Quiz 2 solutions and explanations

Quiz 2 Solutions & Explanations

Everyday Excel, Part 2

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Hello there! This document is meant to provide clear explanations for the Quiz 2 questions (not the in-video quizzes since they have explanations already). I do NOT provide feedback during the quiz (like I do for the screencasts) because a learner could just guess, obtain the correct answers, then put them back into the quiz and get 100%!

This document is purely for you to learn more and to correct your misconceptions about the material. If you view this document soon after you take the quiz to see why you missed a certain question, it will serve as a great learning tool!

PLEASE DO NOT SHARE THIS DOCUMENT WITH ANYONE! Using this document to complete Quiz 2 is a violation of Coursera's Honor Code (a.k.a. cheating).

NOTE that the order of the answers on Coursera are random and likely different from the order shown here (in general but not always, I like to start with the correct answers followed by the incorrect ones).

Question 1:

The nominal interest rate for a 10-year, $25,000 loan is 4.75%, compounded quarterly. If we make payments on the loan every month, which of the following shows how we would calculate the monthly payment in Excel?

Correct answer: **=PMT(NOMINAL(EFFECT(0.0475,4),12)/12,120,25000)**

Explanation: First, if we're asked to calculate a payment, then we're going to be using the **PMT** function, so the **PMT** function is the foundation for our formula. We are given an interest rate that is compounded at a different period than the payments of our loan - we wish to make monthly payments (period = 1 month) but interest is compounded quarterly. Therefore, we first need to convert the quarterly interest rate of 4.75% into an effective interest rate, then we can use that effective interest rate to calculate a new nominal interest rate for monthly compounding.

EFFECT(0.0475,4) will convert the nominal interest rate of 4.75% compounded quarterly and convert it to an effective interest rate. We can embed that inside the **NOMINAL** function to create our new nominal interest rate for monthly compounding: **NOMINAL(EFFECT(0.0475,4),12)**. This result for interest rate can then be embedded inside the **PMT** function for monthly compounding over 10 years (120 months) starting with a principal (present value) of 25,000:
=PMT(NOMINAL(EFFECT(0.0475,4),12)/12,120,25000)

Question 2:

Charlie applies for and receives a $4,000 interest-only loan. The interest rate (compounded quarterly) is 7%. What is Charlie's quarterly payment? Round your answer to the nearest dollar, omit the $ sign, and present the absolute value of your answer.

Correct answer: **70**

Explanation: With an interest-only loan, the payment amount each quarter is the periodic interest (0.07/4 = 0.0175 in this case) multiplied by the principal ($4,000 here). So, the quarterly payment is: ($4,000)(0.0175) = **$70**.

Question 3:

You wish to have $5,000 in 10 years from now. How much do you need to invest today at an annual interest rate of 3.5% (compounded monthly) in order to accomplish this financial goal? Round your answer to the nearest dollar, omit the $ sign, and enter you answer as a positive number.

Correct answer: **3525**

Explanation: The $5,000 in 10 years is a future value. We are asked for an investment today, which is a present value. Therefore, we'll be using the **PV** function. We know the interest rate and number of periods (120 months in 10 years), so we can easily use the following formula in Excel:

=PV(0.035/12,120,0,5000) = $(3,525.24)

Question 4:

We start a savings account with a balance of $5000. Then, we wish to add $200/month for 5 years. At that point, we wish to withdraw equal amounts of money in 5 equal disbursements taken at 1-year intervals (the account will be empty after these 5 withdrawals). Which of the following depicts how we could set this up in a single formula in Excel? Interest rate is 5.5% and compounded monthly.

Correct answer: **=PMT(EFFECT(0.055,12),5,-FV(0.055/12,60,-200,-5000),0)**

Explanation: This is a tough one. We have two "stages" of this problem: 1) investment of $5000 with savings account payments/additions of $200/month for 5 years to create a future value; and 2) withdrawal of 5 equal payments from the result of stage 1 at 1-year intervals (ends of years 6, 7, 8, 9, and 10).

Let's first calculate the future value of the situation in stage 1. We can use the **FV** function: **=FV(0.055/12,60,-200,-5000)**. Note that initial investment and payments are both negative since we are investing and putting money into the bank. This will, therefore, be the starting amount (**PV**) in 5 years for the second stage. Note that this is a *positive* value, as calculated by Excel, but we wish to use this as a negative value (since it's been invested) in the second stage of the problem.

Now let's look into the second stage. If we started with **M** amount of money (this will be a negative quantity) and we wanted to disburse it in 5 equal amounts over 5 years (one per year at the end of each year), then we could calculate the disbursement amount using the **PMT** function. First, though, we have an annual interest rate of 5.5% (compounded monthly), so we can convert this to an annual rate (annual compounding) by using the **EFFECT** function: **=EFFECT(0.055,12)**. We can put this annual interest rate into the **PMT** function: **=PMT(EFFECT(0.055,12),5,M,0)**. The present value for the **PMT** function is the starting amount, **M**, that we will obtain from the first stage (above). The future value of the **PMT** function is 0 since we are paying out all of the money in the fund. Note that we could have also used 0.055/12 as the interest rate (first argument) but we would have had to multiply the 5 years (second argument) by 12 - either way will work the same.

So, if we combine stage 1 with stage 2 (the "**M**" in stage 2 is the **FV** result from stage 1), we get the following:

=PMT(EFFECT(0.055,12),5,-FV(0.055/12,60,-200,-5000),0)

Question 5:

We take a 30-year loan with an interest rate of 4% (compounded monthly) for $200,000. Of the 180th payment, how much money goes towards the loan principal? Round your answer to the nearest dollar, omit the $ sign, and enter your answer as a positive number.

Correct answer: **523**

Explanation: To determine amounts of interest and principal payments for amortized loans, we could either set up an amortization schedule or we can use the **IPMT** and **PPMT** functions. Here, we can use the **PPMT** function to determine how much of the 180th payment (360 total payments in 30 years) goes towards the principal:

=PPMT(0.04/12,180,360,200000) = $(522.80)

✓ Complete Go to next item