

Midterm #2 Financial Functions Practice Annotated Answers

REMEMBER: Ignore negatives and round answers 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**
(\$386,905)
Inputs: n = 40 (70-30); PMT = \$2,500 ("per year"); rate = 6% PV = 0 ("no savings or debt")

#2A BOTH Output = PV "Present Value of Option One"
OPTION ONE Inputs: PMT = \$20,000 ("per year"); n = 15; rate = 5% **NOTICE: PER year = PMT**
(\$207,593)

#2B OPTION TWO Inputs: FV = \$450,000 "lump sum in 7 years"; n = 7; rate = 5%
(\$319,807)

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

#3 Output = PMT "monthly payment" **REMEMBER: FOR ALL LOANS, DO MONTHLY**
(\$1,794)
Inputs: PV = \$350,000 (loan amount); rate = 4.6%/12; n = 30*12

#4 Output = PMT ". . . must be saved each year . . ." **NOTICE: EACH YEAR = PMT**
(\$2,372)
Inputs: FV = \$1,200,000 ("savings goal"); n = 50 (75 - 25); PV = - \$8,000 ("presently have savings of");
rate = 7%. **NOTICE: "Savings" input as negative \$8,000.**

#5 Output = PV "how much should an investor pay" **NOTE: INVESTMENT VALUES = PV**
(\$16,646)
Inputs: FV = \$20,000 (face value); PMT = \$800 per year; rate = 6%; n = 12 years.

#6 Output = PV "how much should an investor pay" **NOTE: INVESTMENT VALUES = PV**
(\$13,112)
Inputs: FV = \$50,000 (face value); rate = 5.5%; n = 25 years

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

(\$357,410)

Inputs: PMT = \$95,000 per year * 35% / 12;
rate = 4.7%/12; n = 15*12

**NOTE: *35% allocates annual income to annual payment
Dividing by 12 converts annual payment to monthly payment**

#8 Output = PMT ("must be saved each year")

(\$4,478)

Inputs: FV = \$1,300,000 ("savings goal"); rate = 6%; n = 50 (75-25)

NOTICE: EACH YEAR = PMT

#9 Output = FV "will have been saved at retirement"

(\$698,686)

Inputs: PMT = \$5,000 ("per year"); PV = -\$20,000 ("student loan"); rate = 7%; n = 40 (70 - 30)

Note: Student loan is a liability, input as negative value

#10 **One Bedroom Unit Monthly Rent = \$750 X 10 units X 12 months (1st Year Income For One Bedroom Units)**
Two Bedroom Unit Monthly Rent = \$1,250 X 5 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	\$90,000	\$93,600	\$97,344	\$101,238	Increase each year gross income 4% by multiplying by 1.04
Two Bedroom Units	\$75,000	\$78,000	\$81,120	\$84,365	Increase each year gross income 4% by multiplying by 1.04
Total Annual Gross Income	\$165,000	\$171,600	\$178,464	\$185,603	Add Gross Income Figures for One & Two Bedroom Units
Vacancy & Collection Loss (6%)	\$9,900	\$10,296	\$10,708	\$11,136	Multiply each year annual gross income by 6%
Annual Effective Gross Income	\$155,100	\$161,304	\$167,756	\$174,466	Subtract vacancy figure from annual gross income for each year
Annual Expenses	\$40,000	\$42,000	\$44,100	\$46,305	Increase each year expenses 5% by multiplying by 1.05
Annual Net Income	\$115,100	\$119,304	\$123,656	\$128,161	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	
	\$115,100	\$119,304	\$123,656	\$128,161	
Add Property Sale Price To Year 4				\$1,300,000	4th year annual net income of \$128,161 + \$1,300,000 proceeds of sale = \$1,428,161
Output = NPV ("net present value")	\$115,100	\$119,304	\$123,656	\$1,428,161	
\$1,313,243					Rate = 9%

#12 **Note: Before the clock starts (time 0), you buy the property for \$950,000. 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	
	-\$950,000	\$115,100	\$119,304	\$123,656	\$1,428,161	
Output = IRR ("internal rate of return")						19.6%

**BE SURE TO ROUND % ANSWER TO NEAREST TENTH
NO input required for "Guess" in function box.**

#BONUS **One Bedroom Unit Monthly Rent =** \$750 **X 10 units X 12 months (1st Year Income For One Bedroom Units)**
Two Bedroom Unit Monthly Rent = \$1,250 **X 5 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	\$90,000	\$93,600	\$97,344	\$101,238	Increase each year gross income 4% by multiplying by 1.04
Two Bedroom Units	\$75,000	\$78,000	\$81,120	\$84,365	Increase each year gross income 4% by multiplying by 1.04
Total Annual Gross Income	\$165,000	\$171,600	\$178,464	\$185,603	Add Gross Income Figures for One & Two Bedroom Units
Vacancy & Collection Loss (6%)	\$9,900	\$10,296	\$10,708	\$11,136	Multiply each year annual gross income by 6%
Annual Effective Gross Income	\$155,100	\$161,304	\$167,756	\$174,466	Subtract vacancy figure from annual gross income for each year
Annual Expenses	\$40,000	\$42,000	\$44,100	\$46,305	Increase each year expenses 7% by multiplying by 1.07
Annual Net Income	\$115,100	\$119,304	\$123,656	\$128,161	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
	\$115,100	\$119,304	\$123,656	\$128,161
Add Property Sale Price To Year 4				\$1,300,000
	\$115,100	\$119,304	\$123,656	\$1,428,161

NET PRESENT VALUE = **\$1,313,243**

Determine the property values ("outcome values") for each of the six possible combinations of rent. Output = NPV ("net present value") Rate = 9% 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 = \$750 & Two Bedroom = \$1,250	\$1,313,243	*	8%	=	\$105,059
One Bedroom = \$900 & Two Bedroom = \$1,250	\$1,371,191	*	20%	=	\$274,238
One Bedroom = \$1,000 & Two Bedroom = \$1,250	\$1,409,824	*	12%	=	\$169,179
One Bedroom = \$750 & Two Bedroom = \$1,400	\$1,342,217	*	12%	=	\$161,066
One Bedroom = \$900 & Two Bedroom = \$1,400	\$1,400,166	*	30%	=	\$420,050
One Bedroom = \$1,000 & Two Bedroom = \$1,400	\$1,438,798	*	18%	=	\$258,984

ADD UP THE PRODUCTS TO FIND THE "EXPECTED VALUE FOR THIS PROPERTY" **\$1,388,576**