Chapter 5 Homework Solutions
Compiled by Joe Kahlig

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1. $A = P(1 + rt)$

   $A = 5000 * (1 + 0.06 * \dfrac{8}{12})$

   Answer: A = \$5200

2. $I = Prt$

   $116.10 = P * 0.09 * 1.5$

   Answer: P = \$860

3. (a) $I = Prt$

   $38 = 600 * r * \dfrac{8}{12}$

   $r = 0.095$

   Answer: 9.5%

   (b) $I = Prt$

   $38 = 600 * r * 8$

   $r = 0.0079167$

   Answer: 0.79167%

4. $I = Prt$

   $10000 - 9562.56 = 9562.56 * r * \dfrac{26}{52}$

   $437.44 = 9562.56 * r * \dfrac{26}{52}$

   Answer: 9.1490%

5. Investment #1: 8.7% compounded annually

   Eff(8.7, 2) = 8.889225%

   Investment #2: 8.6% compounded monthly

   Eff(8.6, 12) = 8.9472%

   Answer: 8.6% compunded monthly is the better investment.

6. Eff(12,4) = 12.550881%

7. (a) N=4*6; I=5; PV=-1000; PMT = 0; P/Y=C/Y=4;
   Solve for FV.
   Answer: \$1,347.35

   (b) Eff(5,4) = 5.0945%

8. N=5*12; PV=-2000; PMT=0; FV=8450.5;
   P/Y=C/Y=12; Solve for I;

   Answer: 29.17%

9. N=6*2; I=4; PV=-3400; PMT=0; P/Y=C/Y=2; Solve
   for FV; FV=4312.02;

   Interest earned: 4312.02-3400 =\$912.02

10. N=4*4; I=4.5; PMT=0; FV=7000; P/Y=C/Y=4; Solve
    for PV;

    Answer: \$5,852.77

11. N=4*12; I=10; PMT=0; FV=3000; P/Y=C/Y=12;
    Solve for PV;

    Answer: \$2,014.30

12. N=3*6; I=−15; PMT=0; FV=375.78; P/Y=C/Y=3;
    solve for PV;

    Answer: \$946.04

13. N=20*1; I=7; PMT=0; FV=10000; P/Y=C/Y=1; Solve
    for PV;

    Answer: \$2,584.19

14. (a) N=5*12; I=12; PV=50000; PMT=0;
    P/Y=C/Y=12. solving gives FV=\$90,834.83
    Interest = 90,834.83-50,000 = \$40,834.83

    (b) N=4*12; I=5; PV=0; FV=90834.83;
    P/Y=C/Y=12. Solve for payment.
    Answer: \$1,713.38

15. (a) N=2*20; I=6.25; PV=0; PMT=-300;
    P/Y=C/Y=2; Solve for FV;
    Answer: \$23,272.27

    (b) $300 * 2 * 20 = \$12,000$

    (c) $23272.27 - 12000 = \$11,272.27$.

16. (a) N=3*12; I=5; PV=0; PMT=-50; P/Y=C/Y=12;
    Solve for FV;
    Answer: \$1,937.67

    (b) $1937.67 - 3 * 12 * 50 = \$137.67$

17. (a) N=4*5; I=7; PV=-500; Pmt=solve for this;
    Fv=6000; P/y=C/y=4
    Answer: \$223.30

    (b) N=15; I=7; PV=-500; Pmt=-223.30; Fv=solve for
    this; P/y=C/y=4
    Answer: \$4,441.24

    (c) Method 1: balance after 15 payments = 4441.24
    balance after 14 payments = 4145.40
    Answer: 4441.24-4145.40-223.30 = 72.54

    Method 2: Balance after 14 payments * i
    Answer: $4145.40 * 0.07/4 = \$72.54$

    (d) Balance after 12th period (end of 3rd year) =
    3568.89
    balance after 8th period (end of 2rd year) = 2474.17
    payments made in the 3rd year: $223.30 * 4 = 893.20$
    Answer: $3568.89 - 2474.17 - 893.20 = 201.52$

18. N=4*5; I=6; PV=-500; PMT=-150; P/Y=C/Y=4;
    Solve for FV;

    Answer: \$4141.98

19. N=2*10; I=8; PV=0; PMT=-1000; P/Y=C/Y=2; Solve
    for FV;
    Answer: \$29,778.08

20. (a) N=4*12;   I=7;   PMT=-100;   FV=7000; P/Y=C/Y=12; Solve for PV;
    Answer: $1,118.77

    (b) N=20;   I=7;   PV=-1118.77;   PMT=-100; P/Y=C/Y=12; Solve for FV;
    Answer: $3,371.60

    (c) Method 1: balance after 20 payments=3371.60
    balance after 19 payments=3252.62
    Answer: $3371.60 - 3252.62 - 100 = 18.98

    Method 2: balance after 19 payments * i
    Answer: $3252.62 * 0.07/12 = $18.97 (difference due to rounding)

    (d) balance after 36th period(end of 3rd year) = 5372.37
    balance after 24th period(end of 2rd year) = 3854.47
    payments made in the 3rd year: $100*12 = 1200$
    Answer: $5372.37 - 3854.47 - 1200 = 317.90$

21. N=5*12; I=7; PV=-30000; FV=100000; P/Y=C/Y=12; Solve for PMT;
    Answer: $802.75

22. (a) N=16*12;   I=6.4;   PMT=1500;   FV=0; P/Y=C/Y=12; Solve for PV;
    Answer: $17,9962.30

    (b) N=16*12;   I=3.4;   PMT=1500;   FV=0; P/Y=C/Y=12; Solve for PV;
    Answer: $22,0281.51

    (c) total of payments sold: $1500*12*16 = 288000
    He would have recieved $288000 - 179962.30 = $108037.7 if he didn't sell.

23. 78 payments is 78/4=19.5 years

    (a) N=19.5*4;   I=2.5;   PMT=6000;   FV=0; P/Y=C/Y=4; Solve for PV;
    Answer: $369511.36

    (b) N=19.5*4;   I=5.7;   PMT=6000;   FV=0; P/Y=C/Y=4; Solve for PV;
    Answer: $281407.72

    (c) total of payments sold: $6000*78 = 468000
    You would have recieved $468000 - 369511.36 = $98488.64 if he didn't sell.

24. (a) End of 5 years:
    N=5*12;   I=5;   PV=-1000;   PMT=-75; P/Y=C/Y=12; Solve for FV;
    Balance at the end of the 5 years is $6,383.81
    At end of next 6 years:
    N=6*12;   I=6.25;   PV=-6383.81;   PMT=-75; P/Y=C/Y=12; Solve for FV;
    Balance at the end of the next 6 years is $15,810.85
    At the end:
    N=4*12;   I=5;   PV=-15810.85;   PMT=-75; P/Y=C/Y=12; Solve for FV;
    Answer: $25,043.49

    (b) amount deposited: $= 1000+75*12*15=145000$
    Interest $= 25043.49-145000 = $10,543.49

25. N=4*4; I=8; PMT=1000; FV=0; P/Y=C/Y=4; Solve for PV;
    Answer: $1,3577.71

26. N=5*12 ; I=9 ; PV=20000 ; FV=0 ; P/Y=C/Y=12; Solve for PMT;
    Answer: $415.17

27. (a) N=6*12 ;   I=18 ;   PV=16000 ;   FV=0 ; P/Y=C/Y=12; Solve for PMT;
    Answer: $364.92

    (b) amount paid $= 12*6*364.92 = $26,274.24
    Interest= 26274.24-16000=$10,274.24

    (c) amortization schedule

period	interest owed	payment	amt. toward principal	outstanding principal
0	—	—	—	16000
1	240	364.92	124.92	15875.08
2	238.13	364.92	126.79	15748.29

28. amortization schedule

period	interest owed	payment	amt. toward principal	outstanding principal
0	—	—	—	8000
1	100	300	200	7800
2	97.5	300	202.50	7597.5

29. (a) N=1.5*12;   I=19.2;   PV=800;   FV=0; P/Y=C/Y=12; Solve for PMT;
    Answer: $51.50

    (b) amount paid $= 1.5*12*51.50 = $927.00
    interest $= 927.00-800 = $127

    (c) amortization schedule

period	interest owed	payment	amt. toward principal	outstanding principal
0	—	—	—	800
1	12.8	51.50	38.7	761.30
2	12.18	51.50	39.32	721.98
3	11.55	51.50	39.95	682.03
4	10.91	51.50	40.59	641.44

30. (a) N=45*12;   I=6;   PV=-1000;   PMT=-150; P/Y=C/Y=12; solve for FV
    Answer: $428,178.85

    (b) N=15*12;   I=6;   PV=428178.85;   FV=0; P/Y=C/Y=12; solve for PMT
    Answer: $3613.22

31. First figure out how much money is needed in the account so he can receive these payments.
N=15*4; I=6; PMT=6000; FV=0; P/Y=C/Y=4; Solve for PV; To receive these payments he needs 236,281.61 in the account when he turns 65.

Now figure out the payments to get to this amount.
N=40*4; I=6; PV=0; FV=236281.61; P/Y=C/Y=4; Solve for PMT; He needs to make quarterly deposits of 360.61

32. (a) I=8.5; PV=-210000; PMT=2000; FV=0; P/Y=C/Y=12; Solve for N;
N = 192.906. this says that there are 192 full months and 0.906 of a month. Every month you withdraw $2000,
Answer: 192 full payments.

   (b) Method 1:
   N=1; I=8.5; PV=-210000; FV=210000; P/Y=C/Y=12; Solve for Pmt;
   Pmt = 1487.50
   Method 2: ballance * i
   210000 * 0.085/12 = 1487.5
   Answer: $1,487.5

33. bob borrows $285,000-$60,000 = $225,000

   (a) N=20*12; I=9.5; PV=225000; FV=0; P/Y=C/Y=12; Solve for Pmt;
   Answer: $2097.30

   (b) N=5*12; I=9.5; PV=225000; PMT=-2097.30; P/Y=C/Y=12; Solve for FV;
   Answer: $200846.75

   (c) N=12*12; I=9.5; PV=225000; PMT=-2097.30; P/Y=C/Y=12; Solve for FV;
   Answer:$14,0654.00

34. Setp 1: Find the payments.
N=6*12; I=3; PV=30000; FV=0; P/Y=C/Y=12; Solve for Pmt; Pmt = 455.81

Step 2: Find the future ballance.
N=6*12; I=3; PV=30000; PMT=-455.81; P/Y=C/Y=12; Solve for FV;
Answer: $15,673.71

35. N=12*4; I=5; PV=28000; FV=-9000; P/Y=C/Y=12; Solve for PMT
Answer: $475.06

36. N=5*12; I=4.5; Pmt=800; Fv=0; P/y=C/y=12; Solve for PV
Answer:$42911.50

37. N=12*3; I=15; PV=solve for this; Pmt=-30; Fv=0; P/y =C/y=12;
You have borrowed $865.42 and when you add this to the down payment you get the price.
Answer:$1465.42

38. N=12*3; I=8; PV=solve for this; Pmt=-75; Fv=0; P/y =C/y=12;
You have borrowed $2393.39 and when you add this to the down payment you get the price.
Answer: $3193.39

39. (a) N= 4*12; I%=6.5; PMT=-625; FV=0; P/Y=C/Y=12; solve for PV.
   He still owes = $26,483.25

   (b) N= 8.5*4; I%=4.5; PMT=-1500; FV=0; P/Y=C/Y=4; solve for PV.
   He still owes = $42,185.04

   (c) Consolidated loan
   N=6*12
   I=5.1%
   PV= 26483.25 + 42185.04
   PMT=solve
   FV=0
   P/Y=C/Y=12
   Monthly Payment = $1,109.09

   (d) Pays back with the consolidated loan:
   1109.09*12*6 = 79854.48
   Pays back on original loans:
   Loan 1: 625*4*12 = 30000
   Loan 2: 1500*4*8.5 = 51000
   Total paid back: $81,000
   Bob will save 81,000-79,854.48 = $1,145.52

40. down payment = 185000*0.08 = 14800

   (a) N=12*15; I=6.36; PV=170200; FV=0; P/Y=C/Y=12; Solve for PMT
   Monthly payment: $ 1,469.56
   Total Paid = 1469.56*12*15 = 264520.8
   Interest owed: 264520.8-170200 = $94,320.80

   (b) Monthly payment: $ 1,060.16
   Interest owed: $211,457.60

   (c) Amortization schedule

period	interest owed	payment	amt. toward principal	outstanding principal
0	—	—	—	170200
1	902.06	1060.16	158.10	170041.9
2	901.22	1060.16	158.94	169882.96
3	900.38	1060.16	159.78	169723.18

   (d) still owe after 8 years:
   N=12*8; I=6.36; PV=170200; PMT=-1060.16; P/Y=C/Y=12; Solve for FV
   still owe = 150480.43
   equity = 185000-150480.43 = $34519.57

41. (a) N=12*5; I=5.75; PV=146000; PMT=-1100.; P/Y=C/Y=12; Solve for FV
   still owe = 118241.67
   Equity = 146000-118241.67 = $27758.33

    (b) N=12*10; I=5.75; PV=146000; PMT=-1100.;
        P/Y=C/Y=12; Solve for FV
        still owe = 81262.71
        Equity = 146000-81262.71 = $64737.29

42. max payment:
    N= 25*12; I%=5.45; PMT=-1275; FV=0;
    P/Y=C/Y=12; solve for PV.
    amount borrowed = $208,638.41 house price =
    $208,638.41 + $20,000 = $228,638.41

    Min Payment:
    N= 25*12; I%=5.45; PMT=-900; FV=0; P/Y=C/Y=12;
    solve for PV.
    amount borrowed = $147,274.17 house price =
    $147,274.17 + $20,000 = $167,274.17

    Answer: between $167,274.17 and $228,638.41

43. (a) First figure out how much he still owes on the loan.
        still owe: $74997.89

        now solve for the new payments with a 15 year loan.
        don't forget to add the fee to what he is borrowing.
        new payments: $629.14

    (b) Figure out what will be paid out for the remainder
        of the loan with both options.
        no refinance: 568.83*12*21 = 143345.16
        refinance: 629.14*12*15 = 113245.2
        Phillip will save $30,099.96 by refinancing.

44. (a) I= 18; PV= 2000; PMT = -35; FV = 0;
        P/Y=C/Y=12; Solve for N and you get 130.697.
        So it will take 131 payments to pay off the balance,
        i.e. 10 years and 11 months.

    (b) N=130; I= 18; PV= 2000; PMT = -35;
        P/Y=C/Y=12; Solve for FV and you get that the
        balance will be $24.12. But, you will still owe one
        more month of interest on this amount at the end
        of the next month.
        N=1; I= 18; PV=24.12; FV=0, P/Y=C/Y=12;
        Solve for PMT and you get $24.48 which is your
        last payment to pay off the credit card.
        Total paid: 35(130) + 24.48(1) = $4574.48
        Interest paid: 4574.48-2000 = $2574.48

    (c) 5 years and 2 months.
        Interest paid: $1077.24