What's Going On?

Checking In

Minds on   Problem Solving

Action!   Annuities

Consolidation Solving Problems on the TI-83s

Learning Goal - I will understand what an annuity is and will be able to solve problems involving annuities.

Warm-Up Questions

(1) You decide to invest $5,000 for 3.5 years at 2.5% interest compounded monthly. ↳ 0.025

Determine what your initial investment will be worth at maturity.

Please copy questions down.

$$FV = PV(1 + i)^n$$

$PV = 5,000$

$i = \dfrac{0.025}{12} = 0.0021$

$n = 12 \times 3.5 = 42$

$FV = 5000 \times (1 + 0.0021)^{42}$

$= 5460.53$

You decide to invest your money for 30 years at an interest rate of 5.2% compounded monthly.

$\rightarrow 0.052$

How much do you need to invest now to have \$100,000 when the investment matures?

$$FV = PV(1 + i)^n$$

$$\frac{}{(1+i)^n} \quad \frac{}{(1+i)^n}$$

$$PV = \frac{FV}{(1+i)^n}$$

$$PV = FV(1+i)^{-n}$$

$$FV = 100,000$$

$$i = \frac{0.052}{12} = 0.0043$$

$$n = 12 \times 30 = 360$$

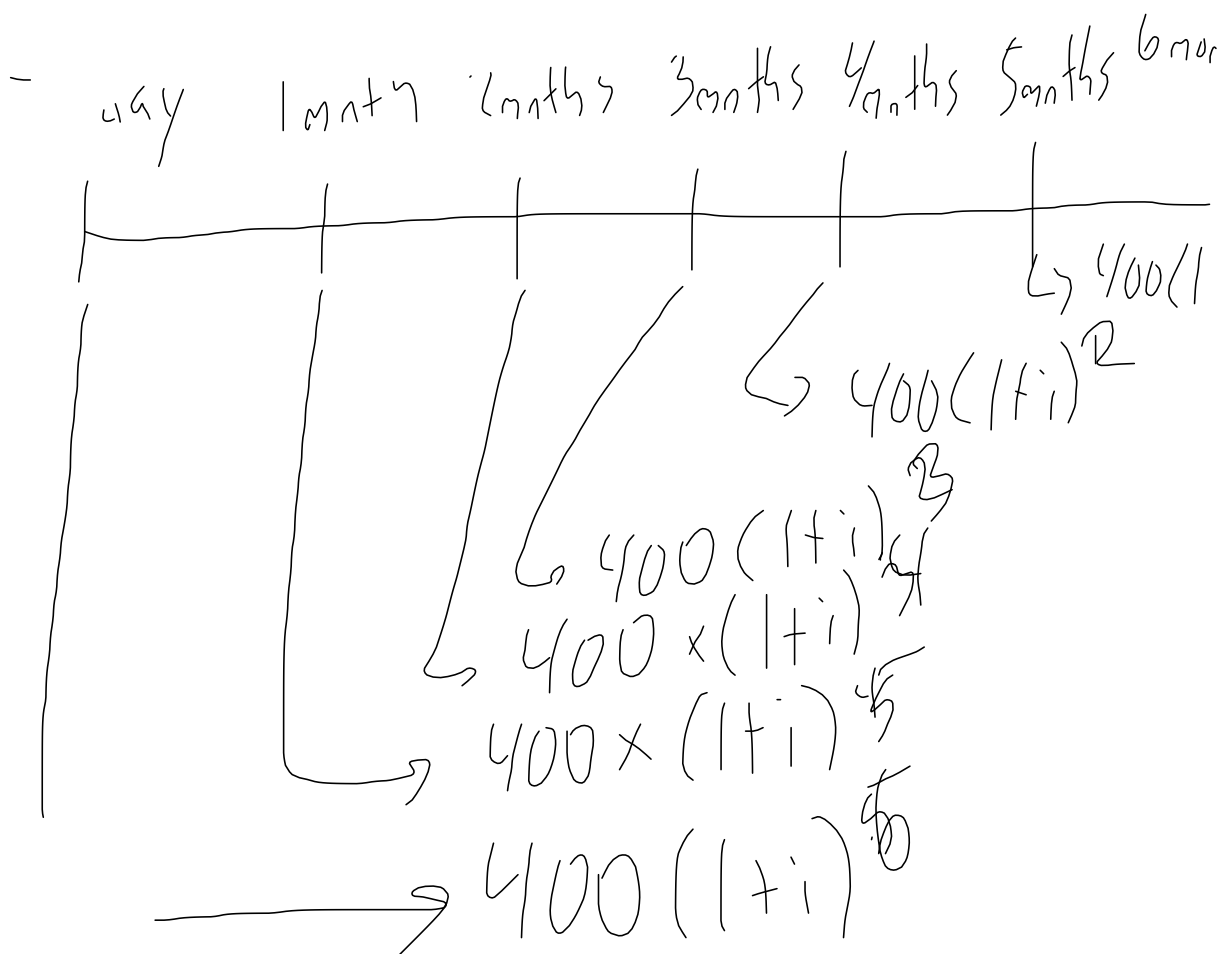$$PV = 100000(1 + 0.0043)^{-360}$$

$$= 21337.99$$

| Minds on

Problem Solving with Compound Interest

You have decided to start saving for a car. You decide to deposit $400 at the end of each month into an account that pays 3.6% per year, compounded monthly.

How much money will you have saved, in total, after 6 months?
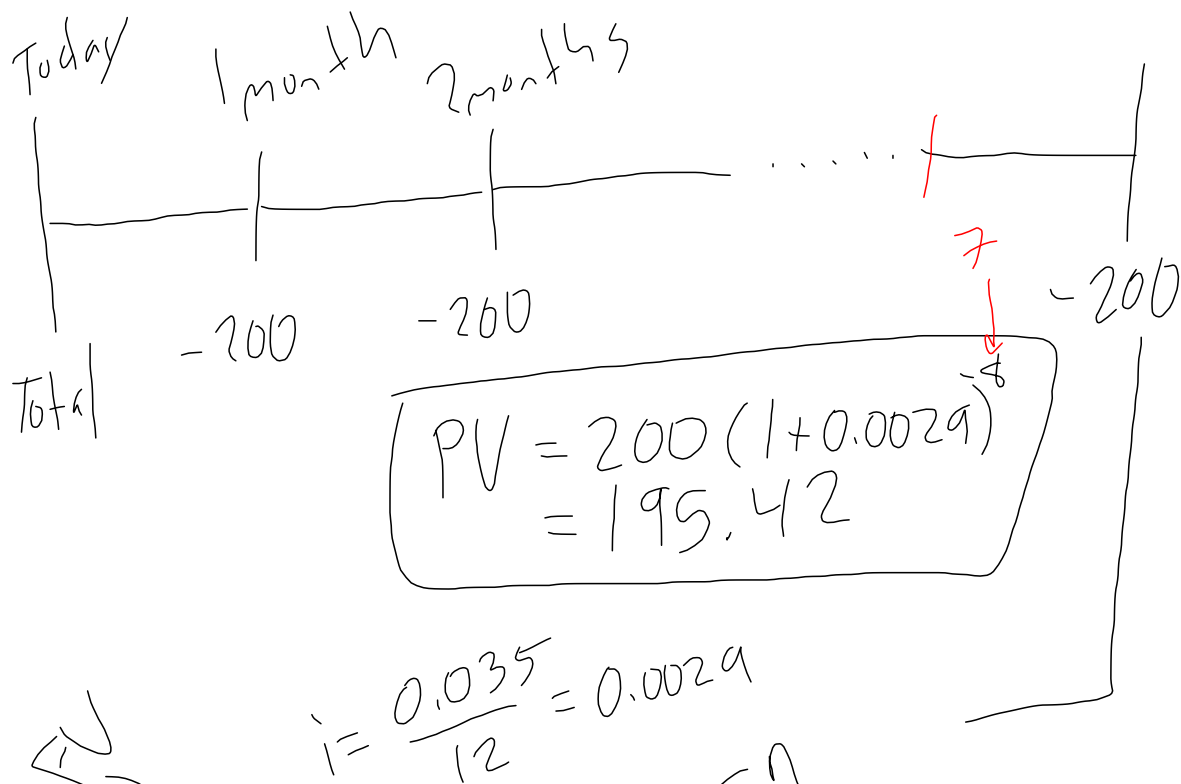
$$FU = PV(1+i)^n$$

now   1 month   2 months   3 months   4 months   5 months   6 mor

$400(1$

$400(1+i)^2$

$400(1+i)^3$

$400 \times (1+i)^4$

$400 \times (1+i)^5$

$400(1+i)^6$

| Minds on

Problem Solving with Compound Interest

You want to make sure that you have money available for "fun" while you are away at college.

How much do you need to invest before you go to school, in an account that earns 3.5% interest compounded monthly, to be able to withdraw $200 per month for 8 months?

✳Assume that you will withdraw the money at the end of each month, and that you will deposit all of the money one month before the initial withdraw.

Today   1 month   2 months

$$PV = 200(1 + 0.0029)^{-8}$$
$$= 195.42$$

Total   −200   −200   −200

$$i = \frac{0.035}{12} = 0.0029$$

How much money do we need to invest NOW to have $200 in 8 months.

Action!

Annuities

An annuity is a series of equal deposits (or payments) made at equal time intervals.

The future value of an annuity tells us the total amount accumulated over time. (think investing $400 per month)

The present value of an annuity is an invested amount that generates a series of equal payments (think scholarship fund), or a loaned amount that requires a series of future payments (think car loan).

Action!

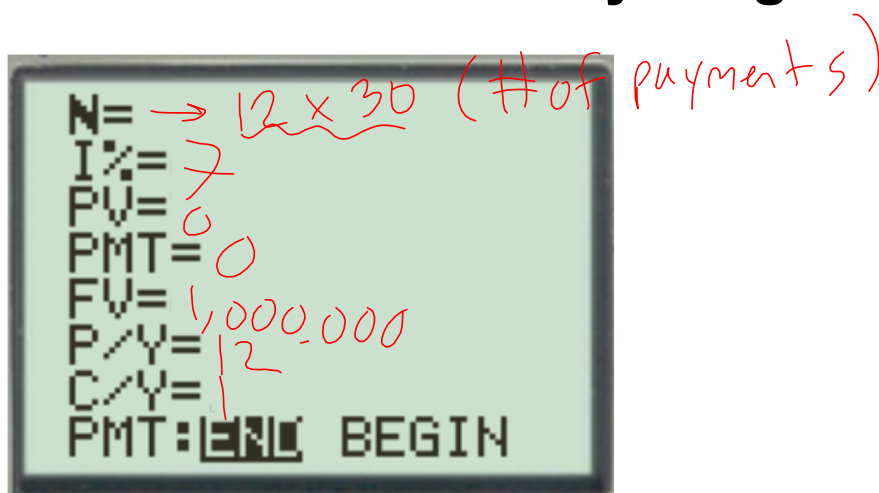## Solving Problems on the TI-83s
Saving For Retirement

You have decided that it's time to start saving for retirement.

You want to have $_____#_____ when you retire.

You want to retire when you are _#_____.

Assume that you are going to invest your money in an account that earns 7% interest per year compounded annually.
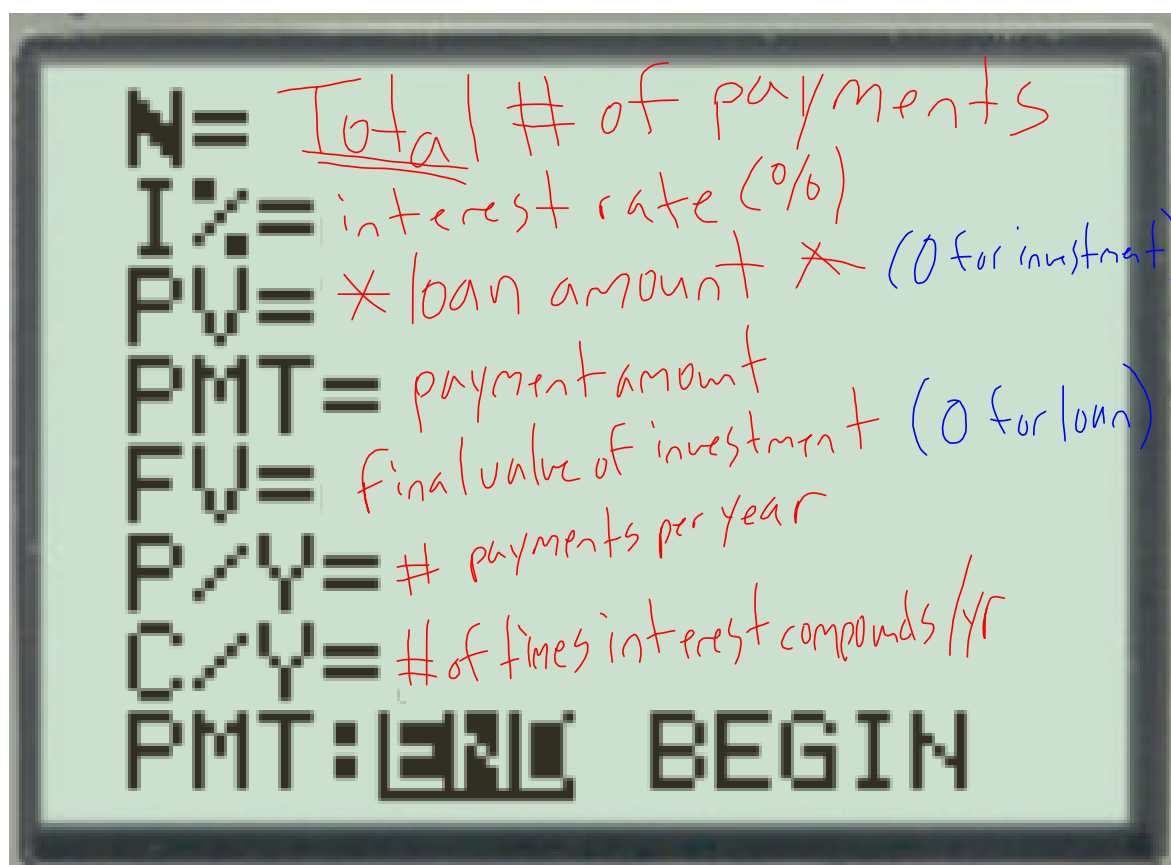
How much money do you need to put away each month to reach your goal ?

```
N=      → 12×30  (# of payments)
I%=     7
PV=     0
PMT=    0
FV=     1,000,000
P/Y=    12
C/Y=    
PMT: END  BEGIN
```

Action!

Solving Problems on the TI-83s
The Variables

N= *Total* # of payments
I%= interest rate (%)
PV= *loan amount* * (0 for invstmnt)
PMT= payment amount
FV= final value of investment (0 for loan)
P/Y= # payments per year
C/Y= # of times interest compounds/yr
PMT: **END** BEGIN

Consolidation

Solving Problems on the TI-83s

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Consolidation

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| **Consolidation**

Solving Problems on the TI-83s

Andrew has just purchased a used motorcycle. His bank has given him a loan with payments of $229.19 per month for one year at 10.5% per year, compounded monthly.

1. What is the actual cost of the motorcycle if Andrew were to pay for it in cash today?

2. How much interest will he pay by choosing the payment plan?

Homework

Annuities

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