Practice Quiz 6: on Chapter 13 Solutions

[1] (13.1 #9) The expression \( F = 3420(1+ (0.025/4))^{4\times3} \) resulted from substituting certain values into the compound-interest formula. Referring to the expression, find the following:

(a) The principal invested: \( P = $3420 \)
(b) The annual interest rate: \( r = 2.5\% \)
(c) The number of compounding periods in a year: \( m = 4 \)
(d) The future value rounded to the nearest cent: \( F = $3685.50 \)

[2] (13.1 #19) Which is the best deal over a 3-year period: investing at 5% compounded annually, investing at 4.95% compounded semiannually, or investing at 4.9% compounded monthly? Explain your answer.

Compute the effective annual interest rate in each case. The biggest EAR gives the best deal (whether it's for 1 year, 3 years, or whatever).

- 5% compounded annually gives an EAR of: \( (1+ 0.05)^1 - 1 = 5\% \)
- 4.95% compounded semiannually gives an EAR of: \( (1+ 0.0495/2)^2 - 1 = 5.01126\% \)
- 4.9% compounded monthly gives an EAR of: \( (1+ 0.049/12)^{12} - 1 = 5.01156\% \)

Thus 4.9% compounded monthly is best.

[3] (13.2 #3) Find the finance charge and new balance for the following credit card account:

- Previous Balance = $250.23
- New Purchases = $245.27
- Payments = $175.00
- Average Daily Balance = $275.00
- Annual Percentage Rate = 18.9%
- Billing Period = 30 days

The daily interest rate is 18.9%/365. This is applied for 30 days, giving a rate of 30(18.9%/365) = 1.5534%.
This is applied to the average daily balance of $275.00, giving a finance charge of \((0.015534)(275.00) = $4.27\). The new balance is: $250.23 + $245.27 – $175.00 + $4.27 = $324.77.


Use the formula on p. 825: \( PMT = P\times\frac{r/12}\times(1+r/12)^{12t}/((1+r/12)^{12t} - 1) \), where here \( P = 19995 - 5000 = 14995 \), \( t = 4 \) and \( r = 0.0625 \), giving a payment of \( PMT = $353.88 \). You can also use the table on p. 824: use the column for 4 years and the row for 6.25. The table entry is 23.59982. This is the payment for a loan of $1000. Our loan is 14.995 times as much so the payment is \((14.995)(23.59982) = $353.88\).

[5] In the previous problem, suppose the monthly payment is $336.90. Use the table on p. 824 to estimate what the interest rate is on the loan.

We must divide the given payment of $336.90 by 14.995 to find the table entry: \$336.90/14.995 = 22.467489. Looking in the column for 4 year loans, we find that 22.467489 corresponds to a rate of about 3.75%.