



## Present Value of an Ordinary Annuity

The present value of an annuity is the single sum of money needed to generate a specific number of payments. Specifically, how much money must be deposited today so that a set amount of money can be withdrawn at regular time intervals?

### Objectives:

- Determine the amount of money that must be invested so that a set amount of money can be withdrawn at regular time intervals.
- Determine the cash price of an item when the monthly payment, the number of payments, and the interest rate are known.

### Example 1:

What amount of money must be invested today at 6% compounded monthly so that payments of \$100 per month can be made from this fund for 5 years?

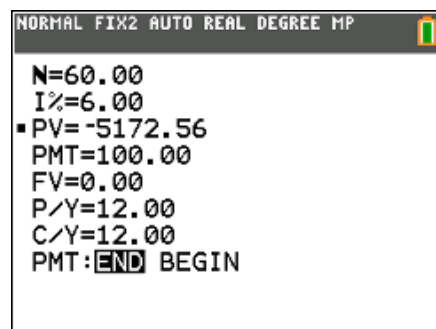
#### Method 1: Using the TVM Solver

1. Press **apps** and select **Finance**. Press **enter** to select **TVM Solver** from the CALC menu.

**Note:** The mode DECIMAL SETTING was changed to **FIX2** to round computations to two decimal places.

2. Enter N = 60, I% = 6, PMT = 100, FV = 0, P/Y = 12, and C/Y = 12.
3. Place the cursor on PV and press **alpha** **[solve]**.

An amount of \$5,172.56 must be invested today.



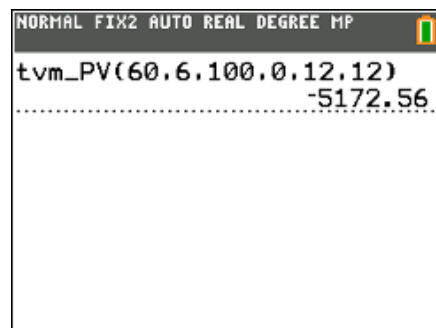
#### Method 2: Using the tvn\_PV function

1. Press **2nd** **[quit]** to return to the home screen.
2. Press **apps**, select **Finance**, and choose **tvn\_PV** from the CALC menu.

This will paste the **tvn\_PV** function on the home screen.

The syntax for this function is **tvn\_PV(N, I%, PMT, FV, P/Y, C/Y)**.

3. For this particular exercise, enter **tvn\_PV(60,6,100,0,12,12)**. Press **enter**.





### Example 2:

The H Club has decided to hold a raffle. The prize is \$100 a month for 5 years. The club can invest at 6% compounded monthly. What does the club need to invest to pay the prize?

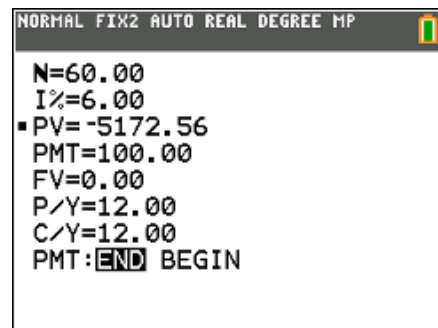
1. Press **[apps]** and select **Finance**. Press **[enter]** to select **TVM Solver**.

2. Enter  $N = 60$ ,  $I\% = 6$ ,  $PMT = 100$ ,  $FV = 0$ ,  $P/Y = 12$ , and  $C/Y = 12$ .

**Note:** PMT is positive because the investment is viewed as producing \$100 per month.

3. Position the cursor on PV and press **[alpha]** **[solve]**.

The present value PV is negative \$5,172.56 because that is what the club must pay to “buy” the prize.



If the Club takes in \$10,000, how much profit will it make on the raffle?

#### Method 1: Using the **PV** variable

The calculation is  $10000 + PV$  because the PV is negative, an expenditure for the club.

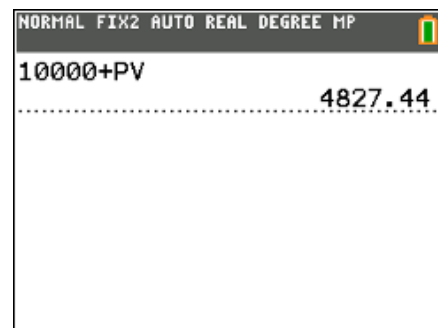
1. Press **[2nd]** **[quit]** to return to the home screen.

2. Enter 10000 **[+]**.

3. To locate the variable PV, press **[apps]**, select **Finance**, and choose **PV** from the VARS menu. This will paste the variable on the home screen.

4. Press **[enter]**.

The club will make \$4,827.44.



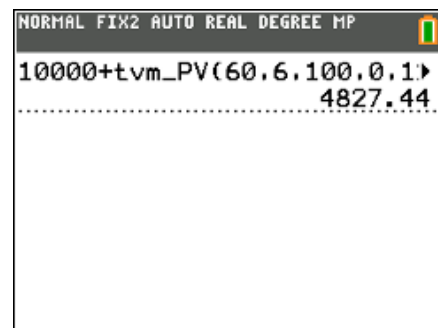
#### Method 2: Using the **tvm\_PV** function

1. On the home screen, enter 10000 **[+]**.

2. Press **[apps]**, select **Finance**, and choose **tvm\_PV** from the CALC menu.

The syntax for this function is **tvm\_PV(N, I%, PMT, FV, P/Y, C/Y)**.

3. For this problem, enter **tvm\_PV(60,6,100,0,12,12)**, and press **[enter]**.



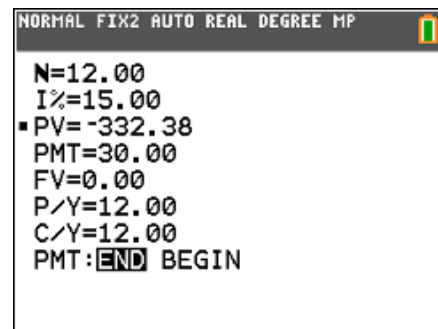


**Example 3:**

Newlyweds purchased a television set for \$100 down and \$30 a month for 12 months. If the finance charge is 15% compounded monthly, find the cash price.

1. Press **[apps]** and select **Finance**. Press **[enter]** to select **TVM Solver**.
2. Enter the values shown. Move the cursor to PV and press **[alpha]** **[solve]**.

PV is shown as a negative number, -332.38, because it is a payout. The total cash price is the sum of the present value and the \$100 down payment. Since the down payment is also a payout, it must be entered as a negative number. Thus the total cash price is  $PV + (-100)$  or  $PV - 100$ .



3. Press **[2nd]** **[quit]** to return to the home screen.
4. Press **[apps]**, select **Finance**, and choose **PV** from the VARS menu to paste the variable on the home screen.
5. Type **[-]** 100 **[enter]**.

The total cash price is \$432.38. The newlyweds will pay  $\$30 \times 12 + \$100 = \$460$  for the television using the installment option.

