Lead Student Lesson Plan

L10: Exponents Revisited; Loan Payment & Savings Equations

Objectives

By the end of the gathering, students will be able to:

- *Answer questions.* There may be some in the class who are struggling and need some help. Using some time to help them overcome the issues is great. However, spending too much time on questions will take away from the activities that need group participation at the end of the lesson. If questions are too long for the gathering, be sure to remind everyone that tutoring is instantly available at byui.edu/mathhelp, and that they can get a personal tutor to meet with them if they would like.

- *Negative Exponents.* Negative Exponents mean to move the number to the denominator with a positive exponent (or vice versa). You might need to write this saying on the board as student will often forget what to do with negative exponents.

- *Additional instruction*. Be sure all students know about the video and textbook instruction for compound interest (pg. 131-135) after Exercises 3.3A. Compound interest (as shown in the instruction) is the most commonly used concept in consumer finances, especially when it is compounded monthly and will be valuable for everyone to understand.

- *FV and PMT formulas.* Be sure there is time to see some of the FV or PMT formulas worked out in class. Very important that you have time to work through the end of the assignment together to help everyone feel comfortable with the concepts.

- *Exam preparation and Visual Charts.* Remind everyone about the way to make visual charts in preparation for Exam 3.

Student Preparation

Students were asked to prepare for gathering by completing specific activities and/or pondering certain questions. Please refer to the gathering instructions in this week's unit or lesson in the course.

Lesson Outline

Below is a sample lesson plan. Feel free to adjust it to best fit the needs of your group. However, try to make sure that the main purposes are still completed.

OPENING	
Announcements, Hymn, and Prayer (10 minutes)	Announcements Opening Hymn: Chosen by the Missionaries Opening Prayer: By Invitation
Devotional (5 minutes)	**Lead Student** Here is a scripture you may choose to use in your devotional. You may also choose one of your own. D&C 19:35; Luke 14:28-30
GROUP ACTIVITIES	
Math Exercise 3.3 Part A (8-10 minutes)	**Whole Class** Review this week's Math Exercise 3.3 Part A homework problems. If there are questions about the assignments, work out a few of the most difficult problems together as a whole group or in small groups of 3-4 people. **Either A:** Ask for a volunteer who understands the difficult problems and can explain how to complete the problem. (It may help to remind people that being able to explain something to someone else is a great way to reinforce one's own learning. Try to include everyone.) **Or B:** In small groups, work through one or two of each type of problem in the homework, letting each group decide which problems they want to work through together.
Math Exercise 3.3 Part B (10-15 minutes) **Print the answers.**	**Small Groups** Work through the problems in Math Exercise 3.3 Part B; rotate the responsibility to explain how to do each problem through the group. If a student doesn't know how to do a problem when it is their turn, they should explain as much as possible and then the rest of the group should help finish the problem. Then, the student should explain how to solve the problem back to the group. • #1-8 should go fairly quickly. If someone has lengthy questions, get with a tutor right away. They are waiting at www.byui.edu/mathhelp.

	• #9 Negative exponents create fractions, so they become very small numbers, but not negative numbers. {Of course, there will probably be someone in the class that will point out that if you do (-2)-3 = 1/(-2)3 = -1/8, you will get a negative number and they are correct, but the result is negative because of the negative on the 2, not the negative in the exponent. If nobody brings it up, it is probably best not to show them.}
Exercise 3.3 Part B Savings (7-10 minutes)	**Whole Class** Using the calculator and spreadsheet functions to solve problems. • #10-13 uses the Savings Plan formulas on pg. 132. A calculator should be used to solve these. They will only use the top formula (lump sum) because there is no payment put into these accounts. • #14-17 If it is possible to have everyone with their own laptops to do these problems on their own, that is definitely the best. If not then sharing or doing the problems on a projector or even writing it on the board will be good. These will all use the FV formula on the spreadsheet. You may need to remind them that the formula requires three special things: • r/n to be entered for the rate, not just r • nper is not n it is $n*Y$ • Money leaving us is negative in a spreadsheet (initial investment) ◦ So #15 should look like =FV(0.07/4,15*4,0,-200).
Exercise 3.3 Part B **Loans** (8-10 minutes)	**Whole Class** Using the calculator and spreadsheet functions to solve problems. • #18-21 uses the Loan Payment formula on pg. 132. A calculator should be used to solve these. This is a big formula and some may struggle putting that many numbers into the calculator disregarding order of operations. Perhaps the easiest way would be to start from the inside out. Most can follow putting in the $1+r/n$ first, then hit =; then raise that number to the $-nY$ power; then take $1 -$ that answer; then r/n divided by that answer; then multiply by P. • #22-25 If it is possible to have everyone with their own laptops to do these problems on their own, that is definitely the best. If not then sharing or doing the problems on a projector or even writing it on the board will be good. These will all use the PMT formula on the

	spreadsheet. You may need to remind them that the formula requires three special things: • r/n to be entered for the rate, not just r • nper is not n it is n*Y • Money leaving us is negative in a spreadsheet (resulting payment) • So #23 should look like =PMT(0.09/12,5*12,4800). • The major goal of this time together is to make sure everyone can put the numbers in the formula and use the spreadsheet. Help others but don't take over for them.
Exercise 3.3 Part B **Benefit vs Bondage** (8-10 minutes)	**Whole Class** • #26 refers to the Benefit vs Bondage example starting on pg. 133. Note that to find the total interest you paid, you need to calculate your total payments and subtract the original loan amount. Similarly, to calculate total interest gained on savings, you must find your total payments and subtract that from the end balance of the account. • As many students will soon be entering BYU-Idaho or perhaps other schooling, this is an important concept to understand in considering whether it is better to work and pay through school or to take a loan. All may have differing circumstances and what is right for one may not be right for another, but understanding the long term effects of loans will be helpful in making a good decision. • #27 – Please don't leave folks behind. Help those that might be off in a corner discouraged. Help them connect with a tutor if they are having trouble.
Exam Preparation (8-10 minutes)	**Whole Class** Review for the exam. Ask the students if there are any concepts that anyone wants to review or questions since the last exam. Remind everyone that a Visual Chart will need to be created for this chapter. Discuss these concepts or answers to questions to make sure everyone feels prepared for Exam 3. Any finance questions on the exam will be able to have the use of a spreadsheet to solve them.
CLOSING	
Conclusion	**Whole Class**

(2 minutes)	As appropriate, bear your testimony as it pertains to this lesson, this course, or your experiences with the math or personal finance concepts you have learned.
Prayer (2 minutes)	Closing Prayer: By Invitation

Note

Please download and print a copy of these instructions to use as a reference during Thursday's Pathway Gathering.