Midterm #2 Financial Functions Practice Annotated Answers

REMEMBER: Ignore negatives and round ansers to the nearest dollar; will explain why in subsequent weeks.

If you understand these problems, you'll do great on the midterm.

#1 Output = FV "how much will have been saved at retirement"   **NOTICE: PER year = PMT**

($5,743,556) Wow, that's a lot of $ for just saving $5,000 per year. It pays to start early!!!!

Inputs: n = 60 (80-20); PMT = $5,000 ("per year"); rate = 7.8% PV = 0 ("no savings or debt")

#2A BOTH   Output = PV "Present Value of Option One"

OPTION ONE   Inputs: PMT = $35,000 ("per year"); n = 10; rate = 8.6%   **NOTICE: PER year = PMT**

($228,627)

#2B

OPTION TWO   Inputs: FV = $450,000 "lump sum in 12 years"; n =12; rate = 8.6%

($167,207)

#2C   **OPTION ONE HAS A HIGHER PRESENT VALUE & IS THE BEST OPTION.**

#3 Output = PMT "monthly payment"   **REMEMBER: FOR ALL LOANS, DO MONTHLY**

($3,814)

Inputs: PV = $780,000 (loan amount); rate = 4.2%/12; n = 30*12

#4 Output = PMT ". . .must be saved each year . . ."   **NOTICE: EACH YEAR = PMT**

($6,006)

Inputs: FV = $1,000,000 ("savings goal"); n = 40 (70 - 30); PV = - $15,000 ("presently have savings of");

rate = 5.7%.   **NOTICE: "Savings" input as negative $15,000.**

#5 Output = PV "how much should an investor pay"   **NOTE: INVESTMENT VALUES = PV**

($35,720)

Inputs: FV = $40,000 (face value); PMT = $2,700 per year; rate = 8%; n = 15 years.

#6 Output = PV "how much should an investor pay"   **NOTE: INVESTMENT VALUES = PV**

($24,879)

Inputs: FV = $60,000 (face value); rate = 4.5%; n = 20 years

#7 Output = PV "how much can you borrow", loan amount

($522,919)

Inputs: PMT = $185,000 per year * 27% / 12;   **NOTE: 27% allocates annual income to annual payment**
          rate = 5.1%/12; n = 15*12   **Dividing by 12 converts annual payment to monthly payment**

#8 Output = PMT ("must be saved each year")   **NOTICE: EACH YEAR = PMT**

($5,435)

Inputs: FV = $1,300,000 ("savings goal"); rate = 6.4%; n = 45 (72-27)

#9 Output = FV "will have been saved at retirement"   **Note: Student loan is a liability, input as negative value**

($873,036)

Inputs: PMT = $8,000 ("per year"); PV = −$30,000 ("student loan"); rate = 5.7%; n = 40 (70 - 30)

#10 **One Bedroom Unit Monthly Rent =** $1,000   **X 8 units X 12 months (1st Year Income For One Bedroom Units)**
         Two Bedroom Unit Monthly Rent = $1,650   **X 9 units X 12 months (1st Year Income For Two Bedroom Units)**

	Year 1	Year 2	Year 3	Year 4	
Annual Gross Income					
One Bedroom Units	$96,000	$103,680	$111,974	**$120,932**	**Increase each year gross income 7% by multiplying by 1.07**
Two Bedroom Units	$178,200	$192,456	$207,852	**$224,481**	**Increase each year gross income 7% by multiplying by 1.07**
Total Annual Gross Income	$274,200	$296,136	$319,827	**$345,413**	**Add Gross Income Figures for One & Two Bedroom Units**
Vacancy & Collection Loss (4%)	$10,968	$11,845	$12,793	**$13,817**	**Multiply each year annual gross income by 5%**
Annual Effective Gross Income	$263,232	$284,291	$307,034	**$331,597**	**Subtract vacancy figure from annual gross income for each year**
Annual Expenses	$45,000	$46,350	$47,741	**$49,173**	**Increase each year expenses 4% by multiplying by 1.04**
Annual Net Income	$218,232	$237,941	$259,293	**$282,424**	**Subtract expenses from effective gross income for each year**

#11 **Use the four net annual income figures for years one, two, three and four.**

	Year One	Year Two	Year Three	Year Four	
	$218,232	$237,941	$259,293	$282,424	
Add Property Sale Price To Year 4				**$1,250,000**	**4th year annual net income of $282,424 +**
	$218,232	$237,941	$259,293	$1,532,424	**$1,250,000 proceeds of sale = $1,532,424**

Output = NPV ("net present value")

$1,542,978   Rate = 12%

#12 Note: Before the clock starts (time 0), you buy the property for $1,600,000. Input the purchase price as a negative number, $ going out
   of your pocket. Use the same figures as used in #11 and put a year zero in front with the purchase price input as a negative.

Year Zero	Year One	Year Two	Year Three	Year Four	
-$1,600,000	$218,232	$237,941	$259,293	$1,532,424	**BE SURE TO ROUND % ANSWER TO NEAREST TENTH**

Output = IRR ("intenral rate of return")   **NO input required for "Guess" in function box.**

10.8%

#BONUS **One Bedroom Unit Monthly Rent =** $650   **X 8 units X 12 months (1st Year Income For One Bedroom Units)**

      Two Bedroom Unit Monthly Rent = $1,500   **X 9 units X 12 months (1st Year Income For Two Bedroom Units)**

	Year 1	Year 2	Year 3	Year 4	
Annual Gross Income					
One Bedroom Units	$62,400	$67,392	$72,783	**$78,606**	Increase each year gross income 8.5% by multiplying by 1.085
Two Bedroom Units	$162,000	$174,960	$188,957	**$204,073**	Increase each year gross income 8.5% by multiplying by 1.085
Total Annual Gross Income	$224,400	$242,352	$261,740	**$282,679**	Add Gross Income Figures for One & Two Bedroom Units
Vacancy & Collection Loss (4%)	$8,976	$9,694	$10,470	**$11,307**	Multiply each year annual gross income by 4%
Annual Effective Gross Income	$215,424	$232,658	$251,271	**$271,372**	Subtract vacancy figure from annual gross income for each year
Annual Expenses	$45,000	$46,350	$47,741	**$49,173**	Increase each year expenses 3.5% by multiplying by 1.035
Annual Net Income	$170,424	$186,308	$203,530	**$222,199**	Subtract expenses from effective gross income for each year

Use the four net annual income figures for years one, two, three and four.

	Year One	Year Two	Year Three	Year Four
	$170,424	$186,308	$203,530	$222,199
Add Property Sale Price To Year 4				**$1,250,000**
	$170,424	$186,308	$203,530	$1,472,199

NET PRESENT VALUE =   **$1,381,166**

Determine the property values ("outcome values") for each of the six possible combinations of rent. Output = NPV ("net present value") Rate = 12%

Calculations use Net Present Value function (see #11 above). Find the probability of each outcome using the multiplication rule.

Outcome Value Assuming:			**P (X,Y)**		**PRODUCT OF PROBABILITY * OUTCOME**
One Bedroom = $650 & Two Bedroom = $1,500	**$1,381,166**	*	7.5%	=	**$103,587**
One Bedroom = $1,000 & Two Bedroom = $1,500	**$1,490,340**	*	12.0%	=	**$178,841**
One Bedroom = $1,350 & Two Bedroom = $1,500	**$1,599,514**	*	10.5%	=	**$167,949**
One Bedroom = $650 & Two Bedroom = $1,650	**$1,433,803**	*	17.5%	=	**$250,916**
One Bedroom = $1,000 & Two Bedroom = $1,650	**$1,542,978**	*	28.0%	=	**$432,034**
One Bedroom = $1,350 & Two Bedroom = $1,650	**$1,652,152**	*	24.5%	=	**$404,777**
				+	

ADD UP THE PRODUCTS TO FIND THE "EXPECTED VALUE FOR THIS PROPERY"   **$1,538,104**

      100.0%

Business Statistics Mr. Nelson 11/15/2013