1. award: 10.00 points

MC Qu. 6 Todd and Cathy created a firm that is... Todd and Cathy created a firm that is a separate legal entity and will share ownership of that firm on a 50-50 basis. Which type of entity did they create if they have no personal liability for the firm's debts?

- Limited partnership
- Corporation
- Sole proprietorship
- General partnership
- Public company

Refer to Section 1.3.

Multiple Choice Difficulty: Easy Section: 1.3 Forms of business organization

MC Qu. 6 Todd and Cathy created a firm that is... Learning Objective: 01-03 Compare the financial implications of the different forms of business organizations.

2. award: 10.00 points

MC Qu. 32 Which of the following are advantages of the... Which of the following are advantages of the corporate form of organization?

I. Ability to raise large sums of equity capital
II. Ease of ownership transfer
III. Profits taxed at the corporate level
IV. Limited liability for all owners

- I and II only
- III and IV only
- II, III, and IV only
- I, II, and IV only
- I, II, III, and IV

Refer to Section 1.3.

Multiple Choice Difficulty: Medium Section: 1.3 Forms of business organization

MC Qu. 32 Which of the following are advantages of the... Learning Objective: 01-03 Compare the financial implications of the different forms of business organizations.
MC Qu. 36 The primary goal of financial management is...
The primary goal of financial management is to maximize which one of the following for a corporation?

- Current profits
- Market share
- Number of shares outstanding
- Market value of existing stock
- Revenue growth

Refer to Section 1.4.

Problem 2-14 Calculating Total Cash Flows [LO 4]
Weiland Co. shows the following information on its 2014 income statement: sales = $156,000; costs = $81,300; other expenses = $4,600; depreciation expense = $10,300; interest expense = $7,800; taxes = $18,200; dividends = $7,500. In addition, you're told that the firm issued $3,200 in new equity during 2014, and redeemed $5,100 in outstanding long-term debt. (Enter your answer as directed, but do not round intermediate calculations.)

Required:
(a) What is the operating cash flow during 2014?

Operating cash flow

(b) What is the cash flow to creditors during 2014?

Cash flow to creditors

(c) What is the cash flow to stockholders during 2014?

Cash flow to stockholders

(d) Assuming net fixed assets increased by $20,550 during the year, what was the addition to NWC?

Addition to net working capital

Explanation:
(a) To calculate the OCF, we first need to construct an income statement. The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract out interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

Income Statement

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$156,000</td>
</tr>
<tr>
<td>Costs</td>
<td>$81,300</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>4,600</td>
</tr>
<tr>
<td>Depreciation</td>
<td>10,300</td>
</tr>
<tr>
<td><strong>EBIT</strong></td>
<td>$ 59,800</td>
</tr>
<tr>
<td>Interest</td>
<td>7,800</td>
</tr>
<tr>
<td><strong>Taxable income</strong></td>
<td>$ 52,000</td>
</tr>
</tbody>
</table>
Taxes: 18,200
Net income: $33,800
Dividends: $7,500
Addition to retained earnings: 26,300

Dividends paid plus the addition to retained earnings must equal net income, so:

Net income = Dividends + Addition to retained earnings
Addition to retained earnings = $33,800 – 7,500
Addition to retained earnings = $26,300

So, the operating cash flow is:

OCF = EBIT + Depreciation – Taxes
OCF = $59,800 + 10,300 – 18,200
OCF = $51,900

(b)
The cash flow to creditors is the interest paid, minus any new borrowing. Since the company redeemed
long-term debt, the net new borrowing is negative. So, the cash flow to creditors is:

Cash flow to creditors = Interest paid – Net new borrowing
Cash flow to creditors = $7,800 – ($5,100)
Cash flow to creditors = $12,900

(c)
The cash flow to stockholders is the dividends paid minus any new equity. So, the cash flow to
stockholders is:

Cash flow to stockholders = Dividends paid – Net new equity
Cash flow to stockholders = $7,500 – 3,200
Cash flow to stockholders = $4,300

(d)
In this case, to find the addition to NWC, we need to find the cash flow from assets. We can then use the
cash flow from assets equation to find the change in NWC. We know that cash flow from assets is equal
to cash flow to creditors plus cash flow to stockholders. So, cash flow from assets is:

Cash flow from assets = Cash flow to creditors + Cash flow to stockholders
Cash flow from assets = $12,900 + 4,300
Cash flow from assets = $17,200

Net capital spending is equal to depreciation plus the increase in fixed assets, so:

Net capital spending = Depreciation + Increase in fixed assets
Net capital spending = $10,300 + 20,550
Net capital spending = $30,850

Now we can use the cash flow from assets equation to find the change in NWC. Doing so, we find:

Cash flow from assets = OCF – Change in NWC – Net capital spending
$17,200 = $51,900 – Change in NWC – 30,850
Change in NWC = $3,850

Worksheet

<table>
<thead>
<tr>
<th>Problem 2-14 Calculating Total Cash Flows [LO 4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty: Intermediate</td>
</tr>
<tr>
<td>Learning Objective: 02-04 Determine a firm's cash flow from its financial statements.</td>
</tr>
</tbody>
</table>
5. | 10.00 points

Problem 2-7 Tax Rates [LO 3]
The SGS Co. had $297,000 in taxable income. Use the rates from Table 2.3. (Enter your answer as directed, but do not round intermediate calculations.)

Requirement 1:
What is the average tax rate? (Round your answer to 2 decimal places (e.g., 32.16)).

Average tax rate: 33.36 ± 1%

Requirement 2:
What is the marginal tax rate?

Marginal tax rate: 39 ± 1%

Explanation:
Using Table 2.3, we can see the marginal tax schedule. The first $50,000 of income is taxed at 15 percent, the next $25,000 is taxed at 25 percent, the next $25,000 is taxed at 34 percent, and the next $197,000 is taxed at 39 percent. So, the total taxes for the company will be:

Taxes = .15($50,000) + .25($25,000) + .34($25,000) + .39($297,000 - 100,000)
Taxes = $99,080

The average tax rate is the total taxes paid divided by taxable income, so:

Average tax rate = Total tax / Taxable income
Average tax rate = $99,080 / $297,000
Average tax rate = .3336 or 33.36%

The marginal tax rate is the tax rate on the next dollar of income. The company has net income of $297,000 and the 39 percent tax bracket is applicable to a net income up to $335,000, so the marginal tax rate is 39 percent.

View Hint #1

Worksheet Difficulty: Basic

Problem 2-7 Tax Rates [LO 3] Learning Objective: 02-03 Explain the difference between average and marginal tax rates.
Problem 2-18 Marginal versus Average Tax Rates [LO 3]

(Refer to Table 2.3.) Corporation Growth has $87,000 in taxable income, and Corporation Income has $8,700,000 in taxable income. (Enter your answer as directed, but do not round intermediate calculations.)

Required:
(a) What is the tax bill for each firm?

| Corporation Growth | $17,830 ± .1% |
| Corporation Income | $2,958,000 ± .01% |

(b) Suppose both firms have identified a new project that will increase taxable income by $5,000. How much in additional taxes will each firm pay?

| Corporation Growth | $1,700 ± .1% |
| Corporation Income | $1,700 ± .1% |

Explanation:

(a) Using Table 2.3, we can see the marginal tax schedule. For Corporation Growth, the first $50,000 of income is taxed at 15 percent, the next $25,000 is taxed at 25 percent, and the next $12,000 is taxed at 34 percent. So, the total taxes for the company will be:

\[ \text{Taxes}_{\text{Growth}} = 0.15(50,000) + 0.25(25,000) + 0.34(12,000) \]

\[ \text{Taxes}_{\text{Growth}} = $17,830 \]

For Corporation Income, the first $50,000 of income is taxed at 15 percent, the next $25,000 is taxed at 25 percent, the next $25,000 is taxed at 34 percent, the next $235,000 is taxed at 39 percent, and the next $8,365,000 is taxed at 34 percent. So, the total taxes for the company will be:

\[ \text{Taxes}_{\text{Income}} = 0.15(50,000) + 0.25(25,000) + 0.34(25,000) + 0.39(235,000) + 0.34(8,365,000) \]

\[ \text{Taxes}_{\text{Income}} = $2,958,000 \]

(b) The marginal tax rate is the tax rate on the next $1 of earnings. Each firm has a marginal tax rate of 34% on the next $5,000 of taxable income, despite their different average tax rates, so both firms will pay an additional $1,700 in taxes.
Problem 2-2 Building an Income Statement [LO 2]

Draiman, Inc., has sales of $592,000, costs of $266,000, depreciation expense of $67,500, interest expense of $34,500, and a tax rate of 40 percent. (Enter your answer as directed, but do not round intermediate calculations.)

Required:
What is the net income for this firm?

Net income $134,400 ± .1%

Explanation:
The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract out interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

<table>
<thead>
<tr>
<th>Income statement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$592,000</td>
</tr>
<tr>
<td>Costs</td>
<td>266,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>67,500</td>
</tr>
<tr>
<td><strong>EBIT</strong></td>
<td>$258,500</td>
</tr>
<tr>
<td>Interest</td>
<td>34,500</td>
</tr>
<tr>
<td><strong>Taxable income</strong></td>
<td>$224,000</td>
</tr>
<tr>
<td>Taxes (40%)</td>
<td>89,600</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td>$134,400</td>
</tr>
</tbody>
</table>
Problem 2-1 Building a Balance Sheet [LO 1]
Kroeger, Inc., has current assets of $2,350, net fixed assets of $11,100, current liabilities of $1,440, and long-term debt of $4,160. (Enter your answer as directed, but do not round intermediate calculations.)

Requirement 1:
What is the value of the shareholders’ equity account for this firm?

Shareholder’s equity $7,850 ± .1%

Requirement 2:
How much is net working capital?

Net working capital $910 ± 1%

Explanation:
The balance sheet for the company will look like this:

<table>
<thead>
<tr>
<th>Current assets</th>
<th>$2,350</th>
<th>Current liabilities</th>
<th>$1,440</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net fixed assets</td>
<td>$11,100</td>
<td>Long-term debt</td>
<td>$4,160</td>
</tr>
<tr>
<td>Owner's equity</td>
<td>$7,850</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total assets</td>
<td>$13,450</td>
<td>Total liabilities and owners’ equity</td>
<td>$13,450</td>
</tr>
</tbody>
</table>

The owners’ equity is a plug variable. We know that total assets must equal total liabilities and owners’ equity. Total liabilities and owners’ equity is the sum of all debt and equity, so if we subtract debt from total liabilities and owners’ equity, the remainder must be the equity balance, so:

Owners’ equity = Total liabilities and owners’ equity – Current liabilities – Long-term debt

Owners’ equity = $13,450 – 1,440 – 4,160

Owner’s equity = $7,850

Net working capital is current assets minus current liabilities, so:

NWC = Current assets – Current liabilities

NWC = $2,350 – 1,440

NWC = $910

View Hint #1
Worksheet

Problem 2-1 Building a Balance Sheet [LO 1]
Learning Objective: 02-01 Differentiate between accounting value (or “book” value) and market value.
Problem 3-11 Internal Growth [LO 3]

If Nuber, Inc., has an ROA of 8.6 percent and a payout ratio of 33 percent.

Required:
What is its internal growth rate? (Do not round intermediate calculations. Enter your answer as a percent rounded to 2 decimal places (e.g., 32.16).)

Internal growth rate \( 6.11 \pm 1\% \) %

Explanation:

To find the internal growth rate, we need the plowback, or retention, ratio. The plowback ratio is:

\[
b = 1 - \text{Payout ratio} \\
b = 1 - .33 \\
b = .67
\]

Now, we can use the internal growth rate equation to find:

\[
\text{Internal growth rate} = \left(\text{ROA} \cdot b\right) / \left[1 - (\text{ROA} \cdot b)\right]
\]

\[
\text{Internal growth rate} = \left[.086(.67)\right] / \left[1 - .086(.67)\right]
\]

\[
\text{Internal growth rate} = .0611, \text{ or } 6.11\%
\]
10. **Problem 3-2 Calculating Profitability Ratios [LO 2]**

Remi, Inc., has sales of $18.4 million, total assets of $13.4 million, and total debt of $4.2 million. If the profit margin is 12 percent.

**Requirement 1:**
What is net income? *(Do not round intermediate calculations. Enter your answer in dollars, not millions of dollars (e.g., 1,234,567).)*

Net income $2,208,000 ± 0.01%

**Requirement 2:**
What is ROA? *(Do not round intermediate calculations. Enter your answer as a percent rounded 2 decimal places (e.g., 32.16).)*

ROA 16.48 ± 1%

**Requirement 3:**
What is ROE? *(Do not round intermediate calculations. Enter your answer as a percent rounded to 2 decimal places (e.g., 32.16).)*

ROE 24.00 ± 1%

**Explanation:**

1. To find the return on assets and return on equity, we need net income. We can calculate the net income using the profit margin. Doing so, we find the net income is:

   \[
   \text{Net margin} = \frac{\text{Net income}}{\text{Sales}}
   \]

   \[
   0.12 = \frac{\text{Net income}}{18,400,000}
   \]

   Net income = $2,208,000

2. Now we can calculate the return on assets as:

   \[
   \text{ROA} = \frac{\text{Net income}}{\text{Total assets}}
   \]

   ROA = $2,208,000 / $13,400,000

   ROA = 0.1648, or 16.48%

3. We do not have the equity for the company, but we know that equity must be equal to total assets minus total debt, so the ROE is:

   \[
   \text{ROE} = \frac{\text{Net income}}{(\text{Total assets} - \text{Total debt})}
   \]

   ROE = $2,208,000 / ($13,400,000 - 4,200,000)

   ROE = 0.2400, or 24.00%

View Hint #1

Worksheet

**Problem 3-2 Calculating Profitability Ratios [LO 2]**

Learning Objective: 03-02 Compute and, more important, interpret some common ratios.

11. **Problem 3-6 Calculating Market Value Ratios [LO 2]**

Rossdale, Inc., had additions to retained earnings for the year just ended of $626,000. The firm paid out $125,000 in cash dividends, and it has ending total equity of $7.21 million.

**Requirement 1:**
If the company currently has 580,000 shares of common stock outstanding, what are earnings per share?
Dividends per share? What is book value per share? (Do not round intermediate calculations. Round your answers to 2 decimal places (e.g., 32.16).)

<table>
<thead>
<tr>
<th>Earnings per share</th>
<th>$1.29 ± 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividends per share</td>
<td>$0.22 ± 0.01</td>
</tr>
<tr>
<td>Book value per share</td>
<td>$12.43 ± 1%</td>
</tr>
</tbody>
</table>

**Requirement 2:**
If the stock currently sells for $29.10 per share, what is the market-to-book ratio? The price-earnings ratio? (Do not round intermediate calculations. Round your answers to 2 decimal places (e.g., 32.16).)

<table>
<thead>
<tr>
<th>Market-to-book ratio</th>
<th>2.34 ± 1% times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price-earnings ratio</td>
<td>22.47 ± 1% times</td>
</tr>
</tbody>
</table>

**Requirement 3:**
If total sales were $10.51 million, what is the price-sales ratio? (Do not round intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

| Price-sales ratio | 1.61 ± 1% times |

**Explanation:**

1. 
We need to calculate the net income before we calculate the earnings per share. The sum of dividends and addition to retained earnings must equal net income, so net income must have been:

Net income = Addition to retained earnings + Dividends
Net income = $626,000 + 125,000
Net income = $751,000

So, the earnings per share were:

EPS = Net income / Shares outstanding
EPS = $751,000 / 580,000
EPS = $1.29 per share

The dividends per share were:

Dividends per share = Total dividends / Shares outstanding
Dividends per share = $125,000 / 580,000
Dividends per share = $.22 per share

The book value per share was:

Book value per share = Total equity / Shares outstanding
Book value per share = $7,210,000 / 580,000
Book value per share = $12.43 per share

2. 
The market-to-book ratio is:

Market-to-book ratio = Share price / Book value per share
Market-to-book ratio = $29.10 / $12.43
Market-to-book ratio = 2.34 times

The P/E ratio is:

P/E ratio = Share price / EPS
P/E ratio = $29.10 / $1.29
P/E ratio = 22.47 times

3. 
Sales per share are:

Sales per share = Total sales / Shares outstanding
Sales per share = $10,510,000 / 580,000
Sales per share = $18.12

The P/S ratio is:
12. award: 10.00 points

Problem 3-7 DuPont Identity [LO 3]
If jPhone, Inc., has an equity multiplier of 1.37, total asset turnover of 1.66, and a profit margin of 9 percent.

Required:
What is the company's ROE? (Do not round intermediate calculations. Enter your answer as a percent rounded to 2 decimal places (e.g., 32.16).)

\[
\text{ROE} = (\text{Profit margin})(\text{Total asset turnover})(\text{Equity multiplier})
\]
\[
\text{ROE} = (.09)(1.66)(1.37)
\]
\[
\text{ROE} = .2047, \text{ or } 20.47\% 
\]

Explanation:
With the information given, we must use the Du Pont identity to calculate return on equity. Doing so, we find:

ROE = (Profit margin)(Total asset turnover)(Equity multiplier)
ROE = (.09)(1.66)(1.37)
ROE = .2047, or 20.47%
Problem 4-1 Simple Interest versus Compound Interest [LO 1]
First City Bank pays 8 percent simple interest on its savings account balances, whereas Second City Bank pays 8 percent interest compounded annually.

Required:
If you made a deposit of $14,500 in each bank, how much more money would you earn from your Second City Bank account at the end of 9 years? (Do not round intermediate calculations and round your answer to 2 decimal places (e.g., 32.16).)

Difference $4,045.57 ± 0.1%

Explanation:
The time line for the cash flows is:

\[
\begin{array}{c|c|c}
0 & 9 \\
\hline
\$14,500 & FV \\
\end{array}
\]

The simple interest per year is:
$14,500 \times .08 = \$1,160

So, after 9 years, you will have:
$1,160 \times 9 = \$10,440 in interest.

The total balance will be $14,500 + 10,440 = \$24,940

With compound interest, we use the future value formula:
\[
FV = PV(1 + r)^t
\]

\[
FV = \$14,500(1.08)^9 = \$28,985.57
\]

The difference is:
$28,985.57 − 24,940 = \$4,045.57

Calculator Solution:
Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>9</th>
<th>8%</th>
<th>−$14,500</th>
<th>PV</th>
<th>PMT</th>
<th>Solve for</th>
<th>FV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>I/Y</td>
<td>PV</td>
<td>PMT</td>
<td></td>
<td>$28,985.57</td>
<td></td>
</tr>
</tbody>
</table>

$28,985.57 − 24,940 = \$4,045.57

Worksheet

Difficulty: Basic

Learning Objective: 04-01 Determine the future value of an investment made today.
Problem 4-17 Calculating Present Values [LO 2]
Suppose you are committed to owning a $205,000 Ferrari.

Required:
If you believe your mutual fund can achieve a 10.7 percent annual rate of return, and you want to buy the car in 12 years on the day you turn 30, how much must you invest today? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount to be invested $60,531.64

Explanation:
The time line is:

0 12
PV $205,000

To find the PV of a lump sum, we use:

\[ PV = \frac{FV}{(1 + r)^t} \]

\[ PV = \frac{205,000}{(1.1070)^{12}} \]

\[ PV = 60,531.64 \]

Calculator Solution:
Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

Enter

<table>
<thead>
<tr>
<th>12</th>
<th>10.70%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV</td>
<td>$205,000</td>
</tr>
</tbody>
</table>

Solve for

- $60,531.64

Worksheet

Problem 4-17 Calculating Present Values [LO 2]
Learning Objective: 04-02 Determine the present value of cash to be received at a future date.

Problem 4-18 Calculating Future Values [LO 1]
You have just made your first $4,000 contribution to your individual retirement account. Assume you earn a 10.60 percent rate of return and make no additional contributions.

Requirement 1:
What will your account be worth when you retire in 43 years? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount $304,460.15

Requirement 2:
What if you wait 10 years before contributing? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount $111,167.84
16. award: 10.00 points

**Explanation:**

1: To find the FV of a lump sum, we use:

\[ FV = PV(1 + r)^t \]

\[ FV = 4,000(1.1060)^{43} \]
\[ FV = 304,460.15 \]

2: If you wait 10 years, the value of your deposit at your retirement will be:

\[ FV = 4,000(1.1060)^{33} \]
\[ FV = 111,167.84 \]

Better start early!

**Calculator Solution:**

**Note:** Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>43</th>
<th>10.60%</th>
<th>~$4,000</th>
<th>PV</th>
<th>PMT</th>
<th>FV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve for</td>
<td>N</td>
<td>I/Y</td>
<td>PV</td>
<td>PMT</td>
<td>FV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>10.60%</td>
<td>$4,000</td>
<td></td>
<td></td>
<td>$304,460.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enter</th>
<th>33</th>
<th>10.60%</th>
<th>~$4,000</th>
<th>PV</th>
<th>PMT</th>
<th>FV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve for</td>
<td>N</td>
<td>I/Y</td>
<td>PV</td>
<td>PMT</td>
<td>FV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>10.60%</td>
<td>$4,000</td>
<td></td>
<td></td>
<td>$111,167.84</td>
</tr>
</tbody>
</table>

**Problem 4-18 Calculating Future Values [LO 1]**

You have just made your first $5,000 contribution to your individual retirement account. Assume you earn a 11.40 percent rate of return and make no additional contributions.

**Requirement 1:**

What will your account be worth when you retire in 44 years? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

**Requirement 2:**

What if you wait 10 years before contributing? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)
32.16.)
Amount $196,366.09 ± .1%

Explanation:

1: To find the FV of a lump sum, we use:

\[ FV = PV(1 + r)^t \]

\[
\begin{align*}
0 & \quad 44 \\
5,000 & \quad \text{FV}
\end{align*}
\]

\[ FV = 5,000(1.1140)^{44} \]

\[ FV = 577,987.44 \]

2: If you wait 10 years, the value of your deposit at your retirement will be:

\[
\begin{align*}
0 & \quad 34 \\
5,000 & \quad \text{FV}
\end{align*}
\]

\[ FV = 5,000(1.1140)^{34} \]

\[ FV = 196,366.09 \]

Better start early!

Calculator Solution:

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>44</th>
<th>11.40%</th>
<th>-5,000</th>
<th>[N]</th>
<th>[I/Y]</th>
<th>[PV]</th>
<th>[PMT]</th>
<th>[FV]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve for</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>577,987.44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enter</th>
<th>34</th>
<th>11.40%</th>
<th>-5,000</th>
<th>[N]</th>
<th>[I/Y]</th>
<th>[PV]</th>
<th>[PMT]</th>
<th>[FV]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve for</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>196,366.09</td>
</tr>
</tbody>
</table>

Worksheet

Problem 4-18 Calculating Future Values
[LO 1] Learning Objective: 04-01 Determine the future value of an investment made today.
Problem 4-19 Calculating Future Values [LO 1]
You are scheduled to receive $14,000 in two years. When you receive it, you will invest it for eight more years at 9.5 percent per year.

Required:
How much will you have in ten years? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount $28,936.17 ± .1%

Explanation:
The time line is:

0 2 10
$14,000 FV

Even though we need to calculate the value in ten years, we will only have the money for eight years, so we need to use eight years as the number of periods. To find the FV of a lump sum, we use:

\[ FV = PV(1 + r)^t \]

\[ FV = 14,000(1.0950)^8 \]

\[ FV = 28,936.17 \]

Calculator Solution:

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>8</th>
<th>9.50%</th>
<th>−$14,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>I/Y</td>
<td>PV</td>
</tr>
<tr>
<td>Solve for</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worksheet

| Problem 4-19 Calculating Future Values [LO 1] |
| Learning Objective: 04-01 Determine the future value of an investment made today. |
| Difficulty: Intermediate |
Problem 4-20 Calculating the Number of Periods [LO 4]
You expect to receive $40,000 at graduation in two years. You plan on investing it at 9 percent until you have $175,000.

Required:
How long will you wait from now? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Period 19.13±1% years

Explanation:
The time line is:

<table>
<thead>
<tr>
<th>0</th>
<th>2</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>~$40,000</td>
<td></td>
<td>$175,000</td>
</tr>
</tbody>
</table>

To answer this question, we can use either the FV or the PV formula. Both will give the same answer since they are the inverse of each other. We will use the FV formula, that is:

\[ FV = PV(1 + r)^t \]

\[ $175,000 = $40,000(1.0900)^t \]

\[ t = \ln($175,000 / $40,000) / \ln 1.0900 \]

\[ t = 17.13 \text{ years} \]

From now, you’ll wait 2 + 17.13 = 19.13 years

Calculator Solution:

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

Enter 9.00% −$40,000  $175,000
Solve for N I/Y PV PMT FV

You must wait 2 + 17.13 = 19.13 years.
Problem 4-22 Calculating Interest Rates [LO 3]
An investment offers to double your money in 12 months (don’t believe it).

Required:
What rate per three months are you being offered? (Round your answer as directed, but do not use rounded numbers in intermediate calculations. Enter your answer as a percent rounded to 2 decimal places (e.g., 32.16).)

Rate 18.92 ± 1% %

Explanation:
The time line is:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>$2</td>
<td></td>
</tr>
</tbody>
</table>

To find the length of time for money to double, triple, etc., the present value and future value are irrelevant as long as the future value is twice the present value for doubling, three times as large for tripling, etc. We also need to be careful about the number of periods. Since the length of the compounding period is 3 months and we have 12 months, there are four compounding periods. To answer this question, we can use either the FV or the PV formula. Both will give the same answer since they are the inverse of each other. We will use the FV formula, that is:

\[ FV = PV(1 + r)^t \]

Solving for \( r \), we get:

\[ r = \frac{FV}{PV} \]
\[ r = \frac{\$2}{\$1}^{1/4} - 1 \]
\[ r = .1892, \text{ or } 18.92\% \]

Calculator Solution:

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>4</th>
<th>$1</th>
<th>$2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td>PV</td>
<td>PMT</td>
</tr>
<tr>
<td>Solve for</td>
<td>18.92%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worksheet

Problem 4-22 Calculating Interest Rates [LO 3] Learning Objective: 04-03 Calculate the return on an investment.
Problem 4-23 Calculating the Number of Periods [LO 4]
You can earn .45 percent per month at your bank.

Required:
If you deposit $2,800, how long must you wait until your account has grown to $4,500? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Number of months 105.67 ± 1%

Explanation:

The time line is:

0 __________________________________________ t

−$2,800 $4,500

To answer this question, we can use either the FV or the PV formula. Both will give the same answer since they are the inverse of each other. We will use the FV formula, that is:

\[ FV = PV(1 + r)^t \]

\[ $4,500 = $2,800(1.0045)^t \]

\[ t = \ln(\frac{$4,500}{\$2,800}) / \ln 1.0045 \]

\[ t = 105.67 \text{ months} \]

Calculator Solution:

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>.45%</th>
<th>−$2,800</th>
<th>$4,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>I/Y</td>
<td>PV</td>
<td>PMT</td>
</tr>
<tr>
<td>Solve for</td>
<td>105.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worksheet

Problem 4-23 Calculating the Number of Periods [LO 4]

Learning Objective: 04-04 Predict how long it takes for an investment to reach a desired value.
Problem 4-24 Calculating Present Values [LO 2]
You need $89,000 in 8 years.

Required:
If you can earn .56 percent per month, how much will you have to deposit today? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount to deposit $ 52,067.24 ± 0.1%

Explanation:
The time line is:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th>PV</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>96</td>
<td>$89,000</td>
</tr>
</tbody>
</table>

To find the PV of a lump sum, we use:

PV = FV / (1 + r)^t
PV = $89,000 / (1.0056)^96
PV = $52,067.24

Calculator Solution:

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>96</th>
<th>.5%</th>
<th>PV</th>
<th>$89,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve for</td>
<td>N</td>
<td>I/Y</td>
<td>PMT</td>
<td>FV</td>
</tr>
</tbody>
</table>

Worksheet

Difficulty: Intermediate

Learning Objective: 04-02 Determine the present value of cash to be received at a future date.

Problem 4-26 Calculating Future Values [LO 1]
You have $17,000 you want to invest for the next 24 years. You are offered an investment plan that will pay you 8 percent per year for the next 12 years and 12 percent per year for the last 12 years.

Requirement 1:
How much will you have at the end of the 24 years? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount $ 166,782.42 ± 0.1%

Requirement 2:
If the investment plan pays you 12 percent per year for the first 12 years and 8 percent per year for the next 12 years, how much will you have at the end of the 24 years? (Enter rounded answer as directed, but do not use rounded numbers in intermediate calculations. Round your answer to 2 decimal places (e.g., 32.16).)

Amount $ 166,782.42 ± 0.1%
Explaination:

The time line is:

\[ \begin{array}{c|c}
0 & 12 \\
$17,000 & FV \\
\end{array} \]

In this case, we have an investment that earns two different interest rates. We will calculate the value of the investment at the end of the first 12 years, then use this value with the second interest rate to find the final value at the end of 24 years. Using the future value equation, at the end of the first 12 years, the account will be worth:

\[
\text{Value in 12 years} = PV(1 + r)^t
\]

\[
\text{Value in 12 years} = $17,000(1.08)^{12}
\]

\[
\text{Value in 12 years} = $42,808.89
\]

Now we can find out how much this will be worth 12 years later at the end of the investment. Using the future value equation, we find:

\[
\text{Value in 24 years} = PV(1 + r)^t
\]

\[
\text{Value in 24 years} = $42,808.89(1.12)^{12}
\]

\[
\text{Value in 24 years} = $166,782.42
\]

It is irrelevant which interest rate is offered when as long as each interest rate is offered for 12 years. We can find the value of the initial investment in 24 years with the following:

\[
FV = PV(1 + r_1)^t \cdot (1 + r_2)^t
\]

\[
FV = $17,000(1.08)^{12} \cdot (1.12)^{12}
\]

\[
FV = $166,782.42
\]

With the commutative property of multiplication, it does not matter in which order the interest rates occur, the final value will always be the same.

Calculator Solution:

**Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.**

\[
\begin{array}{cccc}
\text{Enter} & 12 & 8\% & -$17,000 \\
\text{N} & I/Y & PV & PMT & FV \\
\text{Solve for} & & & $42,808.89 \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{Enter} & 12 & 12\% & -$42,808.89 \\
\text{N} & I/Y & PV & PMT & FV \\
\text{Solve for} & & & $166,782.42 \\
\end{array}
\]

Worksheet

**Problem 4-26 Calculating Future Values**

[LO 1]

Learning Objective: 04-01 Determine the future value of an investment made today.
24. **Problem 4-6 Calculating Rates of Return [LO 3]**

Assume the total cost of a college education will be $360,000 when your child enters college in 15 years. You presently have $58,000 to invest.

**Required:**
What annual rate of interest must you earn on your investment to cover the cost of your child’s college education? (Round your answer as directed, but do not use rounded numbers in intermediate calculations. Enter your answer as a percent rounded to 2 decimal places (e.g., 32.16).)

**Annual rate:** 12.94 ± 1% %

**Explanation:**

The time line is:

<table>
<thead>
<tr>
<th>0</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>−$58,000</td>
<td>$360,000</td>
</tr>
</tbody>
</table>

To answer this question, we can use either the FV or the PV formula. Both will give the same answer since they are the inverse of each other. We will use the FV formula, that is:

\[ FV = PV(1 + r)^t \]

Solving for \( r \), we get:

\[ r = \left(\frac{FV}{PV}\right)^{1/t} - 1 \]
\[ r = \left(\frac{360,000}{58,000}\right)^{1/15} - 1 \]
\[ r = .1294, \text{ or } 12.94\% \]

**Calculator Solution:**

Note: Intermediate answers are shown below as rounded, but the full answer was used to complete the calculation.

<table>
<thead>
<tr>
<th>Enter</th>
<th>15</th>
<th>−$58,000</th>
<th>$360,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>I/Y</td>
<td>PV</td>
<td>PMT</td>
</tr>
</tbody>
</table>

Solve for: 12.94%

Worksheet

**Problem 4-6 Calculating Rates of Return [LO 3]**

Learning Objective: 04-03 Calculate the return on an investment.

Difficulty: Basic