

Chapter 9

Long-Term Liabilities

REVIEW QUESTIONS

Question 9-1 (LO 9-1)

Capital structure is the mixture of liabilities and stockholders' equity a business uses. Companies in the auto industry, like Ford, typically lean more toward liabilities for their financing, while companies in the computer industry, like Microsoft, use stockholders' equity to a greater extent in financing their asset growth.

Question 9-2 (LO 9-1)

One of the primary reasons a company chooses to borrow money rather than issue additional stock relates to taxes. Interest expense incurred when borrowing money is tax deductible, while dividends paid to stockholders is *not* tax deductible. Therefore, debt can be a less costly form of financing.

A second reason relates to control. If a company issues additional shares to investors, control in the company is shared with the new shareholders. If a company borrows funds, voting control in the company is retained.

Question 9-3 (LO 9-2)

Both interest expense and the carrying value of the note decrease over time. Interest expense decreases with each installment payment. In each of the following periods, the amount that goes to interest expense becomes less and the amount that goes to decreasing the carrying value becomes more. Interest expense decreases over time because the carrying value decreases over time, and interest is a constant percentage of carrying value.

Question 9-4 (LO 9-3)

A lease is a contractual arrangement by which the *lessor* (owner) provides the *lessee* (user) the right to use an asset for a specified period of time. In the balance sheet, a lease asset is reported for the right to use an asset, and a lease liability is reported for the obligation to make lease payments. The amount to report at the beginning of the lease is the present value of the lease payments.

Question 9-5 (LO 9-4)

Bond issue costs include underwriting services, legal, accounting, registration, and printing fees incurred to complete the bond issue. An underwriter is the investment house through which the bonds are sold like JPMorgan Chase, Citigroup, and Bank of America.

Answers to Review Questions (continued)

Question 9-6 (LO 9-4)

A company that borrows by issuing bonds is effectively by-passing the bank and borrowing directly from the investing public, usually at a lower interest rate than from a bank loan. However, issuing bonds entails significant bond issue costs that often exceed 5% of the amount borrowed. For smaller loans, the additional bond issue costs exceed the savings from a lower interest rate, making it more economical to borrow from a bank. For loans of \$20 million or more, the interest rate savings often exceed the additional bond issuance costs, making a bond issue more attractive.

Question 9-7 (LO 9-4)

(a) Secured bonds are supported by assets pledged as collateral. Unsecured bonds, also referred to as debentures, are not backed by a specific asset. (b) Term bonds require payment of the full principal amount of the bond at a single maturity date. Serial bonds require payments in installments over a series of years. (c) Callable bonds allow the issuer to repay the bonds before their scheduled maturity date at a specified call price. Convertible bonds allow the investor to convert each bond into a specified number of shares of common stock.

Question 9-8 (LO 9-4)

Convertible bonds allow the investor to convert each bond into a specified number of shares of common stock. The investor benefits from the conversion feature if share prices rise above the fixed conversion rate. For instance, assume a \$1,000 bond is convertible into 40 shares of common stock, when the stock is trading at \$23 per share. If the stock rises above \$25 ($\$1,000/40$), the shareholder will benefit by converting the bond into 40 common shares of stock. The borrower also benefits. Convertible bonds sell at a higher price and require a lower interest rate than bonds without a conversion feature.

Question 9-9 (LO 9-5)

(a) The face amount is the amount that will be repaid at maturity. The carrying value is the balance in the Bonds Payable account minus any discount or plus any premium. For example, a \$100,000 bond that issues for \$93,205 has a face value of \$100,000 and a carrying value of \$93,205 on the date of issue calculated as Bonds Payable of \$100,000 less Discount on Bonds Payable of \$6,795. The carrying value will increase from \$93,205 to \$100,000 over the life of the bond issue. (b) The stated interest rate is the rate used to determine the periodic interest payments paid by the borrower. The market interest rate represents the true interest rate used by investors to value the bond issue.

Answers to Review Questions (continued)

Question 9-10 (LO 9-5)

The bonds issue at a discount when the stated interest rate is less than the market interest rate. The bonds are paying less than the going rate and, therefore, issue at a discount.

Question 9-11 (LO 9-5)

The bonds issue at a premium when the stated interest rate is more than the market interest rate. The bonds are paying more than the going rate and, therefore, issue at a premium.

Question 9-12 (LO 9-5)

If bonds issue at a discount, the carrying value of the bonds and interest expense will increase over time. Recall that interest expense is calculated as the carrying value of the bond times the market interest rate. As carrying value increases, interest expense also increases.

Question 9-13 (LO 9-5)

If bonds issue at a premium, the carrying value of the bonds and interest expense will decrease over time. Recall that interest expense is calculated as the carrying value of the bond times the market interest rate. As carrying value decreases, interest expense also decreases.

Question 9-14 (LO 9-5)

Cash paid is calculated as the face amount of the bonds times the stated interest rate. Interest expense is the carrying value times the market rate. The difference between interest expense and the cash paid increases the carrying value of the bonds. At the maturity date, the carrying value will equal the face amount.

The amortization schedule is similar when bonds are issued at a premium, except that the difference between interest expense and the cash paid *decreases*, rather than increases, the carrying value of the bonds over time.

Question 9-15 (LO 9-6)

If interest rates decrease, a company may choose to buy back high interest rate bonds and reissue bonds at a lower interest rate. A company can help protect itself from decreases in interest rates by including a call feature allowing the company to repurchase bonds at a fixed price (like 2% over face amount). When interest rates decrease, companies with a call provision are more likely to repurchase higher-cost debt and then reissue debt at new lower interest rates.

Another incentive to repay debt early is to improve the company's debt and profitability ratios. Repurchasing debt can improve debt ratios. It can also improve profitability. If interest rates increase, bond prices go down and a company repurchasing the lower priced debt can report a gain on the income statement.

Answers to Review Questions (continued)**Question 9-16 (LO 9-6)**

A loss of \$50,000 is recorded by the issuer retiring the bonds as follows:

Bonds Payable	250,000	
Premium on Bonds Payable	30,000	
Loss	50,000	
Cash		330,000
<i>(Retire bonds before maturity)</i>		

Question 9-17 (LO 9-7)

We calculate the issue price of a bond as the present value of the principal (the face amount on the bond due at maturity) *plus* the present value of the periodic interest payments. It is not solely the present value of the principal; rather it is the present value of the principal plus the present value of the interest payments.

Question 9-18 (LO 9-7)

The cash payment every six months is \$15,000 ($\$500,000 \times .06 \times 6/12$). There will be 40 interest payments over the 20 years – one every six months.

Question 9-19 (LO 9-7)

- (a) \$562,757
- (b) \$500,000
- (c) \$446,612

(Note: These answers are based on a calculator/Excel. Answers using the present value tables may differ just a little due to rounding.)

Question 9-20 (LO 9-8)

Additional debt increases risk. Failure to repay debt or the interest associated with the debt on a timely basis may result in default and perhaps even bankruptcy. Other things being equal, the higher the debt, the higher the risk of bankruptcy. Additional debt also offers potential rewards. If a company earns a return in excess of the cost of borrowing the funds, shareholders are provided with a total return greater than what could have been earned with equity funds alone. Unfortunately, borrowing is not always favorable. Sometimes the cost of borrowing the funds exceeds the returns they generate.

BRIEF EXERCISES

Brief Exercise 9-1 (LO 9-2)

January 1, 2024

Equipment	30,000	
Notes Payable		30,000
<i>(Issue a note payable)</i>		

January 31, 2024

Interest Expense ($\$30,000 \times 5\% \times 1/12$)	125.00	
Notes Payable (difference)	441.14	
Cash (monthly payment)		566.14
<i>(Pay monthly installment on note)</i>		

Brief Exercise 9-2 (LO 9-2)

January 1, 2024

Building	600,000	
Notes Payable		600,000
<i>(Issue a note payable)</i>		

January 31, 2024

Interest Expense ($\$600,000 \times 6\% \times 1/12$)	3,000.00	
Notes Payable (difference)	597.30	
Cash (monthly payment)		3,597.30
<i>(Pay monthly installment on note)</i>		

Brief Exercise 9-3 (LO 9-2)

- \$36,000
- 36
- \$40,611.96 [= $\$1,128.11 \times 36$]
- \$4,611.96 [= $\$40,611.96 - \$36,000.00$]
- Increases

Brief Exercise 9-4 (LO 9-2)

a1. \$1,067,571 [= (\$5,930.95 × 180 months) + \$0 down]

a2. \$1,004,056.80 [= (\$4,744.76 × 180 months) + \$150,000 down]

b1. \$317,571 [= \$1,067,571 - \$750,000]

b2. \$254,056.80 [= \$1,004,056.80 - \$750,000]

Brief Exercise 9-5 (LO 9-3)

January 1, 2024

Lease Asset

100,000

Lease Payable

100,000

(Sign a lease)

Brief Exercise 9-6 (LO 9-3)

	Assets	Liabilities	Stockholders' Equity
Balance before:	\$600,000	\$400,000	\$200,000
Effect of lease:	+ 40,000	+ 40,000	
Balance after:	\$640,000	\$440,000	\$200,000

Exercise 9-7 (LO 9-4)

Terms

- | | |
|---------|----------------------|
| __ e __ | 1. Sinking fund. |
| __ g __ | 2. Secured bond. |
| __ c __ | 3. Unsecured bond. |
| __ f __ | 4. Term bond. |
| __ b __ | 5. Serial bond. |
| __ a __ | 6. Callable bond. |
| __ d __ | 7. Convertible bond. |
| __ h __ | 8. Bond issue costs. |

Definitions

- Allows the issuer to pay off the bonds early at a fixed price.
- Matures in installments.
- Secured only by the “full faith and credit” of the issuing corporation.
- Allows the investor to transfer each bond into shares of common stock.
- Money set aside to pay debts as they come due.
- Matures on a single date.
- Supported by specific assets pledged as collateral by the issuer.
- Includes underwriting, legal, accounting, registration, and printing fees.

Brief Exercise 9-8 (LO 9-4)

1.

January 1, 2024

Cash	70,000	
Bonds Payable		70,000
<i>(Issue bonds at face amount)</i>		

2.

June 30, 2024

Interest Expense	2,450	
Cash ($\$70,000 \times 7\% \times \frac{1}{2}$)		2,450
<i>(Pay semiannual interest)</i>		

Brief Exercise 9-9 (LO 9-5)

1.

January 1, 2024

Cash	63,948	
Discount on Bonds Payable	6,052	
Bonds Payable		70,000
<i>(Issue bonds at a discount)</i>		

2.

June 30, 2024

Interest Expense ($\$63,948 \times 8\% \times \frac{1}{2}$)	2,558	
Discount on Bonds Payable (difference)		108
Cash ($\$70,000 \times 7\% \times \frac{1}{2}$)		2,450
<i>(Pay semiannual interest)</i>		

Brief Exercise 9-10 (LO 9-5)

1.

January 1, 2024

Cash	76,860	
Bonds Payable		70,000
Premium on Bonds Payable		6,860
<i>(Issue bonds at a premium)</i>		

2.

June 30, 2024

Interest Expense ($\$76,860 \times 6\% \times \frac{1}{2}$)	2,306	
Premium on Bonds Payable (difference)	144	
Cash ($\$70,000 \times 7\% \times \frac{1}{2}$)		2,450
<i>(Pay semiannual interest)</i>		

Brief Exercise 9-11 (LO 9-4)

1.

January 1, 2024

Cash	70,000	
Bonds Payable		70,000
<i>(Issue bonds at face amount)</i>		

2.

December 31, 2024

Interest Expense	4,900	
Cash ($\$70,000 \times 7\%$)		4,900
<i>(Pay annual interest)</i>		

Brief Exercise 9-12 (LO 9-5)

1.

January 1, 2024

Cash	64,008	
Discount on Bonds Payable	5,992	
Bonds Payable		70,000
<i>(Issue bonds at a discount)</i>		

2.

December 31, 2024

Interest Expense ($\$64,008 \times 8\%$)	5,121	
Discount on Bonds Payable (difference)		221
Cash ($\$70,000 \times 7\%$)		4,900
<i>(Pay annual interest)</i>		

Brief Exercise 9-13 (LO 9-5)

1.

January 1, 2024

Cash	76,799	
Bonds Payable		70,000
Premium on Bonds Payable		6,799
<i>(Issue bonds at a premium)</i>		

2.

December 31, 2024

Interest Expense ($\$76,799 \times 6\%$)	4,608	
Premium on Bonds Payable (difference)	292	
Cash ($\$70,000 \times 7\%$)		4,900
<i>(Pay annual interest)</i>		

Brief Exercise 9-14 (LO 9-5)

\$2,653 ($\$88,443 \times 6\% \times \frac{1}{2}$).

Brief Exercise 9-15 (LO 9-5)

Interest expense for the year ended December 31, 2024 would be \$4,157. Interest expense for the first six months ended June 30, 2024 is \$2,075 ($\$82,985 \times 5\% \times \frac{1}{2}$). Interest expense for the next six months ended December 31, 2024 is \$2,082 ($[\$82,985 + (\$2,075 - \$1,800)] \times 5\% \times \frac{1}{2}$). Thus, the total interest expense for the year is $\$2,075 + \$2,082 = \$4,157$.

Brief Exercise 9-16 (LO 9-5)

1.

Cash	63,948	
Discount on Bonds Payable	6,052	
Bonds Payable		70,000
<i>(Issue bonds at a discount)</i>		

2.

Interest Expense	2,558	
Discount on Bonds Payable		108
Cash		2,450
<i>(Pay semiannual interest)</i>		

3. Interest expense increases each period because the carrying value of the debt issued at a discount increases over time. **Recall that interest expense is calculated as the carrying value of the bond times the market interest rate. As carrying value increases, interest expense also increases.**

Brief Exercise 9-17 (LO 9-5)

1.

Cash	76,860	
Bonds Payable		70,000
Premium on Bonds Payable		6,860
<i>(Issue bonds at a premium)</i>		

2.

Interest Expense	2,306	
Premium on Bonds Payable	144	
Cash		2,450
<i>(Pay semi-annual interest)</i>		

3. Interest expense decreases each period because the carrying value of the debt issued at a premium decreases over time. **Recall that interest expense is calculated as the carrying value of the bond times the market interest rate. As carrying value decreases, interest expense also decreases.**

Brief Exercise 9-18 (LO 9-6)

Bonds Payable	70,000	
Loss	3,832	
Discount on Bonds Payable		5,832
Cash		68,000
<i>(Retire bonds before maturity)</i>		

Brief Exercise 9-19 (LO 9-6)

Bonds Payable	70,000	
Premium on Bonds Payable	6,567	
Gain		4,567
Cash		72,000
<i>(Retire bonds before maturity)</i>		

Brief Exercise 9-20 (LO 9-7)

If the market rate is 7%, the bonds will issue at \$60,000 (face amount).

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$60,000
2. Interest payment	PMT	\$2,100 = \$60,000 × 7% × ½ year
3. Number of periods	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	3.5% = 7% / 2 periods each year

Calculator Output

Issue price	PV	\$60,000
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Brief Exercise 9-21 (LO 9-7)

If the market rate is 8%, the bonds will issue at \$54,812 (a discount).

Calculator Input		
Bond Characteristics	Key	Amount
1. Face amount	FV	\$60,000
2. Interest payment	PMT	$\$2,100 = \$60,000 \times 7\% \times \frac{1}{2} \text{ year}$
3. Number of periods	N	$30 = 15 \text{ years} \times 2 \text{ periods each year}$
4. Market interest rate	I	$4\% = 8\% / 2 \text{ periods each year}$
Calculator Output		
Issue price	PV	\$54,812

Brief Exercise 9-22 (LO 9-7)

If the market rate is 6%, the bonds will issue at \$66,934 (a premium).

Calculator Input		
Bond Characteristics	Key	Amount
1. Face amount	FV	\$60,000
2. Interest payment	PMT	$\$2,100 = \$60,000 \times 7\% \times \frac{1}{2} \text{ year}$
3. Number of periods	N	$40 = 20 \text{ years} \times 2 \text{ periods each year}$
4. Market interest rate	I	$3\% = 6\% / 2 \text{ periods each year}$
Calculator Output		
Issue price	PV	\$66,934

Brief Exercise 9-23 (LO 9-8)

1.

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$628	÷	\$99	=	6.34

2.

Net Income	÷	Average Total Assets	=	Return on Assets Ratio
\$66	÷	\$722.5*	=	9.1%

*(\$718 + \$727) / 2

3.

Net Income + Interest + Income Tax Expense	÷	Interest	=	Times Interest Earned Ratio
\$125	÷	\$15	=	8.3

Brief Exercise 9-24 (LO 9-2)

(1)

Income					
Statement:	Revenues	–	Expenses	=	Net Income
Balance					
Sheet:	Assets	=	Liabilities	+	Stockholders' Equity
	+30,000		+30,000		
	Equipment		Notes Payable		

(2)

Income					
Statement:	Revenues	–	Expenses	=	Net Income
			+125.00		–125.00
			Interest Expense		
					↓
Balance					
Sheet:	Assets	=	Liabilities	+	Stockholders' Equity
	–566.14		–441.14		–125.00
	Cash		Notes Payable		

Brief Exercise 9-25 (LO 9-3)

Income					
Statement:	Revenues	–	Expenses	=	Net Income
Balance					
Sheet:	Assets	=	Liabilities	+	Stockholders' Equity
	+100,000		+100,000		
	Lease Asset		Lease Payable		

Brief Exercise 9-26 (LO 9-4)

(1)

Income					
Statement:	Revenues	–	Expenses	=	Net Income

Balance					
Sheet:	Assets	=	Liabilities	+	Stockholders' Equity
	+70,000		+70,000		
	Cash		Bonds Payable		

(2)

Income					
Statement:	Revenues	–	Expenses	=	Net Income
			+2,450		–2,450
			Interest Expense		

↓

Balance					
Sheet:	Assets	=	Liabilities	+	Stockholders' Equity
	–2,450				–2,450
	Cash				

$$(\$70,000 \times 7\% \times \frac{1}{2}) = \$2,450$$

EXERCISES

Exercise 9-1 (LO 9-1)

Requirement 1

	<u>Issue Note</u>	<u>Issue Stock</u>
Operating income	\$11,000,000	\$11,000,000
Interest expense (on note only)	2,450,000	
Income before tax	<u>8,550,000</u>	<u>11,000,000</u>
Income tax expense (25%)	<u>2,137,500</u>	<u>2,750,000</u>
Net income	<u>\$ 6,412,500</u>	<u>\$ 8,250,000</u>
# of shares	4,000,000	5,000,000
Earnings per share (Net income / # of shares)	<u>\$1.60</u>	<u>\$1.65</u>

Requirement 2

- (a) Interest payments are higher by \$2,450,000 ($= \$35,000,000 \times 7\%$).
- (b) Dividend payments are higher by \$2,450,000 ($= \$1,000,000 \text{ new shares} \times \2.45).
- (c) **Issuing stock** results in higher earnings per share. Issuing the note results in earnings per share of \$1.60 compared with \$1.65 for issuing stock.

Exercise 9-2 (LO 9-2)January 1, 2024

Cash	50,000.00	
Notes Payable		50,000.00
<i>(Issue a note payable)</i>		

January 31, 2024

Interest Expense ($\$50,000 \times 6\% \times 1/12$)	250.00	
Notes Payable (difference)	578.64	
Cash (monthly payment)		828.64
<i>(Pay monthly installment on note)</i>		

February 28, 2024

Interest Expense ($[\$50,000 - 578.64] \times 6\% \times 1/12$)	247.11	
Notes Payable (difference)	581.53	
Cash (monthly payment)		828.64
<i>(Pay monthly installment on note)</i>		

Exercise 9-3 (LO 9-2)

Requirement 1

January 1, 2024

Land	800,000.00	
Notes Payable		800,000.00
<i>(Issue a note payable for land)</i>		

Requirement 2

June 30, 2024

Interest Expense ($\$800,000 \times 6\% \times 6/12$)	24,000.00	
Notes Payable (difference)	191,221.64	
Cash (semiannual payment)		215,221.64
<i>(Pay annual installment on note)</i>		

December 31, 2024

Interest Expense ($[\$800,000 - 191,221.64] \times 6\% \times 6/12$)	18,263.35	
Notes Payable (difference)	196,958.29	
Cash (annual payment)		215,221.64
<i>(Pay annual installment on note)</i>		

Requirement 3

$$\text{Notes Payable} = \$800,000 - \$191,221.64 - \$196,958.29 = \$411,820.07$$

$$\text{Interest Expense} = \$24,000.00 + \$18,263.35 = \$42,263.35$$

Exercise 9-4 (LO 9-2)**Requirement 1****January 1, 2024**

Equipment	700,000.00	
Cash		100,000.00
Notes Payable		600,000.00
<i>(Purchase equipment with down payment and installment note)</i>		

Requirement 2**March 31, 2024**

Interest Expense ($\$600,000 \times 8\% \times 3/12$)	12,000.00	
Notes Payable (difference)	69,905.88	
Cash (three-month payment)		81,905.88
<i>(Pay installment on note)</i>		

Exercise 9-5 (LO 9-2)**Requirement 1**Option 1

Cash	200,000.00	
Notes Payable		200,000.00
<i>(Issue a note payable)</i>		

Option 2

Cash	200,000.00	
Notes Payable		200,000.00
<i>(Issue a note payable)</i>		

Requirement 2Option 1 – First Month

Interest Expense ($\$200,000 \times 6\% \times 1/12$)	1,000.00	
Notes Payable (difference)	2,866.56	
Cash (monthly payment)		3,866.56
<i>(Pay monthly installment on note)</i>		
<i>(Interest = $[\\$200,000] \times 6\% \times 1/12$)</i>		

Option 1 – Second Month

Interest Expense ($[\$200,000 - \$2,866.56] \times 6\% \times 1/12$)	985.67	
Notes Payable (difference)	2,880.89	
Cash (monthly payment)		3,866.56
<i>(Pay monthly installment on note)</i>		

Option 2 – First Month

Interest Expense ($\$200,000 \times 7\% \times 1/12$)	1,166.67	
Notes Payable (difference)	1,155.50	
Cash (monthly payment)		2,322.17
<i>(Pay monthly installment on note)</i>		

Option 2 – Second Month

Interest Expense ($[\$200,000 - \$1,155.50] \times 7\% \times 1/12$)	1,159.93	
Notes Payable (difference)	1,162.24	
Cash (monthly payment)		2,322.17
<i>(Pay monthly installment on note)</i>		

Requirement 3

Option 1. $\$31,993.60$ [= $(\$3,866.56 \times 60) - \$200,000$]

Option 2. $\$78,660.40$ [= $(\$2,322.17 \times 120) - \$200,000$]

Exercise 9-6 (LO 9-3, LO 9-8)

Requirement 1

Assets	=	Liabilities	+	Stockholders' Equity
\$25 million		\$15 million		?

Stockholders' equity must be \$10 million (\$25 million – \$15 million).

Requirement 2

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$15 million	÷	\$10 million	=	1.50

Requirement 3

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$15 + \$2 = \$17 million	÷	\$10 million	=	1.70

Requirement 4

Yes. A higher ratio typically indicates greater risk.

Exercise 9-7 (LO 9-3)

PV of lease payments = \$3,618.18 × 22.110544* = \$80,000 (rounded)

* Present value of an annuity; n = 24; i = 8%/12

June 1, 2024

Lease Asset	80,000	
Lease Payable		80,000
<i>(Record a 24-month lease)</i>		

Exercise 9-8 (LO 9-3)

PV of lease payments = $\$29,122.87 \times 17.16864^* = \$500,000$ (rounded)

* Present value of an annuity; $n = 20$; $i = 6\%/4$ (Table 4)

June 30, 2024

Lease Asset	500,000	
Lease Payable		500,000
<i>(Record a 20-quarter lease)</i>		

Exercise 9-9 (LO 9-2, 9-3)**Requirement 1**

January 1, 2024

Equipment	250,000	
Notes Payable		250,000
<i>(Issue a 30-month note payable for purchase of equipment)</i>		

Requirement 2

January 1, 2024

Lease Asset	200,000	
Lease Payable		200,000
<i>(Sign a 30-month lease for equipment)</i>		

PV of lease payments = $\$7,749.62 \times 25.80771^* = \$200,000$ (rounded)

* Present value of an annuity; $n = 30$; $i = 12\%/12$ (Table 4)

Requirement 3

The **installment note** increases debt by **\$50,000 more**. The amount of the borrowing from the note is higher than the present value of the lease payments.

Requirement 4

Purchasing with installment note. Purchasing the equipment with an installment note has greater initial debt obligation, but the company retains \$100,000 of value at the end of 30-month period. Under the leasing agreement, the equipment must be returned, and the company retains no value. Under the note, the present value of the asset's \$100,000 residual value is \$74,192 ($i=1\%$, $n=30$, Table 2). Because of this, the

net cost (initial obligation less value retained) will be less when purchasing with the installment note.

Exercise 9-10 (LO 9-4)January 1, 2024

Cash	500,000	
Bonds Payable		500,000
<i>(Issue bonds at face amount)</i>		

June 30, 2024

Interest Expense	22,500	
Cash ($\$500,000 \times 9\% \times \frac{1}{2}$)		22,500
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	22,500	
Cash ($\$500,000 \times 9\% \times \frac{1}{2}$)		22,500
<i>(Pay semiannual interest)</i>		

Exercise 9-11 (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount <u>x 4.5%</u> Stated Rate	Interest Expense Carrying Value <u>x 5% Market</u> Rate	Increase in Carrying Value <u>(3) - (2)</u>	Carrying Value Prior Carrying Value + (4)
1/ 1 /2024				\$ 457,102
6/30/2024	\$ 22,500	\$ 22,855	\$ 355	457,457
12/31/2024	22,500	22,873	373	457,830

Requirement 2January 1, 2024

Cash	457,102	
Discount on Bonds Payable	42,898	
Bonds Payable		500,000
<i>(Issue bonds at a discount)</i>		

June 30, 2024

Interest Expense	22,855	
Discount on Bonds Payable (difference)		355
Cash ($\$500,000 \times 9\% \times \frac{1}{2}$)		22,500
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	22,873	
Discount on Bonds Payable (difference)		373
Cash ($\$500,000 \times 9\% \times \frac{1}{2}$)		22,500
<i>(Pay semiannual interest)</i>		

Exercise 9-12 (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
	Face Amount <u>x 4.5%</u> Stated Rate	Carrying Value <u>x 4% Market</u> Rate	<u>(2) – (3)</u>	Prior Carrying Value – (4)
1/ 1 /2024				\$ 549,482
6/30/2024	\$ 22,500	\$ 21,979	\$ 521	548,961
12/31/2024	22,500	21,958	542	548,419

Requirement 2January 1, 2024

Cash	549,482	
Bonds Payable		500,000
Premium on Bonds Payable		49,482
<i>(Issue bonds at a premium)</i>		

June 30, 2024

Interest Expense	21,979	
Premium on Bonds Payable (difference)	521	
Cash ($\$500,000 \times 9\% \times \frac{1}{2}$)		22,500
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	21,958	
Premium on Bonds Payable (difference)	542	
Cash ($\$500,000 \times 9\% \times \frac{1}{2}$)		22,500
<i>(Pay semiannual interest)</i>		

Exercise 9-13 (LO 9-4)January 1, 2024

Cash	600,000	
Bonds Payable		600,000
<i>(Issue bonds at face amount)</i>		

June 30, 2024

Interest Expense	21,000	
Cash ($\$600,000 \times 7\% \times \frac{1}{2}$)		21,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	21,000	
Cash ($\$600,000 \times 7\% \times \frac{1}{2}$)		21,000
<i>(Pay semiannual interest)</i>		

Exercise 9-14 (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount <u>x 3.5%</u> Stated Rate	Interest Expense Carrying Value <u>x 4% Market</u> Rate	Increase in Carrying Value <u>(3) - (2)</u>	Carrying Value Prior Carrying Value + (4)
1/ 1 /2024				\$ 559,229
6/30/2024	\$ 21,000	\$ 22,369	\$ 1,369	560,598
12/31/2024	21,000	22,424	1,424	562,022

Requirement 2January 1, 2024

Cash	559,229	
Discount on Bonds Payable	40,771	
Bonds Payable		600,000
<i>(Issue bonds at a discount)</i>		

June 30, 2024

Interest Expense	22,369	
Discount on Bonds Payable (difference)		1,369
Cash ($\$600,000 \times 7\% \times \frac{1}{2}$)		21,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	22,424	
Discount on Bonds Payable (difference)		1,424
Cash ($\$600,000 \times 7\% \times \frac{1}{2}$)		21,000
<i>(Pay semiannual interest)</i>		

Exercise 9-15 (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount <u>x 3.5%</u> Stated Rate	Interest Expense Carrying Value <u>x 3% Market</u> Rate	Decrease in Carrying Value <u>(2) – (3)</u>	Carrying Value Prior Carrying Value – (4)
1/ 1 /2024				\$ 644,632
6/30/2024	\$ 21,000	\$ 19,339	\$ 1,661	642,971
12/31/2024	21,000	19,289	1,711	641,260

Requirement 2January 1, 2024

Cash	644,632	
Bonds Payable		600,000
Premium on Bonds Payable		44,632
<i>(Issue bonds at a premium)</i>		

June 30, 2024

Interest Expense	19,339	
Premium on Bonds Payable (difference)	1,661	
Cash ($\$600,000 \times 7\% \times \frac{1}{2}$)		21,000
<i>(Pay semi-annual interest)</i>		

December 31, 2024

Interest Expense	19,289	
Premium on Bonds Payable (difference)	1,711	
Cash ($\$600,000 \times 7\% \times \frac{1}{2}$)		21,000
<i>(Pay semi-annual interest)</i>		

Exercise 9-16 (LO 9-4)

January 1, 2024

Cash	600,000	
Bonds Payable		600,000
<i>(Issue bonds at face amount)</i>		

December 31, 2024

Interest Expense	42,000	
Cash ($\$600,000 \times 7\%$)		42,000
<i>(Pay annual interest)</i>		

December 31, 2025

Interest Expense	42,000	
Cash ($\$600,000 \times 7\%$)		42,000
<i>(Pay annual interest)</i>		

Exercise 9-17 (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount x 7% Stated Rate	Interest Expense Carrying Value x 8% Market Rate	Increase in Carrying Value <u>(3) – (2)</u>	Carrying Value Prior Carrying Value + (4)
1/ 1 /2024				\$ 559,740
12/31/2024	\$ 42,000	\$ 44,779	\$ 2,779	562,519
12/31/2025	42,000	45,002	3,002	565,521

Requirement 2January 1, 2024

Cash	559,740	
Discount on Bonds Payable	40,260	
Bonds Payable		600,000
<i>(Issue bonds at a discount)</i>		

December 31, 2024

Interest Expense	44,779	
Discount on Bonds Payable (difference)		2,779
Cash (\$600,000 × 7%)		42,000
<i>(Pay annual interest)</i>		

December 31, 2025

Interest Expense	45,002	
Discount on Bonds Payable (difference)		3,002
Cash (\$600,000 × 7%)		42,000
<i>(Pay annual interest)</i>		

Exercise 9-18 (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount x 7% Stated Rate	Interest Expense Carrying Value x 6% Market Rate	Decrease in Carrying Value (2) – (3)	Carrying Value Prior Carrying Value – (4)
1/ 1 /2024				\$ 644,161
12/31/2024	\$ 42,000	\$ 38,650	\$ 3,350	640,811
12/31/2025	42,000	38,449	3,551	637,260

Requirement 2January 1, 2024

Cash	644,161	
Bonds Payable		600,000
Premium on Bonds Payable		44,161
<i>(Issue bonds at a premium)</i>		

December 31, 2024

Interest Expense	38,650	
Premium on Bonds Payable (difference)	3,350	
Cash (\$600,000 × 7%)		42,000
<i>(Pay annual interest)</i>		

December 31, 2025

Interest Expense	38,449	
Premium on Bonds Payable (difference)	3,551	
Cash (\$600,000 × 7%)		42,000
<i>(Pay annual interest)</i>		

Exercise 9-19 (LO 9-6)

Requirement 1

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount x 4.5% <u>Stated Rate</u>	Interest Expense Carrying Value x 5% Market <u>Rate</u>	Increase in Carrying Value <u>(3) - (2)</u>	Carrying Value Prior Carrying Value + (4)
1/ 1 /2024				\$ 457,102
6/30/2024	\$ 22,500	\$ 22,855	\$ 355	457,457
12/31/2024	22,500	22,873	373	457,830
6/30/2025	22,500	22,892	392	458,222
12/31/2025	22,500	22,911	411	458,633

Requirement 2

If the market rate drops to 7%, it will cost \$601,452 to retire the bonds.

Calculator Input

Bond characteristics	Key	Amount
1. Face amount	FV	\$500,000
2. Interest payment each period	PMT	\$22,500 = \$500,000 × 9% × ½ year
3. Number of periods	N	36 = 18 years × 2 periods each year
4. Market interest rate each period	I	3.5% = 7% / 2 periods each year

Calculator Output

Issue price PV \$601,452

December 31, 2025

Bonds Payable	500,000	
Loss	142,819	
Discount on Bonds Payable		41,367
Cash		601,452
<i>(Retire bonds before maturity)</i>		

Exercise 9-21 (LO 9-7)**Requirement 1**

Premium. The issue price is \$45,057,519

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$41,000,000
2. Interest payment	PMT	\$1,845,000 = \$41,000,000 × 9% × ½ year
3. Number of periods	N	40 = 20 years × 2 periods each year
4. Market interest rate	I	4% = 8% / 2 periods each year

Calculator Output

Issue price	PV	\$45,057,519
-------------	----	--------------

Requirement 2

Face amount. The issue price is \$41,000,000.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$41,000,000
2. Interest payment	PMT	\$1,845,000 = \$41,000,000 × 9% × ½ year
3. Number of periods	N	40 = 20 years × 2 periods each year
4. Market interest rate	I	4.5% = 9% / 2 periods each year

Calculator Output

Issue price	PV	\$41,000,000
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Requirement 3

Discount. The issue price is \$37,482,387

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$41,000,000
2. Interest payment	PMT	\$1,845,000 = \$41,000,000 × 9% × ½ year
3. Number of periods	N	40 = 20 years × 2 periods each year
4. Market interest rate	I	5% = 10% / 2 periods each year

Calculator Output

Issue price	PV	\$37,482,387
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Exercise 9-22 (LO 9-7)**Requirement 1**

Premium. The issue price is \$27,934,072.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$26,000,000
2. Interest payment	PMT	\$910,000 = \$26,000,000 × 7% × ½ year
3. Number of periods	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	3% = 6% / 2 periods each year

Calculator Output

Issue price	PV	\$27,934,072
-------------	----	--------------

Requirement 2

Face amount. The issue price is \$26,000,000.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$26,000,000
2. Interest payment	PMT	\$910,000 = \$26,000,000 × 7% × ½ year
3. Number of periods	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	3.5% = 7% / 2 periods each year

Calculator Output

Issue price	PV	\$26,000,000
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Requirement 3

Discount. The issue price is \$24,233,258.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$26,000,000
2. Interest payment	PMT	\$910,000 = \$26,000,000 × 7% × ½ year
3. Number of periods	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	4% = 8% / 2 periods each year

Calculator Output

Issue price	PV	\$24,233,258
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Exercise 9-23 (LO 9-8)**Requirement 1**

	Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
E-Travel	\$4,254,475	÷	\$3,182,681	=	1.34
Pricecheck	\$486,610	÷	\$1,607,614	=	0.30

E-Travel has a higher leverage risk.

Requirement 2

	Net Income + Interest + Taxes	÷	Interest	=	Times Interest Earned Ratio
E-Travel	\$588,159	÷	\$94,233	=	6.2
Pricecheck	\$600,724	÷	\$34,084	=	17.6

Pricecheck, with a times interest earned ratio of 17.6, is better able to meet interest payments as they become due than E-Travel with a ratio of only 6.2.

Exercise 9-24 (LO 9-2, LO 9-8)**Requirement 1**

<u>January 1</u>	<u>Debit</u>	<u>Credit</u>
Cash	100,000	
Notes Payable (Long-term)		100,000
<i>(Issue a long-term note payable)</i>		
<u>January 4</u>	<u>Debit</u>	<u>Credit</u>
Cash	31,000	
Accounts Receivable		31,000
<i>(Receive cash on account)</i>		
<u>January 11</u>	<u>Debit</u>	<u>Credit</u>
Accounts Payable	11,000	
Cash		11,000
<i>(Pay cash on account)</i>		
<u>January 15</u>	<u>Debit</u>	<u>Credit</u>
Salaries Expense	28,900	
Cash		28,900
<i>(Pay for salaries)</i>		
<u>January 30</u>	<u>Debit</u>	<u>Credit</u>
Cash	65,000	
Accounts Receivable	130,000	
Sales Revenue		195,000
<i>(Sell inventory for cash and on account)</i>		
Cost of Goods Sold	112,500	
Inventory		112,500
<i>(Record cost of inventory sold)</i>		
<u>January 31</u>	<u>Debit</u>	<u>Credit</u>
Interest Expense	583	
Notes Payable (Long-term)	1,397	
Cash		1,980
<i>(Pay monthly installment on long-term note)</i>		
<i>(\$583 = \$100,000 × 7% × 1/12)</i>		

Requirement 2

<u>(a) January 31</u>	<u>Debit</u>	<u>Credit</u>
Depreciation Expense	800	
Accumulated Depreciation		800
<i>(Record depreciation for January)</i>		
<i>(\$800 = [\$120,000 - \$24,000] / 120 months)</i>		
<u>(b) January 31</u>	<u>Debit</u>	<u>Credit</u>
Bad Debt Expense	2,300	
Allowance for Uncollectible Accounts		2,300
<i>(Adjust uncollectible accounts)</i>		

<u>(c) January 31</u>	<u>Debit</u>	<u>Credit</u>
Salaries Expense	26,100	
Salaries Payable		26,100
<i>(Adjust salaries payable)</i>		

<u>(d) January 31</u>	<u>Debit</u>	<u>Credit</u>
Income Tax Expense	8,000	
Income Tax Payable		8,000
<i>(Adjust income taxes)</i>		

<u>(e) January 31</u>	<u>Debit</u>	<u>Credit</u>
Notes Payable (Long-term)	17,411	
Notes Payable (Current)		17,411
<i>(Reclassify current portion of note payable)</i>		

Requirement 3

**Freedom Fireworks
Adjusted Trial Balance
January 31, 2024**

Accounts	Debit	Credit
Cash	\$165,320	
Accounts Receivable	133,000	
Allowance for Uncollectible Accounts		\$ 4,100
Inventory	39,500	
Land	67,300	
Buildings	120,000	
Accumulated Depreciation		10,400
Accounts Payable		6,700
Salaries Payable		26,100
Income Tax Payable		8,000
Notes Payable (Current)		17,411
Notes Payable (Long-term)		81,192
Common Stock		200,000
Retained Earnings		155,400
Sales Revenue		195,000
Cost of Goods Sold	112,500	
Salaries Expense	55,000	
Bad Debt Expense	2,300	
Depreciation Expense	800	
Interest Expense	583	
Income Tax Expense	8,000	
Totals	<u>\$704,303</u>	<u>\$704,303</u>

Requirement 3 (continued)

Accounts	Ending Balance	=	Beginning balance in bold , entries during January in blue , and adjusting entries in red .
Cash	\$165,320	=	11,200 +100,000+31,000-11,000-28,900+65,000-1,980
Accounts Receivable	133,000	=	34,000 -31,000+130,000
Allow for Uncoll Accts	4,100	=	1,800 +2,300
Inventory	39,500	=	152,000 -112,500
Land	67,300	=	67,300
Buildings	120,000	=	120,000
Accumulated Depreciation	10,400	=	9,600 +800
Accounts Payable	6,700	=	17,700 -11,000
Salaries Payable	26,100	=	26,100
Income Tax Payable	8,000	=	8,000
Notes Payable (Current)	17,411	=	17,411
Notes Payable (Long-term)	81,192	=	100,000 - 1,397 -17,411
Common Stock	200,000	=	200,000
Retained Earnings	155,400	=	155,400
Sales Revenue	195,000	=	195,000
Cost of Goods Sold	112,500	=	112,500
Salaries Expense	55,000	=	28,900 +26,100
Bad Debt Expense	2,300	=	2,300
Depreciation Expense	800	=	800
Interest Expense	583	=	583
Income Tax Expense	8,000	=	8,000

Requirement 4

Freedom Fireworks		
Multiple-Step Income Statement		
For the year month ended January 31, 2024		
Sales revenue	\$195,000	
Cost of goods sold	112,500	
Gross profit		\$ 82,500
Salaries expense	55,000	
Bad debt expense	2,300	
Depreciation expense	800	
Total operating expenses		58,100
Operating income		24,400
Interest expense		583
Income before taxes		23,817
Income tax expense		8,000
Net income		\$ 15,817

Requirement 5

Freedom Fireworks			
Classified Balance Sheet			
January 31, 2024			
<u>Assets</u>		<u>Liabilities</u>	
Cash	\$165,320	Accounts payable	\$ 6,700
Accounts receivable	133,000	Salaries payable	26,100
Less: Allowance	(4,100)	Income tax payable	8,000
Inventory	39,500	Notes payable (Current)	17,411
Total current assets	333,720	Total current liabilities	58,211
Land	67,300	Notes payable (Long-term)	81,192
Buildings	120,000	Total liabilities	139,403
Less: Accumulated Depreciation	(10,400)	<u>Stockholders' Equity</u>	
		Common stock	200,000
		Retained earnings	171,217 *
		Total stockholders' equity	371,217
		Total liabilities and	
Total assets	\$510,620	stockholders' equity	\$510,620

* Retained earnings = Beginning retained earnings + Net income – Dividends
= \$155,400 + \$15,817 – \$0
= \$171,217

Requirement 6

January 31, 2024	Debit	Credit
Sales Revenue	195,000	
Retained Earnings (Close revenue accounts)		195,000
Retained Earnings	179,183	
Cost of Goods Sold		112,500
Salaries Expense		55,000
Bad Debt Expense		2,300
Depreciation Expense		800
Interest Expense		583
Income Tax Expense (Close expense accounts)		8,000

Requirement 7

(a) The debt to equity ratio is:

$$\text{Debt to Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Stockholders' Equity}} = \frac{\$139,403}{\$371,217} = \mathbf{0.38}$$

Freedom Fireworks is **less** leveraged than the industry average. Freedom Fireworks has a lower proportion of liabilities in relation to stockholders' equity than the industry average of 1.0.

(b) The times interest earned ratio is:

$$\text{Times Interest Earned Ratio} = \frac{\text{Net Income} + \text{Interest Expense} + \text{Tax Expense}}{\text{Interest Expense}} = \frac{\$15,817 + \$583 + \$8,000}{\$583} = \mathbf{41.9}$$

Compared to the industry average of 20 times, Freedom Fireworks is **more** able to meet interest payments than other companies in the same industry.

(c) Based on the debt to equity ratio and the times interest earned ratio, ratio, Freedom Fireworks would more likely receive a **lower** interest rate than the average borrowing rate in the industry. Freedom Fireworks carries less debt than the industry average and is better able to meet interest payments than the average company in the industry.

PROBLEMS: SET A

Problem 9-1A (LO 9-2)

Requirement 1

January 1, 2024

Building	360,000	
Cash		60,000
Notes Payable		300,000
<i>(Issue a mortgage note payable)</i>		

Requirement 2

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
	Monthly Payment	Carrying Value $\times 0.07 \times 1/12$	(2) – (3)	Prior Carrying Value – (4)
1/1/2024				\$ 300,000.00
1/31/2024	\$3,483.25	\$ 1,750.00	\$ 1,733.25	298,266.75
2/28/2024	3,483.25	1,739.89	1,743.36	296,523.39

Requirement 3

January 31, 2024

Interest Expense ($\$300,000 \times 7\% \times 1/12$)	1,750.00	
Notes Payable (difference)	1,733.25	
Cash (monthly payment)		3,483.25
<i>(Pay monthly installment on note)</i>		

In the first monthly payment, \$1,750.00 goes to interest expense and \$1,733.25 goes to reducing the carrying value of the loan.

Requirement 4

Total payments on the loan are \$417,990. Since actual payments on the loan are \$300,000, the remainder of \$117,990 is the amount paid for interest expense.

Problem 9-2A (LO 9-2)**Requirement 1****January 1, 2024**

Cash	2,000,000	
Notes Payable		2,000,000
<i>(Issue a note payable)</i>		

Requirement 2

Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
				\$2,000,000
12/31/2024	\$776,067	\$160,000	\$616,067	1,383,933
12/31/2025	776,067	110,715	665,352	718,581
12/31/2026	776,067	57,486	718,581	0

Requirement 3**December 31, 2024**

Interest Expense	160,000	
Notes Payable	616,067	
Cash		776,067
<i>(Pay annual installment on note)</i>		

December 31, 2025

Interest Expense	110,715	
Notes Payable	665,352	
Cash		776,067
<i>(Pay annual installment on note)</i>		

December 31, 2026

Interest Expense	57,486	
Notes Payable	718,581	
Cash		776,067
<i>(Pay annual installment on note)</i>		

Problem 9-3A (LO 9-3)**Requirement 1**

PV of lease payments:

Option 1. $\$3,000 \times 22.56287(n=24, i=6\%/12)^* = \$67,689$ (rounded)Option 2. $\$2,750 \times 32.87102(n=36, i=6\%/12)^* = \$90,395$ (rounded)Option 3. $\$2,500 \times 42.58032(n=48, i=6\%/12)^* = \$106,451$ (rounded)

* In Excel, =PV(0.06/12, N, PMT)

Requirement 2**Option 1. September 1, 2024**

Lease Asset	67,689	
Lease Payable		67,689
<i>(Record two-year monthly lease)</i>		

Option 2. September 1, 2024

Lease Asset	90,395	
Lease Payable		90,395
<i>(Record three-year monthly lease)</i>		

Option 3. September 1, 2024

Lease Asset	106,451	
Lease Payable		106,451
<i>(Record four-year monthly lease)</i>		

Requirement 3

Option 3 has the highest lease payable.

Problem 9-4A (LO 9-3, 9-8)

Requirement 1

Assets	=	Liabilities	+	Stockholders' Equity
\$81 million		\$11 + \$41 = \$52 million		?

Stockholders' equity must be \$29 million (\$81 million - \$52 million).

Requirement 2

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$52 million	÷	\$29 million	=	1.79

Requirement 3

(\$ in millions)

Lease Asset		16		
Lease Payable				16
<i>(Record a lease)</i>				

Requirement 4

Yes.

The revised debt to equity ratio of 2.34 is greater than the 2.0 ratio required in the bond agreement.

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$52 + 16 = 68 million	÷	\$29 million	=	2.34

Problem 9-5A (LO 9-4, 9-5)**Requirement 1**January 1, 2024

Cash	600,000	
Bonds Payable		600,000
<i>(Issue bonds at face amount)</i>		

June 30, 2024

Interest Expense	24,000	
Cash ($\$600,000 \times 8\% \times \frac{1}{2}$)		24,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	24,000	
Cash ($\$600,000 \times 8\% \times \frac{1}{2}$)		24,000
<i>(Pay semiannual interest)</i>		

Requirement 2January 1, 2024

Cash	544,795	
Discount on Bonds Payable	55,205	
Bonds Payable		600,000
<i>(Issue bonds at a discount)</i>		

June 30, 2024

Interest Expense ($\$544,795 \times 9\% \times \frac{1}{2}$)	24,516	
Discount on Bonds Payable (difference)		516
Cash ($\$600,000 \times 8\% \times \frac{1}{2}$)		24,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense ($[\$544,795 + \$516] \times 9\% \times \frac{1}{2}$)	24,539	
Discount on Bonds Payable (difference)		539
Cash ($\$600,000 \times 8\% \times \frac{1}{2}$)		24,000
<i>(Pay semiannual interest)</i>		

Requirement 3January 1, 2024

Cash	664,065	
Bonds Payable		600,000
Premium on Bonds Payable		64,065
<i>(Issue bonds at a premium)</i>		

June 30, 2024

Interest Expense ($\$664,065 \times 7\% \times \frac{1}{2}$)	23,242	
Premium on Bonds Payable (difference)	758	
Cash ($\$600,000 \times 8\% \times \frac{1}{2}$)		24,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense ($[\$664,065 - \$758] \times 7\% \times \frac{1}{2}$)	23,216	
Premium on Bonds Payable (difference)	784	
Cash ($\$600,000 \times 8\% \times \frac{1}{2}$)		24,000
<i>(Pay semiannual interest)</i>		

Problem 9-6A (LO 9-5)

1. Discount
2. \$37,281,935
3. \$40,000,000
4. $7\% (\$1,400,000 \text{ cash paid} \div \$40,000,000 \text{ face value}) \times 2$
5. $8\% (\$1,491,277 \text{ interest expense} \div \$37,281,935 \text{ carrying value}) \times 2$
6. \$28,000,000 ($\$1,400,000 \times 20$ payments)

Problem 9-7A (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount x 4% Stated Rate	Interest Expense Carrying Value x 4.5% Market Rate	Increase in Carrying Value (3) – (2)	Carrying Value Prior Carrying Value + (4)
1/ 1 /2024				\$ 841,464
6/30/2024	\$ 36,000	\$ 37,866	\$ 1,866	843,330
12/31/2024	36,000	37,950	1,950	845,280

Requirement 2January 1, 2024

Cash	841,464	
Discount on Bonds Payable	58,536	
Bonds Payable		900,000
<i>(Issue bonds at a discount)</i>		

Requirement 3June 30, 2024

Interest Expense ($\$841,464 \times 9\% \times \frac{1}{2}$)	37,866	
Discount on Bonds Payable (difference)		1,866
Cash ($\$900,000 \times 8\% \times \frac{1}{2}$)		36,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense ($\$843,330 \times 9\% \times \frac{1}{2}$)	37,950	
Discount on Bonds Payable (difference)		1,950
Cash ($\$900,000 \times 8\% \times \frac{1}{2}$)		36,000
<i>(Pay semiannual interest)</i>		

Problem 9-8A (LO 9-5, 9-7)**Requirement 1**

Face amount. The issue price is \$1,300,000.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$1,300,000
2. Interest payment	PMT	\$45,500 = \$1,300,000 × 7% × ½ year
3. Number of periods	N	30 = 15 years × 2 periods each year
4. Market interest rate	I	3.5% = 7% / 2 periods each year

Calculator Output

Issue price	PV	\$1,300,000
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(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Increase in Carrying Value	Carrying Value
	Face Amount x 3.5% <u>Stated Rate</u>	Carrying Value x 3.5% Market <u>Rate</u>	<u>(3) – (2)</u>	Prior Carrying Value + <u>(4)</u>
1/ 1 /2024				\$ 1,300,000
6/30/2024	\$ 45,500	\$ 45,500	\$ 0	1,300,000
12/31/2024	45,500	45,500	0	1,300,000

Requirement 2

Discount. The issue price is \$1,187,602.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$1,300,000
2. Interest payment	PMT	\$45,500 = \$1,300,000 × 7% × ½ year
3. Number of periods	N	30 = 15 years × 2 periods each year
4. Market interest rate	I	4% = 8% / 2 periods each year

Calculator Output

Issue price	PV	\$1,187,602
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(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Increase in Carrying Value	Carrying Value
	Face Amount x 3.5% <u>Stated Rate</u>	Carrying Value x 4% Market <u>Rate</u>	<u>(3) – (2)</u>	Prior Carrying Value + (4) <u>Value + (4)</u>
1/ 1 /2024				\$ 1,187,602
6/30/2024	\$ 45,500	\$ 47,504	\$ 2,004	1,189,606
12/31/2024	45,500	47,584	2,084	1,191,690

Requirement 3

Premium. The issue price is \$1,427,403.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$1,300,000
2. Interest payment	PMT	\$45,500 = \$1,300,000 × 7% × ½ year
3. Number of periods	N	30 = 15 years × 2 periods each year
4. Market interest rate	I	3% = 6% / 2 periods each year

Calculator Output

Issue price	PV	\$1,427,403
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(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
	Face Amount x 3.5% <u>Stated Rate</u>	Carrying Value x 3% Market <u>Rate</u>	<u>(2) – (3)</u>	Prior Carrying Value – (4)
1/ 1 /2024				\$ 1,427,403
6/30/2024	\$ 45,500	\$ 42,822	\$ 2,678	1,424,725
12/31/2024	45,500	42,742	2,758	1,421,967

Problem 9-9A (LO 9-8)**Requirement 1**

(\$ in millions)	Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
Bahama Bay	\$5,724	÷	\$3,137	=	1.82
Caribbean Key	\$2,819	÷	\$4,821	=	0.58

Bahama Bay has a higher debt to equity ratio than Caribbean Key.

Requirement 2

(\$ in millions)	Net Income	÷	Average Total Assets	=	Return on Assets Ratio
Bahama Bay	\$562	÷	\$9,210.5*	=	6.1%
Caribbean Key	\$88	÷	\$7,573.5**	=	1.2%

* $(\$8,861 + \$9,560) / 2$

** $(\$7,640 + \$7,507) / 2$

Bahama Bay is more profitable than Caribbean Key.

Requirement 3

(\$ in millions)	Net Income + Interest + Taxes	÷	Interest	=	Times Interest Earned Ratio
Bahama Bay	\$880	÷	\$170	=	5.2
Caribbean Key	\$166	÷	\$70	=	2.4

Bahama Bay, with a times interest earned ratio of 5.2, is better able to meet interest payments as they become due than Caribbean Key with a ratio of only 2.4.

PROBLEMS: SET B

Problem 9-1B (LO 9-2)

Requirement 1

January 1, 2024

Building	610,000	
Cash		110,000
Notes Payable		500,000
<i>(Issue a mortgage note payable)</i>		

Requirement 2

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
	<u>Monthly Payment</u>	Carrying Value <u>x 0.09 × 1/12</u>	<u>(2) – (3)</u>	Prior Carrying Value – (4)
1/1/2024				\$ 500,000.00
1/31/2024	\$ 5,071.33	\$ 3,750.00	\$ 1,321.33	498,678.67
2/28/2024	5,071.33	3,740.09	1,331.24	497,347.43

Requirement 3

January 31, 2024

Interest Expense ($\$500,000 \times 9\% \times 1/12$)	3,750.00	
Notes Payable (difference)	1,321.33	
Cash (monthly payment)		5,071.33
<i>(Pay monthly installment on note)</i>		

In the first monthly payment, \$3,750.00 goes to interest expense and only \$1,321.33 goes to reducing the carrying value of the loan.

Requirement 4

Over the 15 year mortgage, \$412,839 is interest expense and \$500,000 goes to reducing the carrying value of the loan. Interest expense over the 15 year mortgage is calculated as the total payments of \$912,839 minus the \$500,000 carrying value of the loan.

Problem 9-2B (LO 9-2)**Requirement 1****January 1, 2024**

Cash	9,000,000	
Notes Payable		9,000,000
<i>(Issue a note payable)</i>		

Requirement 2

Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
				\$9,000,000
12/31/2024	\$2,657,053	\$630,000	\$2,027,053	6,972,947
12/31/2025	2,657,053	488,106	2,168,947	4,804,000
12/31/2026	2,657,053	336,280	2,320,773	2,483,227
12/31/2026	2,657,053	173,826	2,483,227	0

Requirement 3**December 31, 2024**

Interest Expense	630,000	
Notes Payable	2,027,053	
Cash		2,657,053
<i>(Pay annual installment on note)</i>		

December 31, 2025

Interest Expense	488,106	
Notes Payable	2,168,947	
Cash		2,657,053
<i>(Pay annual installment on note)</i>		

December 31, 2026

Interest Expense	336,280	
Notes Payable	2,320,773	
Cash		2,657,053
<i>(Pay annual installment on note)</i>		

December 31, 2027

Interest Expense	173,826	
Notes Payable	2,483,227	
Cash		2,657,053
<i>(Pay annual installment on note)</i>		

Problem 9-3B (LO 9-3)**Requirement 1**

PV of lease payments (Lease Payable):

Option 1. $\$2,000 \times 33.36570(n=36, i=5\%/12)^* = \$66,731$ (rounded)Option 2. $\$1,300 \times 33.36570(n=36, i=5\%/12)^* = \$43,375$ (rounded)Option 3. $\$600 \times 33.36570(n=36, i=5\%/12)^* = \$20,019$ (rounded)

*In Excel, =PV(0.05/12, 36, 1)

Requirement 2**Option 1. September 1, 2024**

Lease Asset	66,731	
Lease Payable		66,731
<i>(Record three-year monthly lease with zero down)</i>		

Option 2. September 1, 2024

Lease Asset	63,375	
Lease Payable		43,375
Cash		20,000
<i>(Record three-year monthly lease with \$20,000 down)</i>		

Option 3. September 1, 2024

Lease Asset	60,019	
Lease Payable		20,019
Cash		40,000
<i>(Record three-year monthly lease with \$40,000 down)</i>		

Requirement 3

Option 1 has the highest lease asset.

Problem 9-4B (LO 9-3, 9-8)**Requirement 1**

Assets	=	Liabilities	+	Stockholders' Equity
\$201 million		\$91 + \$61 = \$152 million		?

Stockholders' equity must be \$49 million (\$201 million - \$152 million).

Requirement 2

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$152 million	÷	\$49 million	=	3.10

Requirement 3

(\$ in millions)

Lease Asset	26	
Lease Payable		26
<i>(Record a lease agreement)</i>		

Requirement 4

Yes.

The revised debt to equity ratio of 3.63 is greater than the 3.25 ratio required in the bond agreement.

Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
\$152 + 26 = 178 million	÷	\$49 million	=	3.63

Problem 9-5B (LO 9-4, 9-5)**Requirement 1**January 1, 2024

Cash	3,000,000	
Bonds Payable		3,000,000
<i>(Issue bonds at face amount)</i>		

June 30, 2024

Interest Expense	135,000	
Cash ($\$3,000,000 \times 9\% \times \frac{1}{2}$)		135,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense	135,000	
Cash ($\$3,000,000 \times 9\% \times \frac{1}{2}$)		135,000
<i>(Pay semiannual interest)</i>		

Requirement 2January 1, 2024

Cash	2,813,067	
Discount on Bonds Payable	186,933	
Bonds Payable		3,000,000
<i>(Issue bonds at a discount)</i>		

June 30, 2024

Interest Expense ($\$2,813,067 \times 10\% \times \frac{1}{2}$)	140,653	
Discount on Bonds Payable (difference)		5,653
Cash ($\$3,000,000 \times 9\% \times \frac{1}{2}$)		135,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense ($[\$2,813,067 + \$5,653] \times 10\% \times \frac{1}{2}$)	140,936	
Discount on Bonds Payable (difference)		5,936
Cash ($\$3,000,000 \times 9\% \times \frac{1}{2}$)		135,000
<i>(Pay semiannual interest)</i>		

Requirement 3January 1, 2024

Cash	3,203,855	
Bonds Payable		3,000,000
Premium on Bonds Payable		203,855
<i>(Issue bonds at a premium)</i>		

June 30, 2024

Interest Expense ($\$3,203,855 \times 8\% \times \frac{1}{2}$)	128,154	
Premium on Bonds Payable (difference)	6,846	
Cash ($\$3,000,000 \times 9\% \times \frac{1}{2}$)		135,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense ($[\$3,203,855 - \$6,846] \times 8\% \times \frac{1}{2}$)	127,880	
Premium on Bonds Payable (difference)	7,120	
Cash ($\$3,000,000 \times 9\% \times \frac{1}{2}$)		135,000
<i>(Pay semiannual interest)</i>		

Problem 9-6B (LO 9-5)

- Premium
- \$66,934,432
- \$60,000,000
- $7\% (\$2,100,000 \text{ cash paid} \div \$60,000,000 \text{ face value}) \times 2$
- $6\% (\$2,008,033 \text{ interest expense} \div \$66,934,432 \text{ carrying value}) \times 2$
- \$84,000,000 ($\$2,100,000 \times 40 \text{ payments}$)

Problem 9-7B (LO 9-5)**Requirement 1**

(1)	(2)	(3)	(4)	(5)
Date	Cash Paid Face Amount <u>x 3.5%</u> <u>Stated Rate</u>	Interest Expense Carrying Value <u>x 3% Market</u> <u>Rate</u>	Decrease in Carrying Value <u>(2) – (3)</u>	Carrying Value Prior Carrying Value – (4)
1/ 1 /2024				\$ 1,098,002
6/30/2024	\$ 35,000	\$ 32,940	\$ 2,060	1,095,942
12/31/2024	35,000	32,878	2,122	1,093,820

Requirement 2January 1, 2024

Cash	1,098,002	
Bonds Payable		1,000,000
Premium on Bonds Payable		98,002
<i>(Issue bonds at a premium)</i>		

Requirement 3June 30, 2024

Interest Expense ($\$1,098,002 \times 6\% \times \frac{1}{2}$)	32,940	
Premium on Bonds Payable (difference)	2,060	
Cash ($\$1,000,000 \times 7\% \times \frac{1}{2}$)		35,000
<i>(Pay semiannual interest)</i>		

December 31, 2024

Interest Expense ($\$1,095,942 \times 6\% \times \frac{1}{2}$)	32,878	
Premium on Bonds Payable (difference)	2,122	
Cash ($\$1,000,000 \times 7\% \times \frac{1}{2}$)		35,000
<i>(Pay semiannual interest)</i>		

Problem 9-8B (LO 9-5, 9-7)**Requirement 1**

Face amount. The issue price is \$850,000.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$850,000
2. Interest payment	PMT	\$25,500 = \$850,000 × 6% × ½ year
3. Periods to maturity	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	3% = 6% / 2 periods each year

Calculator Output

Issue price	PV	\$850,000
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(1) Date	(2) Cash Paid Face Amount x 3% Stated <u>Rate</u>	(3) Interest Expense Carrying Value x 3% Market <u>Rate</u>	(4) Increase in Carrying Value <u>(3) – (2)</u>	(5) Carrying Value Prior Carrying Value + (4)
1/ 1 /2024				\$ 850,000
6/30/2024	\$ 25,500	\$ 25,500	\$ 0	850,000
12/31/2024	25,500	25,500	0	850,000

Requirement 2

Discount. The issue price is \$789,597.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$850,000
2. Interest payment	PMT	\$25,500 = \$850,000 × 6% × ½ year
3. Periods to maturity	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	3.5% = 7% / 2 periods each year

Calculator Output

Issue price	PV	\$789,597
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(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Increase in Carrying Value	Carrying Value
	<u>Face Amount</u> <u>x 3% Stated</u> <u>Rate</u>	<u>Carrying Value</u> <u>x 3.5% Market</u> <u>Rate</u>	<u>(3) – (2)</u>	<u>Prior Carrying</u> <u>Value + (4)</u>
1/ 1 /2024				\$ 789,597
6/30/2024	\$ 25,500	\$ 27,636	\$ 2,136	791,733
12/31/2024	25,500	27,711	2,211	793,944

Requirement 3

Premium. The issue price is \$916,254.

Calculator Input

Bond Characteristics	Key	Amount
1. Face amount	FV	\$850,000
2. Interest payment	PMT	\$25,500 = \$850,000 × 6% × ½ year
3. Periods to maturity	N	20 = 10 years × 2 periods each year
4. Market interest rate	I	2.5% = 5% / 2 periods each year

Calculator Output

Issue price	PV	\$916,254
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(1)	(2)	(3)	(4)	(5)
Date	Cash Paid	Interest Expense	Decrease in Carrying Value	Carrying Value
	Face Amount x 3% Stated <u>Rate</u>	Carrying Value x 2.5% Market <u>Rate</u>	<u>(2) – (3)</u>	Prior Carrying Value – (4)
1/ 1 /2024				\$ 916,254
6/30/2024	\$ 25,500	\$ 22,906	\$ 2,594	913,660
12/31/2024	25,500	22,842	2,658	911,002

Problem 9-9B (LO 9-8)**Requirement 1**

(\$ in millions)	Total Liabilities	÷	Stockholders' Equity	=	Debt to Equity Ratio
Surf City	\$11,519	÷	\$8,309	=	1.39
Paradise Falls	\$15,232	÷	\$23,929	=	0.64

Surf City has a higher debt to equity ratio than Paradise Falls.

Requirement 2

(\$ in millions)	Net Income	÷	Average Total Assets	=	Return on Assets Ratio
Surf City	\$18	÷	\$19,816*	=	0.1%
Paradise Falls	\$1,298	÷	\$38,899**	=	3.3%

*(\$19,828 + \$19,804) / 2

**(\$39,161 + \$38,637) / 2

Paradise Falls is more profitable than Surf City.

Requirement 3

(\$ in millions)	Net Income + Interest + Taxes	÷	Interest	=	Times Interest Earned Ratio
Surf City	\$374	÷	\$356	=	1.1
Paradise Falls	\$1,638	÷	\$336	=	4.9

Paradise Falls, with a times interest earned ratio of 4.9, is better able to meet interest payments as they become due than Surf City with a ratio of only 1.1.