USING TECHNOLOGY EXERCISES 5.2, page 287

1. \$59,622.15	2. \$55,718.57	3. \$8453.59	4. \$20,460.98
5. \$35,607.23	6. \$45,983.53	7. \$13,828.60	8. \$18,344.08

5.3 CONCEPT QUESTIONS, page 293

1. $R = \dfrac{Pi}{1-(1+i)^{-n}}$.

   a. We rewrite $R = \dfrac{Pi}{1-\dfrac{1}{(1+i)^n}}$. If n increases, then $(1+i)^n$ increases and $1/(1+i)^n$ decreases. Therefore $1-1/(1+i)^n$ increases and so R decreases.

   b. If the principal and interest rate are fixed, and the number of payments are allowed to increase, then the size of the monthly payments gets smaller.

2. $R = \dfrac{iS}{(1+i)^n - 1}$. Letting i and S be fixed, we allow n to increase. Then $(1+i)^n$ increases and $(1+i)^n - 1$ increases. This implies that R (the size of the periodic payment) decreases.

EXERCISES 5.3, page 294

1. The size of each installment is given by

$$R = \frac{100{,}000(0.08)}{1-(1+0.08)^{-10}} \approx 14{,}902.95, \text{ or } \$14{,}902.95.$$

2. The size of each installment is given by

$$R = \frac{40{,}000(0.015)}{1-(1+0.015)^{-30}} \approx 1{,}665.57, \text{ or } \$1{,}665.57.$$

3. The size of each installment is given by

$$R = \frac{5000(0.01)}{1-(1+0.01)^{-12}} \approx 444.24, \text{ or } \$444.24.$$

4. The size of each installment is given by

$$R = \frac{16{,}000(0.0075)}{1-(1+0.0075)^{-48}} \approx 398.16, \text{ or } \$398.16.$$

5. The size of each installment is given by

$$R = \frac{25{,}000(0.0075)}{1-(1+0.0075)^{-48}} \approx 622.13, \text{ or } \$622.13.$$

6. The size of each installment is given by

$$R = \frac{80{,}000(0.00875)}{1-(1+0.00875)^{-180}} \approx 884.32, \text{ or } \$884.32.$$

7. The size of each installment is

$$R = \frac{80{,}000(0.00875)}{1-(1+0.00875)^{-360}} \approx 731.79, \text{ or } \$731.79.$$

8. The size of each installment is

$$R = \frac{100{,}000(0.00875)}{1-(1+0.00875)^{-300}} \approx 944.18, \text{ or } \$944.18.$$

9. The periodic payment that is required is

$$R = \frac{20{,}000(0.02)}{(1+0.02)^{12}-1} \approx 1491.19, \text{ or } \$1491.19.$$

10. The periodic payment that is required is

$$R = \frac{40{,}000(0.01)}{(1+0.01)^{36}-1} \approx 928.57, \text{ or } \$928.57.$$

11. The periodic payment that is required is

$$R = \frac{100{,}000(0.0075)}{(1+0.0075)^{120}-1} \approx 516.76, \text{ or } \$516.76.$$

12. The periodic payment that is required is

$$R = \frac{120{,}000(0.0075)}{(1+0.0075)^{180}-1} \approx 317.12, \text{ or } \$317.12.$$

13. The periodic payment that is required is

$$R = \frac{250{,}000(0.00875)}{(1+0.00875)^{300}-1} \approx 172.95, \text{ or } \$172.95.$$

14. The periodic payment that is required is

$$R = \frac{350{,}000(0.00625)}{(1+0.00625)^{120}-1} \approx 1967.06, \text{ or } \$1967.06.$$

15. The periodic payment that is required is

$$R = \frac{50000\left(\frac{.10}{4}\right)}{\left(1+\frac{.10}{4}\right)^{20}-1} = 1957.36, \text{ or } \$1957.36.$$

16. The periodic payment that is required is

$$R = \frac{60000\left(\frac{0.09}{12}\right)}{\left(1+\frac{0.09}{12}\right)^{120}-1} = 310.05, \text{ or } \$310.05.$$

17. The periodic payment that is required is

$$R = \frac{35000\left(\frac{0.075}{2}\right)}{1-\left(1+\frac{0.075}{2}\right)^{-13}} = 3450.87, \text{ or } \$3450.87.$$

18. The periodic payment required is $R = \frac{42000\left(\frac{0.0625}{12}\right)}{1-\left(1+\frac{0.0625}{12}\right)^{-111}} = 499.19$, or \$499.19.

19. The size of each installment is given by

$$R = \frac{100{,}000(0.10)}{1-(1+0.10)^{-10}} \approx 16{,}274.54, \text{ or } \$16{,}274.54.$$

20. The monthly payment that is required is given by

$$R = \frac{30{,}000\left(\frac{0.12}{12}\right)}{1-\left(1+\frac{0.12}{12}\right)^{-120}} \approx 430.41, \text{ or } \$430.41.$$

21. The monthly payment in each case is given by $R = \frac{100{,}000\left(\frac{r}{12}\right)}{1-\left(1+\frac{r}{12}\right)^{-360}}$.

Thus, if $r = 0.08$, then $R = \frac{100{,}000\left(\frac{0.08}{12}\right)}{1-\left(1+\frac{0.08}{12}\right)^{-360}} \approx 733.76$, or \$733.76

If $r = 0.09$, then $R = \frac{100{,}000\left(\frac{0.09}{12}\right)}{1-\left(1+\frac{0.09}{12}\right)^{-360}} \approx 804.62$, or \$804.62

If $r = 0.10$, then $R = \frac{100{,}000\left(\frac{0.10}{12}\right)}{1-\left(1+\frac{0.10}{12}\right)^{-360}} \approx 877.57$, or \$877.57.

If $r = 0.11$, then $R = \frac{100{,}000\left(\frac{0.11}{12}\right)}{1-\left(1+\frac{0.11}{12}\right)^{-360}} \approx 952.32$, or \$952.32.

a. The difference in monthly payments in the two loans is
\$877.57 - \$665.30 = \$212.27.

b. The monthly mortgage payment on a \$150,000 mortgage would be
1.5(\$877.57) = \$1316.36.
The monthly mortgage payment on a \$50,000 mortgage would be
0.5(\$877.57) = \$438.79.

22. The monthly payment will be

$$R = \frac{288,000\left(\frac{0.09}{12}\right)}{1-\left(1+\frac{0.09}{12}\right)^{-300}} \approx 2416.89, \text{ or } \$2416.89.$$

23. a. The amount of the loan required is 16000 - (0.25)(16000) or 12,000 dollars. If the car is financed over 36 months, the payment will be

$$R = \frac{12,000\left(\frac{0.10}{12}\right)}{1-\left(1+\frac{0.10}{12}\right)^{-36}} \approx 387.21, \text{ or } \$387.21 \text{ per month.}$$

If the car is financed over 48 months, the payment will be

$$R = \frac{12,000\left(\frac{0.10}{12}\right)}{1-\left(1+\frac{0.10}{12}\right)^{-48}} \approx 304.35, \text{ or } \$304.35 \text{ per month.}$$

b. The interest charges for the 36-month plan are

36(387.21) - 12000 = 1939.56,

or $1939.56. The interest charges for the 48-month plan are

48(304.35) - 12000 = 2608.80, or $2608.80.

24. Since the down payment is 0.10($2 million), the amount financed is $1.8 million. The required quarterly payment is

$$R = \frac{1,800,000\left(\frac{0.12}{4}\right)}{1-\left(1+\frac{0.12}{4}\right)^{-60}} \approx 65,039.33, \text{ or } \$65,039.33.$$

25. The amount borrowed is 270,000 - 30,000 = 240,000 dollars. The size of the monthly installment is

$$R = \frac{240,000\left(\frac{0.08}{12}\right)}{1-\left(1+\frac{0.08}{12}\right)^{-360}} \approx 1761.03, \text{ or } \$1761.03.$$

To find their equity after five years, we compute

$$P = 1761.03\left[\frac{1-\left(1+\frac{0.08}{12}\right)^{-300}}{\frac{0.08}{12}}\right] \approx 228{,}167$$

or \$228,167, and so their equity is 270,000 – 228,167 = 41,833, or \$41,833.

To find their equity after ten years, we compute

$$P = 1761.03\left[\frac{1-\left(1+\frac{0.08}{12}\right)^{-240}}{\frac{0.08}{12}}\right] \approx 210{,}539, \text{ or } \$210{,}539.$$

and their equity is 270,000 – 210,539 = 59,461, or \$59,461.

To find their equity after twenty years, we compute

$$P = 1761.03\left[\frac{1-\left(1+\frac{0.08}{12}\right)^{-120}}{\frac{0.08}{12}}\right] \approx 145{,}147, \text{ or } \$145{,}147,$$

and their equity is 270,000 – 145,147, or \$124,853.

26. We use Formula (14) with $S = 10,000,\ r = 0.05,\ m = 12,$ and n = (5)(12) = 60,

obtaining $R = \dfrac{\frac{.05}{12}(10,000)}{\left(1+\frac{0.05}{12}\right)^{60} - 1} \approx 147.05$

and so $R \approx 147.05.$ So Jessica needs to deposit \$147.05 per month into the account.

27. The amount that must be deposited annually into this fund is given by

$R = \dfrac{(0.07)(2.5)}{(1+0.07)^{20} - 1}$ = 0.06098231 million, or approximately \$60,982.31 annually.

28. He will receive $R = \dfrac{20{,}000(0.09)}{1-(1+0.09)^{-5}}$ $\approx$ 5141.85, or \$5141.85 each year.

29. The amount that must be deposited quarterly into this fund is

$$R = \frac{\left(\frac{0.09}{4}\right)200{,}000}{\left(1+\frac{0.09}{4}\right)^{40} - 1} \approx 3{,}135.48, \text{ or } \$3{,}135.48.$$

30. The size of each quarterly installment is given by

$$R = \frac{\left(\frac{0.10}{4}\right)20{,}000}{\left(1+\frac{0.10}{4}\right)^{12} - 1} \approx 1449.74, \text{ or } \$1449.74.$$

31. The size of each monthly installment is given by

$$R = \frac{\left(\frac{0.085}{12}\right)250{,}000}{\left(1+\frac{0.085}{12}\right)^{300} - 1} \approx 242.23, \text{ or } \$242.23.$$

32. By graduation, Joe incurred a debt of $A = P(1+i)^n$ (dollars), where $P = 12{,}000$, $t = 3$, $r = 0.04$, and $m = 12$; that is,

$$A = 12{,}000\left(1+\frac{0.04}{12}\right)^{36} \approx 13{,}527.2625 \text{ (dollars).}$$

To repay the loan, Joe's monthly payments will be

$$R = \frac{Pi}{1-(1+i)^{-n}}$$

with $P = 13527.2625$, $r = 0.04$, $t = 10$, and $m = 12$, or

$$R = \frac{(13527.2625)\left(\frac{0.04}{12}\right)}{1-\left(1+\frac{0.04}{12}\right)^{-120}} \approx 136.957, \text{ or } \$136.96.$$

33. Here $S = 450{,}000$, $i = \frac{0.10}{12}$, and $n = mt = (12)(30) = 360$. Thus, Formula (9) gives

$$450,000 = R\left[\frac{\left(1+\frac{0.10}{12}\right)^{360}-1}{\left(\frac{0.10}{12}\right)}\right].$$

Therefore, $R = \dfrac{450,000\left(\frac{0.10}{12}\right)}{\left(1+\frac{0.10}{12}\right)^{360}-1} \approx 199.07$

and her monthly payment is \$199.07.

34. By age 17, Yumi had accumulated a sum of $A = P(1+i)^n$ (dollars), where $P = 20,000$, $t = 7$, $r = 0.055$, and $m = 12$; that is,

$$A = 20000\left(1+\frac{0.055}{12}\right)^{84} \approx 29,366.4442 \text{ (dollars)}$$

The size of each installment will be $R = \dfrac{iS}{(1+i)^n - 1}$ where $S = 29366.4442$, $r = 0.06$, $t = 4$, and $m = 1$, or

$$R = \frac{\left(\frac{0.06}{1}\right)(29366.4442)}{\left(1+\frac{0.06}{1}\right)^{4}-1} \approx 6712.919,$$ or \$6712.92 per year.

35. The value of the IRA account after 20 years is

$$S = 375\left[\frac{\left(1+\frac{0.08}{4}\right)^{80}-1}{\frac{0.08}{4}}\right] \approx 72,664.48,$$ or \$72,664.48.

The payment he would receive at the end of each quarter for the next 15 years is given by

$$R = \frac{\left(\frac{0.08}{4}\right)72,664.48}{1-\left(1+\frac{0.08}{4}\right)^{-60}} \approx 2090.41,$$ or \$2090.41.

If he continues working and makes quarterly payments until age 65, the value of the IRA account would be

$$S = 375\left[\frac{\left(1+\frac{0.08}{4}\right)^{100}-1}{\frac{0.08}{4}}\right] \approx 117{,}087.11, \text{ or } \$117{,}087.11.$$

The payment he would receive at the end of each quarter for the next 10 years is given by

$$R = \frac{\left(\frac{0.08}{4}\right)117{,}087.11}{1-\left(1+\frac{0.08}{4}\right)^{-40}} \approx 4280.21, \text{ or } \$4280.21.$$

36. If she secures the loan from the manufacturer her monthly payment will be

$$R_1 = \frac{16{,}000\left(\frac{0.079}{12}\right)}{1-\left(1+\frac{0.079}{12}\right)^{-36}} \approx 500.64, \quad \text{or } \$500.64.$$

If she secures the loan from the bank, her monthly payment will be

$$R_2 = \frac{16{,}000\left(\frac{0.115}{12}\right)}{1-\left(1+\frac{0.115}{12}\right)^{-36}} \approx 527.62$$

or \$527.62. Therefore, her savings in interest will be

36(527.62 - 500.64) = 971.28, or \$971.28.

37. Using Equation (14) with $R = 400$, $i = \frac{0.072}{12}$, and $n = 48$, we have

$$P = 400\left[\frac{1-\left(1+\frac{0.072}{12}\right)^{-48}}{\frac{0.072}{12}}\right] \approx 16{,}639.53$$

Since he can get \$8000 for the trade-in, Dan can afford a car that costs no more than \$24,639.53.

38. The monthly payment for car A is

$$R_1 = \frac{28,000}{48} = 583.333, \text{ or } \$583.33.$$

After the rebate, the purchase price of car B is (28,200-2000) dollars and so the monthly payment is

$$R_2 = \frac{26,200\left(\frac{0.03}{12}\right)}{1-\left(1+\frac{0.03}{12}\right)^{-48}} = 579.919, \text{ or } \$579.92.$$

So Paula should purchase car B.

39. The monthly payment the Sandersons are required to make under the terms of their original loan is given by

$$R = \frac{100,000\left(\frac{0.10}{12}\right)}{1-\left(1+\frac{0.10}{12}\right)^{-240}} \approx 965.02, \text{ or } \$965.02.$$

The monthly payment the Sandersons are required to make under the terms of their new loan is given by

$$R = \frac{100{,}000\left(\frac{0.078}{12}\right)}{1-\left(1+\frac{0.078}{12}\right)^{-240}} \approx 824.04, \text{ or } \$824.04.$$

The amount of money that the Sandersons can expect to save over the life of the loan by refinancing is given by 240(965.02 - 824.04) = 33,835.20, or $33,835.20.

40. To find how much Ben would have in his account at age 65, we use Formula (9),

$$S = R\left[\frac{(1+i)^n - 1}{i}\right]$$

with $R = 200$, $r = 0.065$, $m = 12$, and $t = 43$ obtaining

$$S = 200\left[\frac{\left(1+\frac{0.065}{12}\right)^{(12)(43)} - 1}{\frac{0.065}{12}}\right] \approx 562695.76, \text{ or } \$562,695.76.$$

To find how much Larry would have to deposit into his account, we use Formula (14),

$$R = \frac{iS}{(1+i)^n - 1}$$

with $S = 599618.8357$, $r = 0.065$, $m = 12$, and $t = 38$, obtaining

$$R = \frac{\left(\frac{0.065}{12}\right)(562695.76)}{\left(1+\frac{0.065}{12}\right)^{12(38)}} \approx 283.69\text{, or \$283.69 per month.}$$

41. As of now, Paul owes his sister

$$A = Pe^{rt} = 10,000e^{(0.06)(2)} \approx 11,274.9685 \text{ (dollars)}$$

To repay the loan, Paul's monthly payment will be

$$R = \frac{Pi}{1-(1+i)^{-n}} = \frac{11274.9685\left(\frac{0.05}{12}\right)}{1-\left(1+\frac{0.05}{12}\right)^{-60}} \approx 212.773$$

or approximately $212.77/month.

42. Josh's monthly payment on the original loan is found using (14) with P = 180,000(0.80)= 144,000, r = 0.07, and n = 360, obtaining

$$R = \frac{144,000\left(\frac{0.07}{12}\right)}{1-\left(1+\frac{0.07}{12}\right)^{-360}} \approx 958.036\text{, or \$958.04 per month.}$$

Next, we need to find the present value of his outstanding loan after having made 5(12) or 60 payments. To do this, we use (15) with R = 958.036, $i = \frac{0.07}{12}$, and n = 300 obtaining

$$P = 958.036\left[\frac{1-\left(1+\frac{0.07}{12}\right)^{-300}}{\frac{0.07}{12}}\right] \approx 135,549.55$$

Josh is required to make a downpayment of 0.2($250,000) , or $50,000 on the new mortgage, So he can muster $(250,000 - 50,000 - 135,549.55)$ = 64,450.45

or $64,450.45 for his new business.

43. Kim's monthly payment is found using Formula (13) with P = 180,000, $i = \frac{r}{m} = \frac{0.095}{12}$, and n = (12)(30) = 360. Thus,

$$R = 180,000\left[\frac{\frac{0.095}{12}}{1-\left(1+\frac{0.095}{12}\right)^{-360}}\right] \approx 1513.5376.$$

After 8 years, he has paid (8)(12) or 96 payments. His outstanding principal is given by the sum of the remaining installments, (360 – 96), or 264. Using Formula 11, we find

$$P = 1513.5376\left[\frac{1-\left(1+\frac{0.095}{12}\right)^{-264}}{\frac{0.095}{12}}\right] \approx 167,341.3271.$$

So his outstanding principal is $167,341.33.

44. To find Olivia's monthly payment, we use Formula (13) $R = \frac{Pi}{1-(1+i)^{-n}}$ with $P = 200,000$, $r = 0.06$, $m = 12$, and $t = 30$, obtaining

$$R = \frac{200,000\left(\frac{0.06}{12}\right)}{1-\left(1+\frac{0.06}{12}\right)^{-360}} \approx 1199.101 \text{ (dollars/month)}$$

After 60 payments had been made, there were 300 remaining payments. The present value of an annuity with n = 300, R = 1199.10, and i = 0.005; that is,

$$P = 1199.10\left[\frac{1-(1+0.005)^{-300}}{0.005}\right] \approx 186,108.55, \text{ or } \$186,108.55.$$

45. To find Emilio's monthly payment, we use (13) with P = 280,000, r = 0.075, m = 12, and t = 30, obtaining

$$R=\frac{280,000\left(\frac{0.075}{12}\right)}{1-\left(1+\frac{0.075}{12}\right)^{-360}}\approx 1957.80 \text{ (dollars/month)}$$

After 7(12), or 84, payments have been made, there are 276 remaining payments. The present value of an annuity with n = 276, R = 1957.80, and $i=\frac{0.075}{12}$ is

$$P=1957.80\left[\frac{1-\left(1+\frac{0.075}{12}\right)^{-276}}{\frac{0.075}{12}}\right]\approx 257{,}135.23$$

So Emilio's balloon payment is $257,135.23.

46. Sarah's monthly payment is found using Formula (13) with P = 200,000, $i=\frac{r}{m}=\frac{0.06}{12}$, and n = (12)(15) = 180. Thus,

$$R=200,000\left[\frac{\frac{0.06}{12}}{1-\left(1+\frac{0.06}{12}\right)^{-180}}\right]\approx 1687.7137 .$$

After 5 years, she has paid (5)(12) or 60 payments. Her outstanding principal is given by the sum of the remaining installments, (180 – 60), or 120. Using Formula 11, we find

$$P=1687.7137\left[\frac{1-\left(1+\frac{0.06}{12}\right)^{-120}}{\frac{0.06}{12}}\right]\approx 152,018.2012$$

So her outstanding principal is $152,018.20.

47. a. Here P = 200,000, $i=\frac{r}{m}=\frac{0.095}{12}$, and $n=mt$ = (12)(30) = 360. Therefore,

$$R=\frac{200,000\left(\frac{0.095}{12}\right)}{1-\left(1+\frac{0.095}{12}\right)^{-360}}\approx 1681.7084, \text{ and so her monthly payment is \$1681.71.}$$

b. After (4)(12) = 48 monthly payments have been made, her outstanding principal is given by the sum of the present values of the remaining installments (which is 360 – 48 = 312). Using Formula (11), we find it to be

$$P = 1681.7084\left[\frac{1-\left(1+\frac{0.095}{12}\right)^{-312}}{\frac{0.095}{12}}\right] \approx 194,282.6675, \text{ or approximately } \$194,282.67.$$

c. Here P = 194,282.6675, $i = \frac{r}{m} = \frac{0.0675}{12}$, and n = (12)(30) = 360. So

$$R = \frac{194282.67\left(\frac{0.0675}{12}\right)}{1-\left(1+\frac{0.0675}{12}\right)^{-360}} \approx 1260.1137$$

and so her new monthly payment is $1260.11.

d. Emily will save 1681.71 – 1260.11, or $421.60 per month.

48. a. Here P = 300,000, $i = \frac{r}{m} = \frac{0.09}{12}$, and $n = mt$ = (12)(30) = 360. Therefore,

$$R = \frac{300,000\left(\frac{0.09}{12}\right)}{1-\left(1+\frac{0.09}{12}\right)^{-360}} \approx 2413.86785, \text{ and so her monthly payment is } \$2413.87.$$

b. After (5)(12) = 60 monthly payments have been made, her outstanding principal is given by the sum of the present values of the remaining installments (which is 360 – 60 = 300). Using Formula (11), we find it to be

$$P = 2413.86785\left[\frac{1-\left(1+\frac{0.09}{12}\right)^{-300}}{\frac{0.09}{12}}\right] \approx 287,640.4087, \text{ or approximately } \$287,640.41.$$

c. Here $P = 287,640.4087$, $i = \frac{r}{m} = \frac{0.07}{12}$, and n = (12)(30) = 360. So

$$R = \frac{287,640.4087\left(\frac{0.07}{12}\right)}{1-\left(1+\frac{0.07}{12}\right)^{-360}} \approx 1913.6788,$$

and so her new monthly payment is \$1913.68.

d. Diane will save 2413.87 – 1913.68, or \$500.19 per month on her house payment.

49. First we find Samantha's monthly payment on the original loan amount. Here P = 150,000, $i = \frac{r}{m} = \frac{0.075}{12}$, and $n = mt = (12)(30) = 360$. Therefore,

$$R = \frac{150,000\left(\frac{0.075}{12}\right)}{1-\left(1+\frac{0.075}{12}\right)^{-360}} \approx 1048.8218.$$

Next, to find her current outstanding principal, observe that this is just the sum of the present values of the 360 – 36, or 324 payments. Using Formula (9), we have

$$P = 1048.8218\left[\frac{1-\left(1+\frac{0.075}{12}\right)^{-324}}{\frac{0.075}{12}}\right] \approx 145,521.3768$$

Finally, using Formula (14) with P = 145521.3768, $i = \frac{r}{m} = \frac{0.07}{12}$, and $n = mt$ = (12)(27) = 324, we find $R = \frac{145521.3768\left(\frac{0.07}{12}\right)}{1-\left(1+\frac{0.07}{12}\right)^{-324}} \approx 1000.9178$

and so Samantha's new monthly payment will be \$1000.92 per month.

50. First we calculate George's monthly payment on the loan with interest at the rate of 8%/yr. Here P = 300,000, $i = \frac{0.08}{12}$, and $n = mt$ = 360. So

$$R = \frac{300,000\left[\frac{0.08}{12}\right]}{1-\left(1+\frac{0.08}{12}\right)^{-360}} \approx 2201.2937$$

Next, we find his outstanding principal. This is just the sum of the present values of (360 – 60) = 300 payments. Using (9), we find

$$P = 2201.2937\left[\frac{1-\left(1+\frac{0.08}{12}\right)^{-300}}{\frac{0.08}{12}}\right] \approx 285,209.5673$$

Finally, we use (14) with P = 285,209.5673, $i = \frac{0.065}{12}$, and $n = mt = (12)(25) = 300$, we find

$$R = \frac{285,209.5673\left(\frac{0.065}{12}\right)}{1-\left(1+\frac{0.065}{12}\right)^{-300}} \approx 1925.755$$

snd so George's new monthly payment will be \$1925.76 per month.

51. The amount of the loan the Meyers need to secure is \$280,000. Using the bank's financing, the monthly payment would be

$$R = \frac{280,000\left(\frac{0.11}{12}\right)}{1-\left(1+\frac{0.11}{12}\right)^{-300}} \approx 2744.32, \text{ or } \$2744.32.$$

Using the seller's financing, the monthly payment would be

$$R = \frac{280,000\left(\frac{0.098}{12}\right)}{1-\left(1+\frac{0.098}{12}\right)^{-300}} \approx 2504.99, \text{ or } \$2504.99.$$

By choosing the seller's financing rather than the bank's, the Meyers would save (2744.32 – 2504.99)(300) = 71,799 , or \$71,799 in interest.

52. a. The monthly payment required to amortize the loan over the life of the loan under option A is given by

$$\frac{150,000\left(\frac{0.075}{12}\right)}{1-\left(1+\frac{0.075}{12}\right)^{-360}} = 1048.82, \text{ or } \$1048.82/\text{month}.$$

The monthly payment required to amortize the loan over the life of the loan under option B is given by

$$\frac{150,000\left(\frac{0.0725}{12}\right)}{1-\left(1+\frac{0.0725}{12}\right)^{-180}}=1369.29, \quad \text{or } \$1369.29.$$

b. The interest paid under option A is given by

(1048.82)(360)-150,000 = 227,575.20, or $227,575.20.

Similarly, the interest paid under option B is given by

(1369.29)(180) - 150,000 = 96, 472.20, or $96,472.20.

Then the difference between these two amounts gives the amount saved by Mr. and Mrs. Martinez if they chose the 15-year mortgage instead of the 30-year mortgage. Thus, 227,575.20 - 96,472.20 = 131,103, or $131,103 is the amount that would be saved over the life of the loan.

USING TECHNOLOGY EXERCISES 5.3, page 299

1. $628.02 2. $1612.38 3. $1685.47 4. $1036.01

5. $1960,96 6. $1167.40 7. $894.12 8. $946.09

9. $18,288.92. The amortization schedule follows.

End of Period	*Interest charged*	*Repayment made*	*Payment toward Principal*	*Outstanding Principal*
0				120,000.00
1	10,200.00	18,288.92	8,088.92	111,911.08
2	9,512.44	18,288.92	8,776.48	103,134.60
3	8,766.44	18,288.92	9,522.48	93,612.12
4	7,957.03	18,288.92	10,331.89	83,280.23
5	7,078.82	18,288.92	11,210.10	72,070.13
6	6,125.96	18,288.92	12,162.96	59,907.17
7	5,092.11	18,288.92	13,196.81	46,710.36
8	3,970.38	18,288.92	14,318.54	32,391.82
9	2,753.30	18,288.92	15,535.62	16,856.20
10	1,432.78	18,288.98	16,856.14	.00

10. $45,069.31. The amortization schedule follows.

End of Period	*Interest charged*	*Repayment made*	*Payment toward Principal*	*Outstanding Principal*
0				265,000.000
1	19,610.00	45,069.31	25,459.31	239,540.69
2	17,726.01	45,069.31	27,343.30	212,197.39
3	15,702.61	45,069.31	29,366.70	182,830.69
4	13,529.47	45,069.31	31,539.84	151,290.85
5	11,195.52	45,069.31	33,873.79	117,417.06
6	8,688.86	45,069.31	36,380.45	81,036.61
7	5,997.71	45,069.31	39,071.60	41,964.01
8	3,105.34	45,069.31	41,964.01	0.00