

Cell Phone Apps in a Business Math Class

Steven J. Wilson
Johnson County Community College
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Slides available at:
<http://www.milefoot.com/about/presentations/CellPhoneApps.pdf>

A Typical Financial Problem

* Andy is making payments of \$150 at the end of each month into a savings account earning 4.5% compounded monthly. After five years, his balance is \$12,671.83. What was the original balance in the account?

* The variables:

N = 60	I/Y = 4.5	P/Y = 12
PV = ???	PMT = +150	FV = -12671.83

Solution using a formula

* The formula:

$$PV = \left[FV - \frac{PMT}{\left(\frac{I/Y}{100 \times P/Y}\right)} \right] \left(1 - \frac{1}{\left(1 + \frac{I/Y}{100 \times P/Y}\right)^N} \right) - FV$$

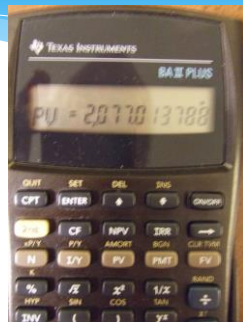
* The computation:

$$PV = \left[-12671.83 - \frac{150}{\left(\frac{4.5}{100 \times 12}\right)} \right] \left(1 - \frac{1}{\left(1 + \frac{4.5}{100 \times 12}\right)^{60}} \right) - (-12671.83)$$

≈ 2077.01

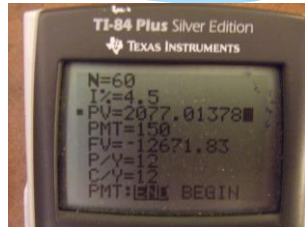
Solution using a BA II Plus

- * 60 N
- * 4.5 I/Y
- * 2nd P/Y 12 ENTER 2nd QUIT
- * 150 PMT
- * 12671.83 +/- FV
- * Maybe: 2nd BGN 2nd SET 2nd QUIT
- * CPT PV



Solution using a TI-84

- * APPS, Finance, TVM Solver
- * 60 ENTER
- * 4.5 ENTER
- * ENTER [to skip PV]
- * 150 ENTER
- * -12671.83 ENTER
- * 12 ENTER
- * ENTER
- * Maybe: Arrow left, ENTER
- * Arrow up, up, up, up, ALPHA SOLVE



Solution using a Cell Phone App

(Bishinevs Financial Calculator)

- * TVM Calculator
- * [in payment cell] 150
- * [in future value cell] -12671.83
- * [in annual rate% cell] 4.5
- * [in periods cell] 60
- * [in compounding menu] Monthly
- * [mode choice] End
- * Press PV button

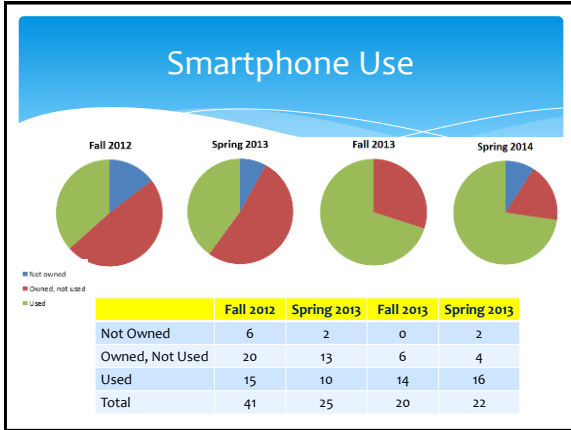


Comparing approaches

	BA II Plus	TI-84	Cell Phone App	Formula
Cost	\$30	\$100	\$0 (if you have a smartphone)	\$0 (if you have a calculator)
Data Entry	Some parts cumbersome	Easy	Easy	Cumbersome
Availability when needed?	Not likely	Not likely	Yes	Need to look it up
Switching modes	Not needed	APPS, Finance, TVM Solver (slow)	Back arrow, Calculator	Not needed

- ### Why allow Cell Phone Apps?
- * Free, no cost (for those who already have smartphones)
 - * Very easy to use
 - * Generally available when needed (who carries their calculator everywhere?)
 - * Business tool

- ### First Four Semesters
- * My face-to-face sections were offered the choice of using the BA II Plus, the TI-84, or a cell phone app.
 - * A survey was administered on the day of the final exam, and student habits were observed during the final exam.



Device Used?

Cell Phone Users	Fall 2012	Spring 2013	Fall 2013	Spring 2014
Android	9	4	5	4
Apple	6	6	9	10
Other	0	0	0	2
Total	15	10	14	16

Calculator Only Users	Fall 2012	Spring 2013	Fall 2013	Spring 2014
BA II Plus	10	4	3	4
TI-83/84	15	11	3	2
Casio	1	0	0	0
Total	26	15	6	6

App Easy to Use?

	Fall 2012	Spring 2013	Fall 2013	Spring 2014
Students who said they used an App	15	10	14	16
Easy to Use	15	10	13*	16
Easy to Install	15	10	13*	16

Used Bishinews App	11	7	8	13
Used TM App	3	3	5	3
Used EZCalc	1	0	1	0

* + 1 "kinda"

A Calculator and an App?

	Fall 2012	Spring 2013	Fall 2013	Spring 2014
Students who said they used an App	15	10	14	16
Students Observed using an App	14	11	14	16
Students who said they used Both	11	6	9	11
Students Observed using Both	12	9	6	5
Also Used a BA II Plus	4	2	1	0
Also Used a TI-83/84	0	2	1	1
Also Used a Casio	1	0	0	2
Also Used a basic 4-function	7	4	4	2
Used an iPad and a Cell Phone	0	1	0	0

Why use Both?

Fall 2012:

- So I wouldn't have to switch to do normal calculations
- TVM on phone, regular on calculator quicker
- In case I needed to divide something
- Easier to keep track of numbers without having to rewrite entire problem
- To find number in periods and to calculate other things
- Easier to do certain tasks than switching between calculators on the phone
- It does not have a regular calculator on it
- Because I like my calculator, I know how to use it very well
- Just to be able to look at both
- Both are very helpful
- No business calculator

Why use Both?

Spring 2013:

- Made it easier to make calculations
- To keep my numbers in order
- To do quick math on calculator
- Simple computations are easy with help
- For backup
- Because I needed to

Why use Both?

Fall 2013:

- For multiplying
- To compare
- It was easier faster
- Because I had to find the periods
- So I didn't have to lose all numbers I had
- b/c
- Calculator for faster computations
- Because I like my calculator
- Different calc.

Why use Both?

Spring 2014:

- To find n, then use app w/ Bishi
- Had to save problem
- To calculate stuff on the app
- Don't really like the calculator on iPhone
- Easier to access [sic]
- So I wouldn't have to go back
- For reg calculations, it was easier
- Needed both
- To help keep track of numbers

Why Not Use an App?

Reason	Fall 2012	Spring 2012	Fall 2013	Spring 2014
Students who did not use an App	26	15	6	6
I do not have a smartphone	6	2	0	2
I trust a calculator more than a cell phone app	19	12	6	2
My cell phone battery drains too quickly	1	1	2	1
I needed to use the JCCC Testing Center, and they do not allow cell phones	1	1	0	0
Other	7	2	1	2

Other Reasons for Not Using an App

Fall 2012

- Have a calculator, didn't want to buy an app
- Was advised at beginning of class to buy calculator, later we learned we could use phone
- The calculator is faster if you know how to use it
- My iTouch was incompatible with the app
- Don't really use apps
- I thought it was easier
- Have a calculator

Spring 2013

- I needed a calculator for my home office
- Prefer the calculator

Fall 2013

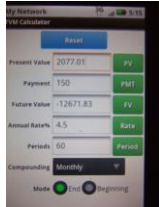
- I feel more comfortable with calculator than cell phone

Spring 2014

- Takes up storage MB's
- Calculator is faster TI-84

Bishinews Issues

- * Requires about 5 MB
- * To find a rate in a beginning annuity, iteration may be required
- * When finding the number of periods, if the answer should be infinite, you will get zero (not an error message)



Some Issues

- * The JCCC Testing Center does not allow cell phones
 - * ADA students must use a calculator
- * The JCCC Testing Center will allow "two calculators" by instructor request, but students can only use one at a time
- * What if students come unprepared to the test?
 - * "Can I borrow your cell phone?"
- * Cell phone use is **NOT** approved for any other math class
 - * Business Math only!

And, of course ...

- * Cheating?
 - * Watch them closely. Probably as easy as using a paper “cheat sheet” under those conditions.

- * Different students have different modes of interaction with their cell phone app (or their calculator)
 - o Traditional style: flat on the desk, with index finger
 - o Texting style: cradled in hands, with two thumbs
 - o Multi-task style: in palm, with fingers wrapped around

Questions?

- * Thank you!

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