8 Applications of Simple Interest

**Exercise 8.1**

1. *a.* Maturity value, *S = P*(1 *+ rt*) = $15,000 = $15,110.96

*b.* Maturity value = $15,110.96 = $15,191.07

3. The investor will earn an interest rate differential of 3.2% − 3.0% = 0.2% on $60,000

for 270 days. The amount of additional interest on the single $60,000 GIC will then be

*I = Prt* *=* $60,000(0.002) = $88.77

5. Maturity value of the 180-day GIC = $15,000 = $15,210.82

Maturity value of the first 90-day GIC = $15,000 = $15,098.01

Maturity value of the second 90-day GIC = $15,098.01 = $15,196.66

Therefore, the investor will earn

$15,210.82 – $15,196.66 = $14.16 more from the 180-day GIC.

7. a. If deposited on June 28,

I = Prt = $24.04

b. If deposited on July 1,

I = $23.12

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 9. | *Period* | *Balance* | *No. of* |  |
|  | *(inclusive)* | *in account* | *days* | *Interest earned* |
|  | Nov. 1-16 | $7255 | 16 | $7255(0.0305) = $9.70 |
|  | Nov. 17-20 | $6735 | 4 | $6735(0.0305) = $2.25 |
|  | Nov. 21-30 | $7650 | 10 | $7650(0.0305) = $6.39 |
|  |  |  | Interest | earned in November = $18.34 |

11. Number of days from June 1 to September 1 = 30 + 31 + 31 = 92 days

The value of the term deposit on September 1

= $12,000 = $12,084.69

|  |  |
| --- | --- |
| *Date* | *Amount in savings account* |
| July 1 | $12,000 = $12,022.19 |
| August 1 | $12,022.19 = $12,045.16 |
| Sept. 1 | $12,045.16 = $12,068.18 |

Joan will earn $12,084.69 – $12,068.18 = $16.51 more

from the term deposit up to September 1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 13. | *Period* | *No. of* |  | *Amount subject to a rate of:* | | |
|  | *(inclusive)* | *days* | *Balance* | *1.25%* | *1.5%* | *1.75%* |
|  | April 1-9 | 9 | $2439 | $1000 | $1439 |  |
|  | April 10-22 | 13 | 3389 | 1000 | 2000 | $389 |
|  | April 23-30 | 8 | 2889 | 1000 | 1889 |  |

Interest earned from April 1–9 inclusive

= [$1000(0.0125) + $1439(0.015)] = $0.840

Interest earned from April 10-22 inclusive

= [$1000(0.0125) + $2000(0.015) + $389(0.0175)] = $1.756

Interest earned from April 23-30 inclusive

= [$1000(0.0125) + $1889(0.015)] = $0.895

Total interest for April = $0.840 + $1.756 + $0.895 = $3.49

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 15. | *Period* | *No. of* | *Balance (for* | *Interest* |  |
|  | *(inclusive)* | *days* | *interest calculation)* | *rate* | *Interest* |
|  | Sept. 1–6 | 6 | $ 8572 | 1.25% | $ 1.761 |
|  | Sept. 7–14 | 8 | 18,072 | 1.50% | 5.941 |
|  | Sept. 15–22 | 8 | 26,672 | 1.75% | 10.230 |
|  | Sept. 23–30 | 8 | 1672 | 0.50% | 0.183 |
|  |  |  | Interest credited for September = | | $18.12 |

**Exercise 8.2**

1. *a.* Value today = Present value of payments

=  + 

= $495.05 + $490.20

= $985.25

*b.* Value in 1 month = Present value, 1 month from now, of the payments

=  + 

= $496.69 + $491.80

= $988.49

*c.* The closer the purchase date to the payments, the smaller the

discount will be for a given time value of money.

3. *a.* Value of certificate A = Sum of the present values of the payments.

=  + 

= $981.194 + $963.082

= $1944.28

*b.* Value of certificate B =  + 

= $976.60 + $958.66

= $1935.26

*c.* The payments from B are received one month later. This makes their

value today less than the value of the payments from A.

5. Maximum price = Sum of the present values of the payments

=  +  + 

= $3967.76 + $2460.02 + $4881.03

= $11,308.81

7. Number of days from:

March 20 to July 1 = 182 – 79 = 103 days

March 20 to September 1 = 244 – 79 = 165 days

Payment on July 1 = $3000 = $3093.12

Payment on September 1 = $5000 = $5248.63

Sale proceeds = Sum of present values of payments

=  + 

= $2959.50 + $4894.61

= $7854.11

**Concept Questions (Section 8.3)**

1. The price of the 98-day T-bill is higher because less time remains until the $100,000 face value is received. You do not need as large a difference between the face value and the purchase price to provide the required rate of return.

3. The fair market value will steadily rise, reaching the T-bill’s face value on the maturity date.

**Exercise 8.3**

1. Price = Present value of face value =  =  = $24,896

3. Time remaining until maturity = 62 days

Price = Present value of face value =  =  = $996,446

|  |  |  |
| --- | --- | --- |
| 5. | *Term* | *Price* |
|  | 30 days | = $99,877 |
|  | 60 days | = $99,754 |
|  | 90 days | = $99,631 |

The longer the term of the commercial paper issue, the lower

the price paid on the issue date.

7. Original purchase price =  =  = $99,086

Subsequent selling price =  = $99,260

Jake earned $99,260 – $99,086 = $174.

9. Effectively, the interest Debra will earn is

*I = S – P =* $100,000 – $99,615 = $385

The corresponding annual interest rate is

*r* =  =  = 0.04702 = 4.702%

Debra will earn an annual rate of 4.702%.

11. If purchased for $99,000, the T-bill will effectively pay $1000 interest when it matures

at $100,000. The time remaining until maturity (when the T-bill will have a market value

of $99,000) is

$100,000 = $99,000 (1 + 3.19% \* t)

t = ($100,000/$99,000)-1 = 0.316646085 years =115.5758 days

3.19%

The bill will first exceed $99,000 on Day 115.

13. *a.* Purchase price =  = $99,043

*b.* (i) Market value =  = $99,457

(ii) Market value =  = $99,525

(iii) Market value =  = $99,592

*c.* The amount earned in each case was:

(i) *I = S – P =* $99,457 – $99,043 = $414

(ii) *I = S – P =* $99,525 – $99,043 = $482

(iii) *I = S – P =* $99,592 – $99,043 = $549

The rate of return actually realized in each case was:

(i) *r* =  =  = 0.01795 = 1.795%

(ii) *r* =  = 0.02090 = 2.090%

(iii) *r* =  = 0.02380 = 2.380%

**Exercise 8.4**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *Rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 5-Feb | -- | -- | -- | -- | ($15,000) | ($15,000) | $15,000 |
|  | 29-Feb | 24 | 8.50% | $83.84 | ~~$83.84~~ | 83.84 |  | 15,000 |
|  | 15-Mar | 15 | 8.50 | 52.40 | 52.40 | 10,000 | 10,000 | 5000 |
|  | 31-Mar | 16 | 8.50 | 18.63 | ~~71.03~~ | 71.03 |  | 5000 |
|  | 30-Apr | 30 | 8.50 | 34.93 | ~~34.93~~ | 34.93 |  | 5000 |
|  | 1-May | 1 | 8.50 | 1.16 | 1.16 | (7000) | (7000) | 12,000 |
|  | 31-May | 30 | 8.50 | 83.84 | ~~85.00~~ | 85.00 |  | 12,000 |
|  |  |  |  |  |  |  |  |  |
|  | The interest charged to Dr. Robillard's account was $83.84 on February 29,  $71.03 on March 31, $34.93 on April 30, and $85.00 on May 31. | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 3-Jul | -- | -- | -- | -- | ($25,000) | ($25,000) | $25,000 |
|  | 20-Jul | 17 | 5.00% | $58.22 | ~~$58.22~~ | 58.22 |  | 25,000 |
|  | 29-Jul | 9 | 5.00 | 30.82 | 30.82 | (30,000) | (30,000) | 55,000 |
|  | 5-Aug | 7 | 5.00 | 52.74 | 83.56 |  |  | 55,000 |
|  | 20-Aug | 15 | 4.75 | 107.36 | ~~190.92~~ | 190.92 |  | 55,000 |

The amounts of interest charged on July 20 and August 20 were $58.22 and $190.92, respectively.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 7-Oct | -- | -- | -- | -- | ($30,000) | ($30,000) | $30,000 |
|  | 15-Oct | 8 | 7.75% | $50.96 | ~~$50.96~~ | 50.96 |  | 30,000 |
|  | 15-Nov | 31 | 7.75 | 197.47 | ~~197.47~~ | 197.47 |  | 30,000 |
|  | 24-Nov | 9 | 7.75 | 57.33 | 57.33 | (15,000) | (15,000) | 45,000 |
|  | 15-Dec | 21 | 7.75 | 200.65 | ~~257.98~~ | 257.98 |  | 45,000 |
|  | 17-Dec | 2 | 7.75 | 19.11 | 19.11 |  |  | 45,000 |
|  | 23-Dec | 6 | 7.50 | 55.48 | 74.59 | (20,000) | (20,000) | 65,000 |
|  | 15-Jan | 23 | 7.50 | 307.19 | ~~381.78~~ | 381.78 |  | 65,000 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 31-Mar | -- | -- | -- | -- | ($30,000.00) | ($30,000) | $30,000 |
|  | 18-Apr | 18 | 7.50% | $110.96 | ~~$110.96~~ | 110.96 |  | 30,000 |
|  | 28-Apr | 10 | 7.50 | 61.64 | 61.64 | (10,000.00) | (10,000) | 40,000 |
|  | 14-May | 16 | 7.50 | 131.51 | 193.15 |  |  | 40,000 |
|  | 18-May | 4 | 7.75 | 33.97 | ~~227.12~~ | 227.12 |  | 40,000 |
|  | 1-Jun | 14 | 7.75 | 118.90 | 118.90 | (15,000.00) | (15,000) | 55,000 |
|  | 18-Jun | 17 | 7.75 | 198.53 | ~~317.43~~ | 5317.43 | 5000 | 50,000 |
|  | 3-Jul | 15 | 7.75 | 159.25 | 159.25 | 10,000.00 | 10,000 | 40,000 |
|  | 18-Jul | 15 | 7.75 | 127.40 | ~~286.65~~ | 286.65 |  | 40,000 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 15-Aug | -- | -- | -- | -- | -- | -- | $3589.80 |
|  | 31-Aug | 16 | 8.75% | $13.77 | $13.77 | $300.00 | $300.00 | 3289.80 |
|  | 15-Sep | 15 | 8.75 | 11.83 | ~~25.60~~ | 100.00 | 74.40 | 3215.40 |
|  | 30-Sep | 15 | 8.75 | 11.56 | 11.56 | 300.00 | 300.00 | 2915.40 |
|  | 11-Oct | 11 | 8.75 | 7.69 | 19.25 |  |  | 2915.40 |
|  | 15-Oct | 4 | 8.50 | 2.72 | ~~21.97~~ | 100.00 | 78.03 | 2837.37 |
|  | 31-Oct | 16 | 8.50 | 10.57 | 10.57 | 300.00 | 300.00 | 2537.37 |
|  | 15-Nov | 15 | 8.50 | 8.86 | ~~19.43~~ | 100.00 | 80.57 | 2456.80 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 1-Apr | -- | -- | -- | -- | -- | -- | $6000.00 |
|  | 1-May | 30 | 4.25% | $20.96 | ~~$20.96~~ | $1000.00 | $979.04 | 5020.96 |
|  | 1-Jun | 31 | 4.25 | 18.12 | ~~18.12~~ | 1000.00 | 981.88 | 4039.08 |
|  | 7-Jun | 6 | 4.25 | 2.82 | 2.82 |  |  | 4039.08 |
|  | 1-Jul | 24 | 4.00 | 10.62 | ~~13.44~~ | 1000.00 | 986.56 | 3052.52 |
|  | 1-Aug | 31 | 4.00 | 10.37 | ~~10.37~~ | 1000.00 | 989.63 | 2062.89 |
|  | 27-Aug | 26 | 4.00 | 5.88 | 5.88 |  |  | 2062.89 |
|  | 1-Sep | 5 | 4.25 | 1.20 | ~~7.08~~ | 1000.00 | 992.92 | 1069.97 |
|  | 1-Oct | 30 | 4.25 | 3.74 | ~~3.74~~ | 1000.00 | 996.26 | 73.71 |
|  | 1-Nov | 31 | 4.25 | 0.27 | ~~0.27~~ | 73.98 | 73.71 | 0.00 |
|  | Total of the interest charges = | | | $73.98 |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 23-Feb | -- | -- | -- | -- | -- | -- | $5000.00 |
|  | 15-Apr | 51 | 5.25% | $36.68 | ~~$36.68~~ | $1000.00 | $963.32 | 4036.68 |
|  | 15-May | 30 | 5.25 | 17.42 | ~~17.42~~ | 1000.00 | 982.58 | 3054.10 |
|  | 15-Jun | 31 | 5.25 | 13.62 | ~~13.62~~ | 1000.00 | 986.38 | 2067.72 |
|  | 15-Jul | 30 | 5.50 | 9.35 | ~~9.35~~ | 1000.00 | 990.65 | 1077.07 |
|  | 31-Jul | 16 | 5.50 | 2.60 | 2.60 |  |  | 1077.07 |
|  | 15-Aug | 15 | 5.75 | 2.55 | ~~5.15~~ | 1000.00 | 994.85 | 82.22 |
|  | 15-Sep | 31 | 5.75 | 0.40 | ~~0.40~~ | 82.62 | 82.22 | 0.00 |

**Exercise 8.5**

1. Number of days from June 1 to September 3 = 246 – 152 = 94

Number of days from Sept. 3 to (and including) Nov. 30 = 334 + 1 – 246 = 89

Interest accrued during the 6-month grace period

 = $241.70

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
| *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
| 1-Dec | --- | --- | --- | --- | --- | --- | $9641.70 |
| 31-Dec | 30 | 5.00% | $39.62 | ~~$39.62~~ | $135.00 | $95.38 | 9546.32 |
| 17-Jan | 17 | 5.00 | 22.23 | 22.23 |  | 0.00 | 9546.32 |
| 31-Jan | 14 | 5.25 | 19.22 | ~~41.45~~ | 135.00 | 93.55 | 9452.77 |
| 28-Feb | 28 | 5.25 | 38.07 | ~~38.07~~ | 135.00 | 96.93 | 9355.84 |

3. Number of days from July 1 to September 22 = 265 – 182 = 83

Number of days from Sept. 22 to (and including) Dec. 31 = 365 + 1 – 265 = 101

Interest accrued during the 6-month grace period

 = $286.67

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
| *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
| 1-Jan | --- | --- | --- | --- | --- | --- | $7086.67 |
| 31-Jan | 30 | 8.25% | $48.05 | ~~$48.05~~ | $200.00 | $151.95 | 6934.72 |
| 28-Feb | 28 | 8.25 | 43.89 | ~~43.89~~ | 200.00 | 156.11 | 6778.61 |
| 2-Mar | 2 | 8.25 | 3.06 | 3.06 |  |  | 6778.61 |
| 25-Mar | 23 | 7.75 | 33.10 | 36.16 | 500.00 | 500.00 | 6278.61 |
| 31-Mar | 6 | 7.75 | 8.00 | ~~44.16~~ | 200.00 | 155.84 | 6122.77 |

5. Number of days from June 1 to (and including) Nov. 30 = 334 + 1 – 152 = 183

Interest accrued during the 6-month grace period

= $149.91

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
| *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
| 1-Dec | --- | --- | --- | --- | --- | --- | $5349.91 |
| 31-Dec | 30 | 5.75% | $25.28 | ~~$25.28~~ | $110.00 | $84.72 | 5265.19 |
| 31-Jan | 31 | 5.75 | 25.71 | ~~25.71~~ | 110.00 | 84.29 | 5180.90 |
| 14-Feb | 14 | 5.50 | 10.93 | 10.93 | 300.00 | 300.00 | 4880.90 |
| 28-Feb | 14 | 5.50 | 10.30 | ~~21.23~~ | 110.00 | 88.77 | 4792.13 |

**Review Problems**

1. Price =  =  = $49,841.81

3. The earnings from the certificate will be

*I = S – P =* $100,000 – $98,950 = $1050

The corresponding annual rate of return is

*r* =  =  = 0.04304 = 4.304%

The investment will yield the buyer 4.304%.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 5. | Period | *No. of* |  | *Amount subject to a rate of:* | | |
|  | *(inclusive)* | *days* | *Balance* | *1.00%* | *1.75%* | *2.25%* |
|  | Jan. 1-13 | 13 | $3678 | $1000 | $2000 | $678 |
|  | Jan. 14-24 | 11 | 878 | 878 |  |  |
|  | Jan. 25-31 | 7 | 1828 | 1000 | 828 |  |

*I* (Jan. 1-13) = [$1000(0.01) + $2000(0.0175) + $678(0.0225)] = $2.146

*I* (Jan. 14-24) = $878(0.01) = $0.265

*I* (Jan. 25-31) = [$1000(0.01) + $828(0.0175)] = $0.470

Total interest for January = $2.146 + $0.265 + $0.470 = $2.88

7. Maturity value of the 180-day GIC = $20,000 = $20,345.21

Maturity value of the first 90-day GIC = $20,000 = $20,162.74

Maturity value of the second 90-day GIC = $20,162.74 = $20,326.80

Therefore, Paul will earn $20,345.21 – $20,326.80 = $18.41 more

by purchasing the 180-day GIC.

9. *a.* Price =  = $99,101.41

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *b.* |  | Market return | Market value |
|  |  | (i) | 2% | = $99,547.26 |
|  |  | (ii) | 1.97% | = $99,554.03 |
|  |  | (iii) | 1.84% | = $99,583.33 |

*c.* The interest effectively earned in each case was:

(i) *I = S – P =* $99,547.26 – $99,101.41 = $445.85

(ii) *I = S – P =* $99,554.03 – $99,101.41 = $452.62

(iii) *I = S – P =* $99,583.33 – $99,101.41 = $481.92

The rate of return actually realized in each case was:

(i) *r* =  =  = 0.01932 = 1.932%

(ii) *r =*  = 0.01961 = 1.961%

(iii) *r =*  = 0.02088 = 2.088%

11. Size of the first payment = *P*(1 *+ rt*) = $1900 = $1959.38

Size of the second payment = $1900 = $2018.75

Price = Sum of present values of the payments (discounted at 18%)

=  +  = $1902.31 + $1877.91 = $3780.22

The finance company should pay $3780.22 if it requires an 18% rate of return.

13. Number of days from May 1 to July 9 = 190 – 121 = 69

Number of days from July 9 to (and including) Oct. 31 = 304 + 1 – 190 = 115

Interest accrued during the 6-month grace period

 = $284.70

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 1-Nov | --- | --- | --- | --- | --- | --- | $7484.70 |
|  | 30-Nov | 29 | 7.75% | $46.09 | ~~$46.09~~ | $120.00 | $73.91 | 7410.79 |
|  | 13-Dec | 13 | 7.75 | 20.46 | 20.46 |  |  | 7410.79 |
|  | 31-Dec | 18 | 7.50 | 27.41 | ~~47.87~~ | 120.00 | 72.13 | 7338.66 |
|  | 31-Jan | 31 | 7.50 | 46.75 | ~~46.75~~ | 120.00 | 73.25 | 7265.41 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 23-May | --- | --- | --- | --- | --- | --- | $15,000.00 |
|  | 15-Jun | 23 | 6.50% | $61.44 | ~~$61.44~~ | $700.00 | $638.56 | 14,361.44 |
|  | 15-Jul | 30 | 6.50% | 76.73 | ~~76.73~~ | 700.00 | 623.27 | 13,738.17 |
|  | 26-Jul | 11 | 6.50% | 26.91 | 26.91 |  |  | 13,738.17 |
|  | 15-Aug | 20 | 6.25% | 47.05 | ~~73.96~~ | 700.00 | 626.04 | 13,112.13 |
|  | 14-Sep | 30 | 6.25% | 67.36 | 67.36 |  |  | 13,112.13 |
|  | 15-Sep | 1 | 6.75% | 2.42 | ~~69.78~~ | 700.00 | 630.22 | 12,481.91 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17. |  | *Number* | *Interest* |  | *Accrued* | *Payment* | *Principal* |  |
|  | *Date* | *of days* | *rate* | *Interest* | *interest* | *(Advance)* | *portion* | *Balance* |
|  | 3-Jun | -- | -- | -- | -- | ($50,000) | ($50,000) | $50,000 |
|  | 26-Jun | 23 | 9.00% | $283.56 | ~~$283.56~~ | $283.56 |  | 50,000 |
|  | 30-Jun | 4 | 9.00 | 49.32 | 49.32 | (40,000) | (40,000) | 90,000 |
|  | 5-Jul | 5 | 9.00 | 110.96 | 160.28 |  |  | 90,000 |
|  | 17-Jul | 12 | 9.25 | 273.70 | 433.98 | (25,000) | (25,000) | 115,000 |
|  | 26-Jul | 9 | 9.25 | 262.29 | ~~696.27~~ | 696.27 |  | 115,000 |
|  | 31-Jul | 5 | 9.50 | 149.66 | 149.66 | 30,000 | 30,000 | 85,000 |
|  | 18-Aug | 18 | 9.50 | 398.22 | 547.88 | 35,000 | 35,000 | 50,000 |
|  | 26-Aug | 8 | 9.50 | 104.11 | ~~651.99~~ | 651.99 |  | 50,000 |

**Case (Chapter 8)**

***Debt Consolidation***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. |  |  | *Interest* | *30 days’* | *Minimum* |
|  | *Debt* | *Balance* | *rate* | *interest* | *payment* |
|  | Visa | $4700 | 17.5% | $67.60 ➀ | 0.05($4700 + $67.60) = $238.38 |
|  | MasterCard | 3900 | 15.9% | 50.97 | 0.05($3900 + $50.97) = $197.55 |
|  | American Express | 3850 | 28.8% | 91.13 | 0.04($3850 + $91.13) = $157.65 |
|  | Canadian Tire | 1250 | 28.8% | 29.59 | 0.05($1250 + $29.59) = $63.98 |
|  | Total: | $13,700 |  | $239.29 | $657.56 |

➀ *I = Prt =* $4700(0.175) = $67.60

3. Reduction in first month’s debt service payments = $300 + $657.56 – $595.61 = $361.95

5. Current weighted average interest rate

=

= 15.45%

Weighted average interest rate after debt consolidation = = 9.37%

7. (1) The interest rate on the Canada Student Loan (CSL) is 0.5% lower.

(2) The total monthly debt service cost would be higher if the CSL is also consolidated (since 3% of $6800 is more than $100).

**Exercise 8A**

1. Issue date = May 19 = 139th day of the year (Table 6.2)

Legal due date = 139 + 120 + 3 = 262nd day of the year = September 19

3. Term = October 17 – 3 days – July 6 = 290 – 3 – 187 = 100 days

5. Issue date = Feb. 28 – 3 days – 4 months = October 25

7. Issue date = September 2 – 3 days – 180 days

= 245 – 183

= 62nd day of the year

= March 3

9. Interest period = August 30 + 3 days – April 30 = 242 + 3 – 120 = 125 days

Maturity value, *S = P*(1 *+ rt*) = $1000 = $1032.53

11. Face value,  =  = $2600.00

13. *I = S – P =* $6388.04 – $6200 = $188.04

*r* =  =  = 0.090 = 9.00%

15. *I = S – P =* $5275.22 – $5200 = $75.22

*t* =  =  = 0.131504 year = 48 days

Term = 48 – 3 = 45 days

17. Time until maturity = 50 + 3 – 9 = 44 days

Proceeds =  =  = $988.09

19. Maturity value = *P*(1 *+ rt*) = $2700 = $2836.85

Time from sale date until maturity = 84 days

Proceeds =  =  = $2760.61

21. Maturity value = *P*(1 *+ rt*) = $9000 = $9185.42

Time from date of sale until maturity = 94 – 35 = 59 days

Discount rate, *r* =  =  = 0.075 = 7.50%

23. *a.* Legal due date = September 29, 2019 + 5 months + 3 days

= February 29, 2020 + 3 days

= March 3, 2020

*b.* Legal due date = September 29, 2019 + 150 days + 3 days

= 272nd day + 153 days

= (425 – 365) days into 2020

= 60th day in 2020

= February 29, 2020

25. Maturity value, *S = P*(1 *+ rt*) = $1000 = $1036.23

27. Time from sale date until due date = 93 – 31 = 62 days

Fair selling price =  =  = $3257.12

29. Maturity value = $750 = $776.46

Time from settlement date until legal due date = 103 – 26 = 77 days

Settlement amount =  = $763.18

31. Legal due date = December 30 + 3 days = January 2

Total interest period = 365 + 2 – 181 = 186 days

Maturity value = $2900 = $3099.50

Time from September 1 to January 2 = 186 – 63 = 123 days

Proceeds =  = $3000.90