

BEFORE: SAVINGS LAB

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Savings Lab Assignment, Math 1005

For this Savings Lab, you are to write up the solution to the following question with clarity and detail.

In the last two years of college, you scrape by and save \$25 per month. Then, your family gives you \$1000 as a graduation present. After graduation, with your new job you can save \$75 per month for 3 years. After 3 years, you decide to double your monthly savings and put away \$150 per month. How much will you have in the account after a total of 20 years assuming you earn 3.8% compounded monthly?

Your write up should be typed and submitted to AsULearn as a pdf file.

AFTER: SAVINGS LAB

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MAT 1005 Savings Lab

Purpose: The purpose of this assignment is to (1) improve your mathematical writing, (2) demonstrate your mathematical thinking and (3) demonstrate proficiency with applying the savings calculations.

Assignment: For this Savings Lab, you are to write up the solution to the following question with clarity and detail. This assignment is worth 20 points total.

Question: In the last two years of college college, you scrape by and save \$25 per month. Then, your family gives you \$1000 as a graduation present. After graduation, with your new job you can save \$75 per month for 3 years. After 3 years, you decide to double your monthly savings and put away \$150 per month. How much will you have in the account after a total of 20 years assuming you earn 3.8% compounded monthly?

Sample Product

Problem: During the first 4 years of your job, you are able to save \$200 per month. After 4 years, life gets crazy (marriage, kids, etc) that drain your money so you are not able to save anymore, but you are able to keep the amount you saved tucked away. What will it be worth forty years from when you started saving assuming you can get 4.2% compounded monthly?

Answer: At the end of 40 years, there will be \$47,200.34 in the account.

Solution: To find out how much money will be in the account after 40 years, first figure out how much is in the account after 4 years because the monthly deposits only last for 4 years. Using the TVM application, see figure 1, there will be \$10,433.70 after 4 years. There is no initial deposit so Present Value is 0, the monthly payments are \$200, the annual rate is 4.2%, and there are 48 periods (months). The future value is -10,433.70 because of the cash flow - in other words, if 200 is going into the bank (positive), then the amount coming out in 4 years is negative.

The image shows a screenshot of a TVM Calculator interface. At the top, there are navigation links: '< Home', 'TVM Calculator', and 'Advanced ?'. Below this, there are several input fields with corresponding buttons to the right:

- Present Value: 0 (button: PV)
- Payments: 200 (button: PMT)
- Future Value: -10,433.70 (button: FV)
- Annual Rate%: 4.2 (button: Rate)
- Periods: 48 (button: Periods)

Below these fields, there are additional settings:

- Compounding: Monthly
- Mode: End (selected), Beginning
- Decimal: Two (selected), Three, Four, Five

Figure 1: Calculation for periodic payments

The amount after 4 years will be the present value in the second calculation (see Figure 2). The payment amount is 0 since there is not longer any monthly payment. The annual rate stays the same and the number of periods is 36 times 12 (432) since there are 36 years left and 12 months in a year. Solving for the future value, this tells us that there will be \$47,200.34 in the account after a total of 40 years.

The screenshot shows a 'TVM Calculator' interface with the following fields and values:

Field	Value	Label
Present Value	10,433.70	PV
Payments		PMT
Future Value	-47,200.34	FV
Annual Rate%	4.2	Rate
Periods	432	Periods
Compounding	Monthly	
Mode	End	Beginning
Decimal	Two	Three, Four, Five

Figure 2: Calculation for 36 year lump sum

Below there is a checklist and a rubric. These are meant to help you know whether your solution is done correctly. I will be using the rubric for grading, but the checklist may help you more.

Checklist

- Did you restate/rewrite the problem?
- Did you write the answer in a complete sentence (in a box or highlighted) ?
- Did you explain your steps and reasoning thoroughly?
- Did you use the correct language when describing your solution?
- Did you explain the variables (present value, payments, etc) you used?

Criteria/Rubric:

	Proficient	Emerging	Needs Improvement
Savings Calculation Accuracy	Includes most steps and steps are accurate (6)	missing a few steps and/or some steps are inaccurate (4)	many missing steps and/or many inaccurate steps (1)
Variable Accuracy	Uses the correct variables (6)	Mostly correct variables (4)	Many incorrect variables (1)
Mathematics Language	language and terminology is mostly correct (6)	mostly correct mathematics language (4)	many incorrect reasonings and terminology (1)
Problem Restatement	rewrites problem correctly (1)	rewrites problem incorrectly (0.5)	does not include problem statement (0)
Solution Statement	rewrites problem correctly (1)	rewrites problem incorrectly (0.5)	does not include problem statement (0)