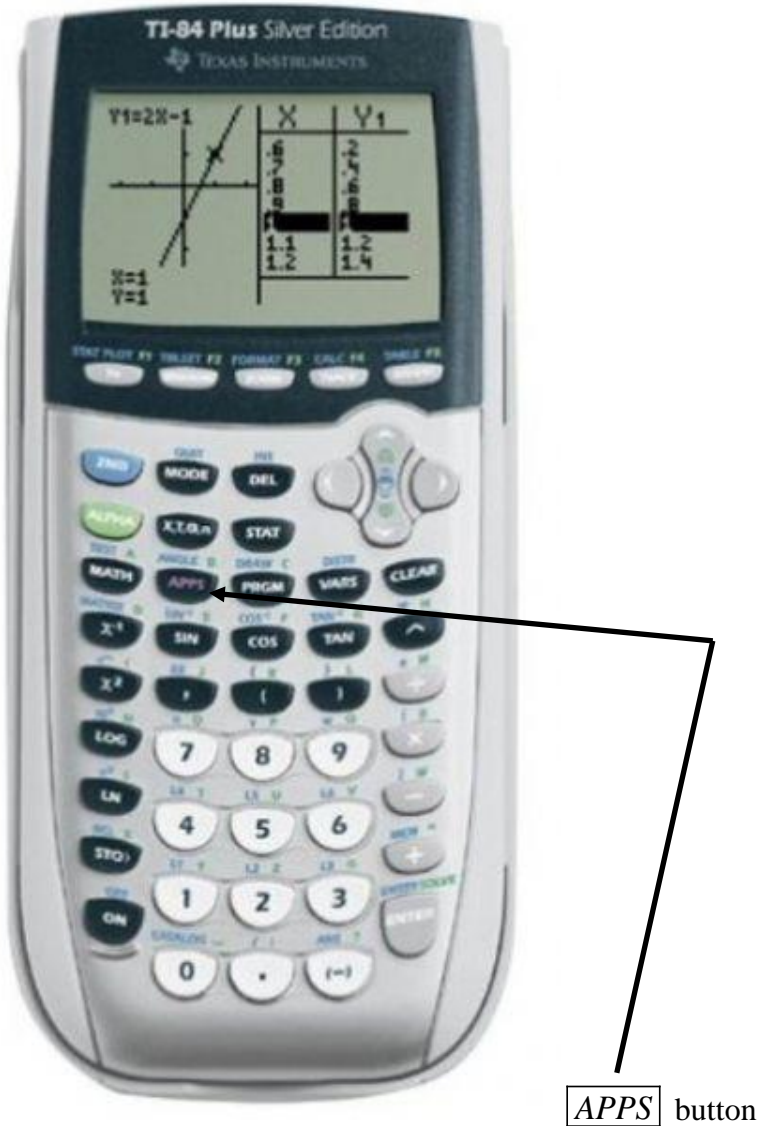


## AMDM Unit 6 • TVM Solver

This worksheet uses the TVM Solver key on the TI-84, TI-83 Plus or TI-83. To locate this key do the following:

To locate this key do the following:



Press the **APPS** button.

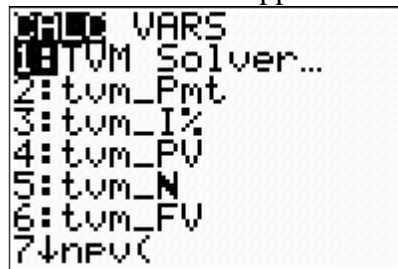
## AMDM Unit 6 • TVM Solver

The APPLICATIONS screen will appear.



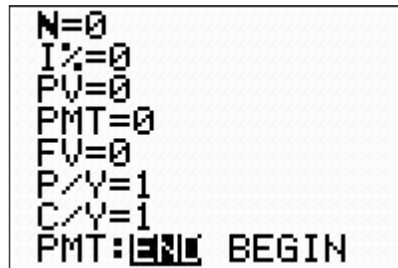
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



**OR**

For the **TI-83**: Press 2<sup>nd</sup> Finance, #1 TVM Solver.

**N** is the total number of periods in the loan. For example: For 12 monthly payments for 30 years,  $N = 360$ . For 12 monthly payments for 15 years,  $N = 180$ .

**I%** is the interest rate. **DO NOT CHANGE THE PERCENT TO A DECIMAL.**

**PV** is the Present Value of the loan. This amount will be the beginning value of the loan. Be sure to subtract the down payment from the purchase price amount to get the value of the loan.

**PMT** is the payment amount. Enter this as a negative value

**FV** is the Future Value of the loan. This is the ending value of the loan.

**P/Y** is the number of periods in a year.

**C/Y** is the number of compounding in a year. (In general, these will be the same).

## AMDM Unit 6 • TVM Solver

FV will be zero, since the ending value of the loan will be zero.

Formulas

$$\text{Amount Financed} = \text{Cash Price} - \text{Down payment}$$

$$\text{Total of all payments} = \# \text{ of payments} \times \text{amount of payment}$$

$$\text{Total Finance charge} = \text{Total of all payments} - \text{Amount financed}$$

Examples

1. Yue Chen is going to purchase a house with a purchase price of \$118,000.00. He has \$24,000.00 to pay as a down payment. He is going to finance the home for 30 years at an 8% interest rate.

a.) What is the Amount Financed? \_\_\_\_\_

Answer:  $\$118,000.00 - \$24,000.00 = \$94,000.00$

b.) What is the payment amount? \_\_\_\_\_

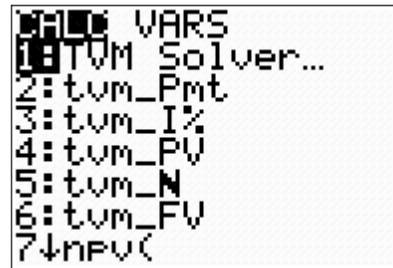
Press the **APPS** button.

The APPLICATIONS screen will appear.



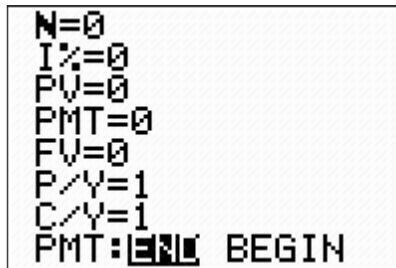
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



## AMDM Unit 6 • TVM Solver

The correct values are:

N= 360 (30 years, monthly payment = 30 \* 12 = 360)

I%= 8

PV= 94000 (amount financed)

PMT= 0 alpha solve

FV= 0 (The loan amount will be zero in the future)

P/Y= 12 (There are 12 payments per year)

C/Y= 12

Since the monthly payment is the unknown, use the arrow keys to place the cursor on that value.  
Now Press: ALPHA, SOLVE (the solve key is the same as the ENTER key.)

The calculator should now show:

```

N=360
I%=8
PV=94000
■ PMT= -689.73869...
FV=0
P/Y=12
C/Y=12
PMT: [ ] [ ] [ ] BEGIN
    
```

(Notice the payment shows up on the calculator as a negative.)

Answer: The monthly payment (without escrow) is \$689.74.

c.) What is the total of all the payments? \_\_\_\_\_

Answer:  $\$689.74 * 360 = \$248,306.40$

d.) What is the finance charge? \_\_\_\_\_

Answer:  $\$248,306.40 - \$94000.00 = \$154,306.40$

e.) Complete the Amortization Schedule below.

Monthly Payment Number	Principal Balance	Interest Amount	Amount of Monthly Payment	Reduction in Principal due	Principal Balance
1	<b>\$94,000.00</b>	$\$94000.00 * .08 * 1/12$ <b>= \$626.67</b>	<b>\$689.74</b>	$\$689.74 - \$626.67$ <b>= \$63.07</b>	$\$94000.00 - \$63.07 =$ <b>\$93,936.93</b>
2	<b>\$93,936.93</b>	$\$93,936.93 * .08 * 1/12$ <b>= \$626.25</b>	<b>\$689.74</b>	$\$689.74 - \$626.25 =$ <b>\$63.49</b>	$\$93,936.93 - \$63.49 =$ <b>\$93,873.44</b>
3	<b>\$93,873.44</b>	$\$93,873.44 * .08 * 1/12$ <b>= \$625.82</b>	<b>\$689.74</b>	$\$689.74 - \$625.82$ <b>= \$63.92</b>	$\$93,873.44 - \$63.92 =$ <b>\$93,809.52</b>

## AMDM Unit 6 • TVM Solver

2. You are planning to buy a house with a purchase price of \$253,000.00. You have 20% to pay as a down payment and will finance the remaining amount for 15 years at a 6.54% interest rate.

a.) What is the Amount Financed? \_\_\_\_\_

Answer:  $\$253,000.00 * .80 = \$202,400.00$

b.) What is the payment amount? \_\_\_\_\_

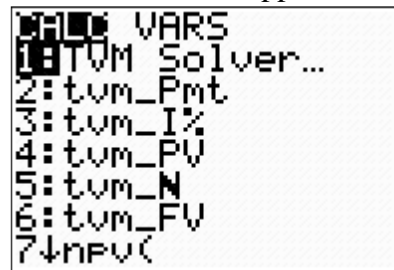
Press the **APPS** button.

The APPLICATIONS screen will appear.



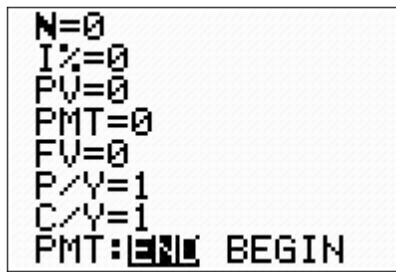
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



The correct values are:

N= 180 (15 years, monthly payment =  $12 * 15$ )

I%= 6.54

PV= 202400 (Amount financed, after down payment)

PMT= 0 Alpha Solve

FV= 0 (The balance will be zero in the future)

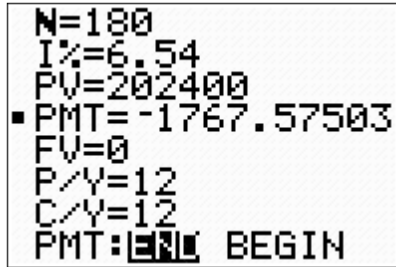
P/Y= 12 (There are 12 payments per year)

C/Y= 12

## AMDM Unit 6 • TVM Solver

Since the monthly payment is the unknown, use the arrow keys to place the cursor beside PMT.  
Now Press: ALPHA, SOLVE (the solve key is the same as the ENTER key.)

The calculator should now show:



```
N=180
I%=6.54
PV=202400
PMT=-1767.57503
FV=0
P/Y=12
C/Y=12
PMT: [BEG] BEGIN
```

(Notice the payment shows up on the calculator as a negative.)

Answer: The monthly payment amount will be \$1,767.58

c.) What is the total of all the payments? \_\_\_\_\_

Answer:  $\$1767.58 * 180 = \$318,164.40$

d.) What is the finance charge? \_\_\_\_\_

Answer:  $\$318,164.40 - \$202,400.00 = \$115,764.40$

3. Jim Hicks is going to purchase a house with a purchase price of \$132,000.00. He has 20% to pay as a down payment. He is going to finance the home for 25 years at a 7.5% interest rate.

a.) What is the Amount Financed? \_\_\_\_\_

Answer: Paying 20% down implies financing 80%.  $\$132000 * .80 = \$105,600.00$

b.) What is the payment amount? \_\_\_\_\_

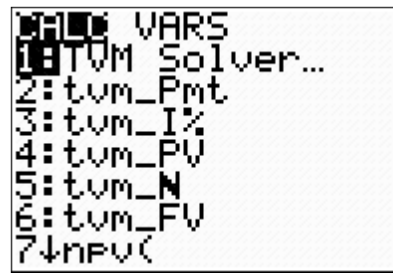
Press the **APPS** button.

The APPLICATIONS screen will appear.

Press **1: Finance**

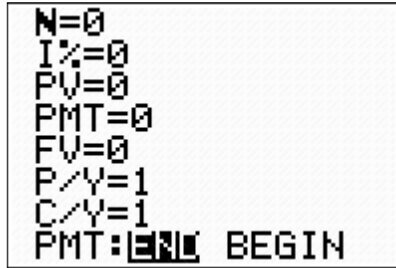
The screen should appear as follows:

## AMDM Unit 6 • TVM Solver



Press **1**: TVM Solver.

The screen should now look like:



The correct values are:

$N = 300$  (25 years, monthly payments =  $12 * 25 = 300$ )

$I\% = 7.5$

$PV = 105600$  (amount financed after down payment)

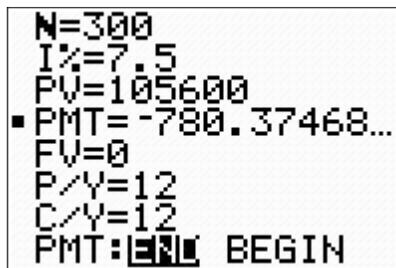
$PMT = 0$  alpha solve

$FV = 0$

$P/Y = 12$

$C/Y = 12$

The calculator should now show:



(Notice the payment shows up on the calculator as a negative.)

Answer: The amount of the monthly payment is: \$780.37

c.) What is the total of all the payments? \_\_\_\_\_

Answer:  $\$780.37 * 300 = \$234,111.00$

d.) What is the finance charge? \_\_\_\_\_

Answer:  $\$234,111.00 - \$105,600.00 = \$128,511.00$

## AMDM Unit 6 • TVM Solver

**Practice Problems. Answer each of the following. Use the TI-83/84 to find payment.**

1. Jeff Jones purchased a new condominium for \$159,000.00. The bank required a \$10,000 down payment. Assume a rate of 6.5 % on a 30-year mortgage.

- What is the amount financed?
- What is Jeff's monthly payment?
- What is Jeff's total payback (or total of all payments)?
- What is Jeff's total interest cost?

2. Bill Stedman bought a home for \$108,000.00. He put down 25% and obtained a mortgage for 30 years at 11 %.

- What is the amount financed?
- What is Bill's monthly payment?
- What is Bill's total payback (or the total of all monthly payments)?
- What is the total interest cost?

3. Robin Mullins purchased a new condominium for \$96,500.00. The bank required a \$22,000 down payment. Assume a rate of 8.45 % on a 20-year mortgage.

- What is the amount financed?
- What is Robin's monthly payment?
- What is Robin's total payback (or total of all payments)?
- What is Robin's total interest cost?

4. Ruth Price bought a home for \$118,000.00. He put down 30% and obtained a mortgage for 35 years at 6 %.

- What is the amount financed?
- What is Ruth's monthly payment?
- What is Ruth's total payback (or the total of all monthly payments)?
- What is the total interest cost?



## AMDM Unit 6 • TVM Solver

### Practice Answers

1.a. Answer:  $\$159,000.00 - \$10,000.00 = \$149,000$

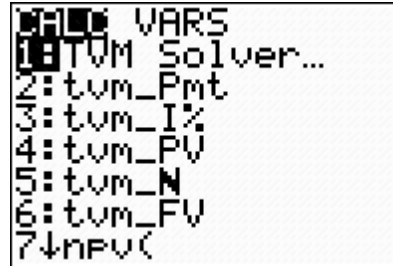
b. Press the **APPS** button.

The APPLICATIONS screen will appear.



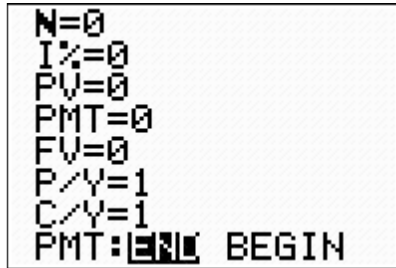
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



The correct values are:

$N = 360$  (30 years \* 12 = 360)

$I\% = 6.5$

$PV = 149000$  (amount financed)

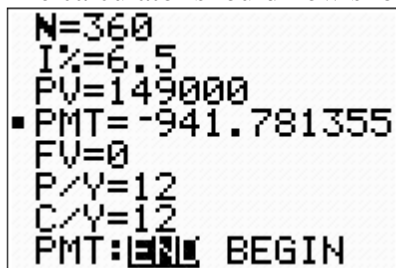
$PMT = 0$  alpha solve

$FV = 0$  (balance will be zero in the future)

$P/Y = 12$  (payments are made monthly)

$C/Y = 12$

The calculator should now show:



(Notice the payment appears as a negative)

Answer:  $\$941.78$

## AMDM Unit 6 • TVM Solver

c.  $\$941.78 * 360 = \$339,040.80$

d.  $\$339,040.80 - \$149,000.00 = \$190,040.80$

2. a. 25% down means he will finance 75% of the loan.  
 $\$108,000 * 0.75 = \$81,000.00$

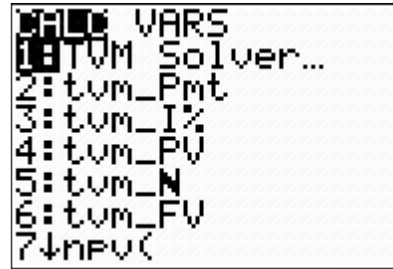
b. Press the **APPS** button.

The APPLICATIONS screen will appear.



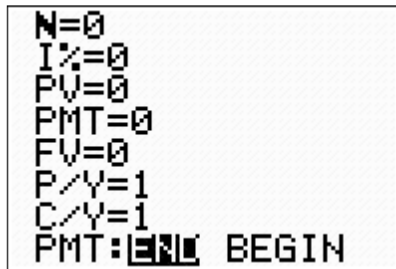
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



The correct values are:

$N = 360$  (30 years \* 12 = 360)

$I\% = 11$

$PV = 81000$  (amount financed)

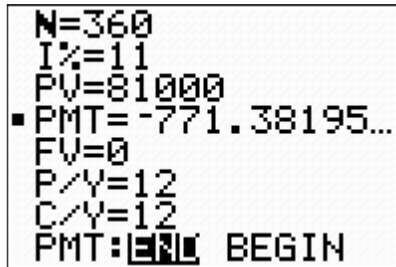
$PMT = 0$  alpha solve

$FV = 0$  (balance will be zero in the future)

$P/Y = 12$  (payments are made monthly)

$C/Y = 12$

The calculator should now show:



Answer: \$771.38

(Notice the payment appears as a negative)

## AMDM Unit 6 • TVM Solver

c.  $\$771.38 * 360 = \$277,696.80$

d.  $\$277,696.80 - \$81,000.00 = \$196,696.80$

3. a.  $\$96,500.00 - \$22,000 = \$74,500$

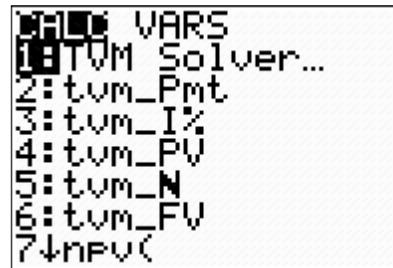
b. Press the **APPS** button.

The APPLICATIONS screen will appear.



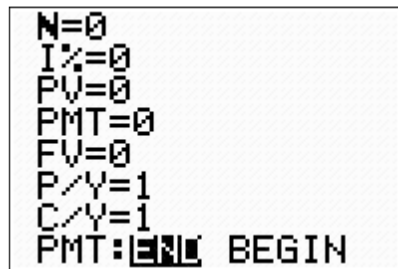
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



The correct values are:

$N = 240$  (20 years \* 12 = 240)

$I\% = 8.45$

$PV = 74500$  (amount financed)

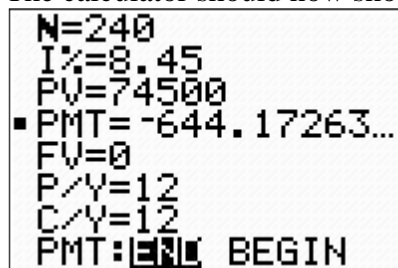
$PMT = 0$  alpha solve

$FV = 0$  (balance will be zero in the future)

$P/Y = 12$  (payments are made monthly)

$C/Y = 12$

The calculator should now show:



Answer: \$644.17

(Notice the payment appears as a negative)

## AMDM Unit 6 • TVM Solver

c.  $\$644.17 \times 240 = \$154,600.80$

d.  $\$154,600.80 - \$74,500.00 = \$80,100.80$

4. a. A 30% down payment implies she will finance 70% of the purchase price  
 $\$118,000.00 \times 0.70 = \$82,600.00$

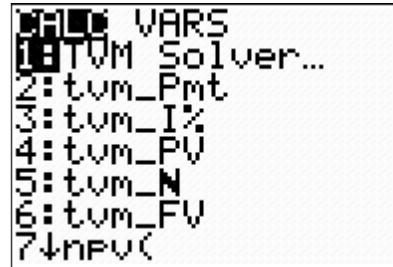
b. Press the **APPS** button.

The APPLICATIONS screen will appear.



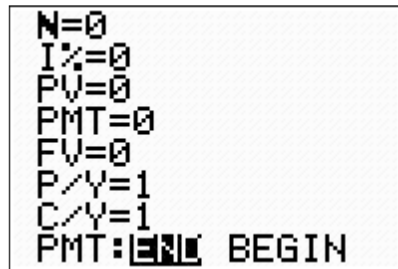
Press **1: Finance**

The screen should appear as follows:



Press **1: TVM Solver**.

The screen should now look like:



The correct values are:

$N = 420$  (35 years \* 12 = 420)

$I\% = 6$

$PV = 82600$  (amount financed)

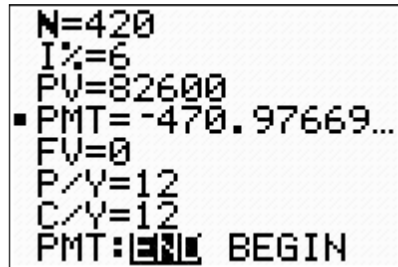
$PMT = 0$  alpha solve

$FV = 0$  (balance will be zero in the future)

$P/Y = 12$  (payments are made monthly)

$C/Y = 12$

The calculator should now show:



Answer: \$470.98

(Notice the payment appears as a negative)

## AMDM Unit 6 • TVM Solver

c.  $\$470.98 * 420 = \$197,811.60$

d.  $\$197,811.60 - \$82,600.00 = \$115,211.60$