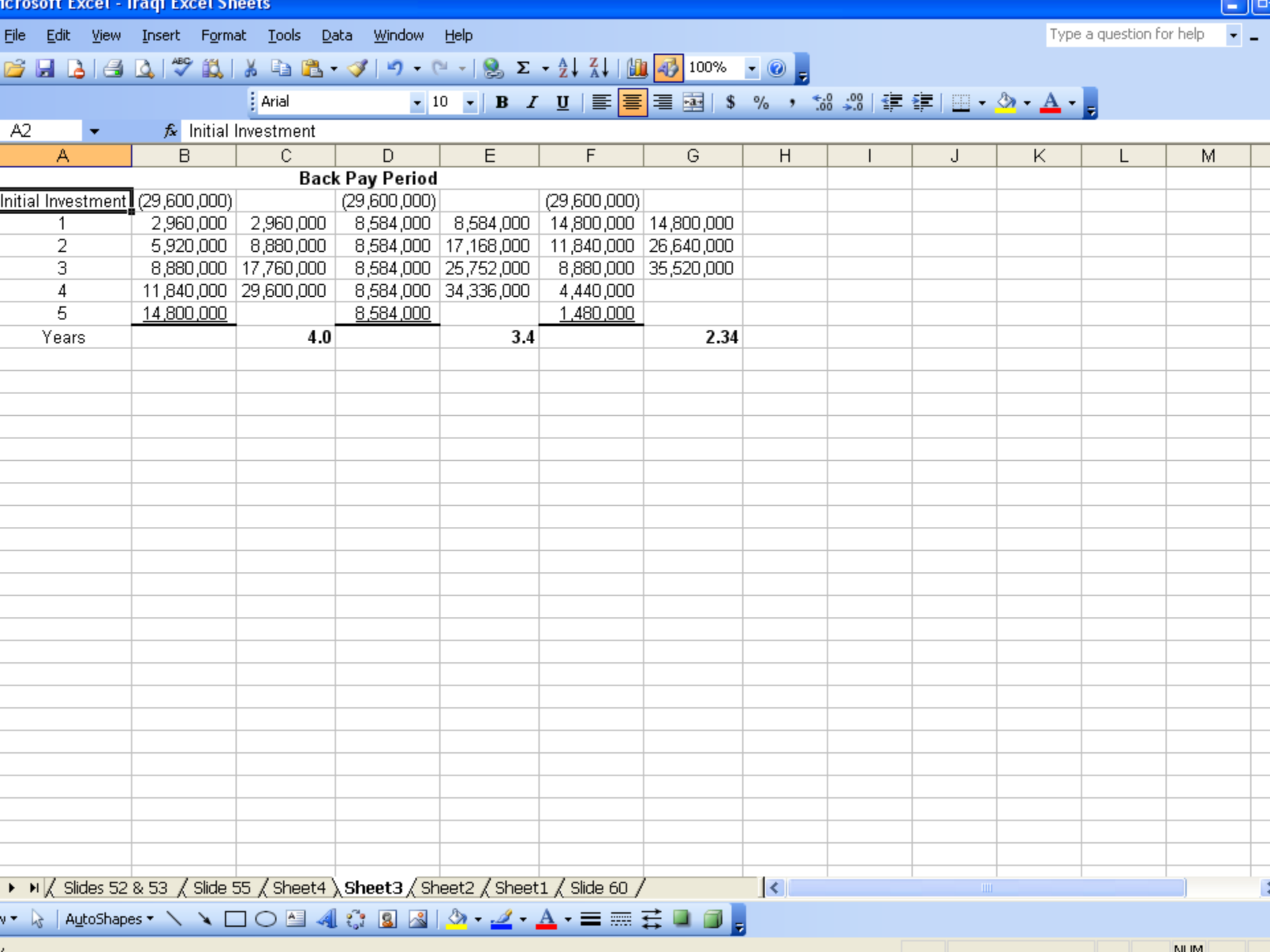
Cash Flows for Three Investments

Year	Investment A	Investment B	Investment C
0 - present	- ID 29,600,000	- ID 29,600,000	- ID 29,600,000
1	2,960,000	8,584,000	14,800,000
2	5,920,000	8,584,000	11,840,000
3	8,880,000	8,584,000	8,880,000
4	11,840,000	8,584,000	4,440,000
5	14,800,000	8,584,000	1,480,000

- **Back Pay Period (P)**

$$P = \frac{I}{E}$$

Where I = initial investment "and
E = projected cash flow per period$^{(n)}$ from the investment



	A	B	C	D	E	F	G	H	I	J	K	L	M
				Back Pay Period									
	Initial Investment	(29,600,000)		(29,600,000)		(29,600,000)							
	1	2,960,000	2,960,000	8,584,000	8,584,000	14,800,000	14,800,000						
	2	5,920,000	8,880,000	8,584,000	17,168,000	11,840,000	26,640,000						
	3	8,880,000	17,760,000	8,584,000	25,752,000	8,880,000	35,520,000						
	4	11,840,000	29,600,000	8,584,000	34,336,000	4,440,000							
	5	14,800,000		8,584,000		1,480,000							
	Years		**4.0**		**3.4**		**2.34**						

Evaluating Comparative Investments Cash Flows

Cash Flows for Three Investments

Year	Investment A	Investment B	Investment C
0 - present	- ID 29,600,000	- ID 29,600,000	- ID 29,600,000
1	2,960,000	8,584,000	14,800,000
2	5,920,000	8,584,000	11,840,000
3	8,880,000	8,584,000	8,880,000
4	11,840,000	8,584,000	4,440,000
5	14,800,000	8,584,000	1,480,000

- **Net Present Value (NPV)**

Where: INV = initial investment; and

$$NPV = -INV + \frac{P_1}{1+I} + \frac{p_2}{(1+I)^2} + \ldots + \frac{p_n}{(1+I)^n} + \frac{V_n}{(1+i)^n}$$

P_n = the net cash flows attributed to the investment that can be withdrawn each year; and
V_n = any salvage or terminal investment value; and
N = the length of planning horizon; and
I = the interest rate

Simplified: $NPV = -INV + A[USPV_{i,n}] + V_n/(1+i)^n$

	A	B	C	D	E	F	G	H	I	J	K	L
	Net Present Value											
	Discount Rate	8%	8%	8%								
	Initial Investment	(29,600,000)	(29,600,000)	(29,600,000)								
	1	2,960,000	8,584,000	14,800,000								
	2	5,920,000	8,584,000	11,840,000								
	3	8,880,000	8,584,000	8,880,000								
	4	11,840,000	8,584,000	4,440,000								
	5	14,800,000	8,584,000	1,480,000								
	Net Present Value	3,741,483	4,327,243	5,161,686								

Evaluating Comparative Investments Cash Flows

Cash Flows for Three Investments

Year	Investment A	Investment B	Investment C
0 - present	- ID 29,600,000	- ID 29,600,000	- ID 29,600,000
1	2,960,000	8,584,000	14,800,000
2	5,920,000	8,584,000	11,840,000
3	8,880,000	8,584,000	8,880,000
4	11,840,000	8,584,000	4,440,000
5	14,800,000	8,584,000	1,480,000

- **Internal Rate of Return (IRR)**

$$O = -INV + \frac{P_1}{1+I} + \frac{p_2}{(1+I)^2} + \ldots + \frac{p}{(1+I)^n} + \frac{V_n}{(1+i)^n}$$

Where: INV = initial investment; and p_n = the net cash flows attributed to the investment that can be withdrawn each year; and
V_n = any salvage or terminal investment value; and
N = the length of planning horizon

The IRR calculation equates the present value of the cash flow series to the initial investment by solving for i (the interest rate).

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Type a question for help

Arial 10

A2 Discount Rate

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
		Internal Rate of Return												
	Discount Rate	8%	8%	8%										
	Initial Investment	(29,600,000)	(29,600,000)	(29,600,000)										
	1	2,960,000	8,584,000	14,800,000										
	2	5,920,000	8,584,000	11,840,000										
	3	8,880,000	8,584,000	8,880,000										
	4	11,840,000	8,584,000	4,440,000										
	5	14,800,000	8,584,000	1,480,000										
	IRR	**12.0%**	**13.8%**	**17.6%**										

Slides 52 & 53 | Slide 55 | Sheet4 | Sheet3 | Sheet2 | **Sheet1** | Slide 60

AutoShapes

Capital Budgeting Results for Three Investments

Criterion	Investment A	Investment B	Investment C
Simple rate-of-return	10%	9%	8%
Payback	4.0 years	3.4 years	2.3 years
Net present Value @ 8%	3,741,440	4,327,520	5,162,240
Internal rate-of-return	12.01%	13.82%	17.57%

SUMMARY

- CAPITAL BUDGETING
- Important Investment Analysis Concept
- TIME VALUE OF MONEY @ INTEREST OR DISCOUNT RATE
  - Present/Future value of lump sum payments
  - Present/Future value of a uniform series of payments
  - Present/Future value of a non-uniform series of payments
  - Internal rate of return
- Amortization