$$\text{Assets} = \text{Liabilities} + \text{Shareholders' equity} \quad [2.1]$$

$$\text{Revenues} - \text{Expenses} = \text{Income} \quad [2.2]$$

$$\text{Cash flow from assets} = \text{Cash flow to bondholders} + \text{Cash flow to shareholders} \quad [2.3]$$

$$\text{Current ratio} = \text{Current assets}/\text{Current liabilities} \quad [3.1]$$

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}} \quad [3.2]$$

$$\text{Cash ratio} = \text{Cash}/\text{Current liabilities} \quad [3.3]$$

$$\text{Net working capital to total assets} = \text{Net working capital}/\text{Total assets} \quad [3.4]$$

$$\text{Interval measure} = \text{Current assets}/\text{Average daily operating costs} \quad [3.5]$$

$$\text{Total debt ratio} = [\text{Total assets} - \text{Total equity}]/\text{Total assets} = [\$3{,}588 - 2{,}591]/\$3{,}588 = .28 \quad [3.6]$$

$$\text{Debt/equity ratio} = \text{Total debt}/\text{Total equity} = \$.28/\$.72 = .39 \quad [3.7]$$

$$\text{Equity multiplier} = \text{Total assets}/\text{Total equity} = \$1/\$.72 = 1.39 \quad [3.8]$$

$$\text{Long-term debt ratio} = \frac{\text{Long-term debt}}{\text{Long-term debt} + \text{Total equity}} = \$457/[\$457 + 2{,}591] = \$457/\$3{,}048 = .15 \quad [3.9]$$

$$\text{Times interest earned ratio} = \text{EBIT}/\text{Interest} = \$691/\$141 = 4.9 \text{ times} \quad [3.10]$$

$$\text{Cash coverage ratio} = [\text{EBIT} + \text{Depreciation}]/\text{Interest} = [\$691 + 276]/\$141 = \$967/\$141 = 6.9 \text{ times} \quad [3.11]$$

$$\text{Inventory turnover} = \text{Cost of goods sold}/\text{Inventory} = \$1{,}344/\$422 = 3.2 \text{ times} \quad [3.12]$$

$$\text{Days' sales in inventory} = 365 \text{ days}/\text{Inventory turnover} = 365/3.2 = 114 \text{ days} \quad [3.13]$$

$$\text{Receivables turnover} = \text{Sales}/\text{Accounts receivable} = \$2{,}311/\$188 = 12.3 \text{ times} \quad [3.14]$$

$$\text{Days' sales in receivables} = 365 \text{ days}/\text{Receivables turnover} = 365/12.3 = 30 \text{ days} \quad [3.15]$$

$$\text{NWC turnover} = \text{Sales}/\text{NWC} = \$2{,}311/(\$708 - \$540) = 13.8 \text{ times} \quad [3.16]$$

$$\text{Fixed asset turnover} = \text{Sales}/\text{Net fixed assets} = \$2{,}311/\$2{,}880 = .80 \text{ times} \quad [3.17]$$

$$\text{Total asset turnover} = \text{Sales/Total assets} = \$2{,}311/\$3{,}588 = .64 \text{ times} \quad [3.18]$$

$$\text{Profit margin} = \text{Net income/Sales} = \$363/\$2{,}311 = 15.7\% \quad [3.19]$$

$$\text{Return on assets} = \text{Net income/Total assets} = \$363/\$3{,}588 = 10.12\% \quad [3.20]$$

$$\text{Return on equity} = \text{Net income/Total equity} = \$363/\$2{,}591 = 14\% \quad [3.21]$$

$$\text{P/E ratio} = \text{Price per share/Earnings per share} = \$157/\$11 = 14.27 \text{ times} \quad [3.22]$$

$$\text{Market-to-book ratio} = \text{Market value per share/Book value per share} = \$157/(\$2{,}591/33) = \$157/\$78.5 = 2 \text{ times} \quad [3.23]$$

$$\text{ROE} = \text{Net income/Sales} \times \text{Sales/Assets} \times \text{Assets/Equity} = \text{Profit margin} \times \text{Total asset turnover} \times \text{Equity multiplier} \quad [3.24]$$

$$\text{Dividend payout ratio} = \text{Cash dividends/Net income} = \$44/\$132 = 33\tfrac{1}{3}\% \quad [4.1]$$

$$\text{EFN} = \text{Increase in total assets} - \text{Addition to retained earnings} = A(g) - p(S)R \times (1 + g) \quad [4.2]$$

$$\text{EFN} = -p(S)R + [A - p(S)R] \times g \quad [4.3] \qquad \text{EFN} = -p(S)R + [A - p(S)R] \times g \quad [4.4]$$

$$\begin{aligned} g &= pS(R)/[A - pS(R)] \\ &= .132(\$500)(2/3)/[\$500 - .132(\$500)(2/3)] \\ &= 44/[500 - 44] \\ &= 44/456 = 9.65\% \end{aligned}$$

$$\text{Internal growth rate} = \frac{ROA \times R}{1 - ROA \times R} \quad [4.5]$$

$$\text{EFN} = \text{Increase in total assets} - \text{Addition to retained earnings} - \text{New borrowing} = A(g) - p(S)R \times (1 + g) - pS(R) \times (1 + g)[D/E] \quad [4.6]$$

$$\text{EFN} = 0$$

$$g^* = ROE \times R/[1 - ROE \times R] \quad [4.7]$$

$$g^* = \frac{p(S/A)(1 + D/E) \times R}{1 - p(S/A)(1 + D/E) \times R} \quad [4.8]$$

$$\text{EFN} = \text{Increase in total assets} - \text{Addition to retained earnings} - \text{New borrowing} = A(g) - p(S)R \times (1 + g) - pS(R) \times (1 + g)[D/E] \quad [4A.1]$$

$$\text{ROE} = p(S/A)(1 + D/E) \quad [4A.2]$$

$$\text{Future value} = \$1 \times (1 + r)^t \quad [5.1]$$

$$\text{PV} = \$1 \times [1/(1 + r)^t] = \$1/(1 + r)^t \quad [5.2]$$

$$\text{PV} \times (1 + r)^t = \text{FV}_t \quad [5.3]$$
$$\text{PV} = \text{FV}_t/(1 + r)^t = \text{FV}_t \times [1/(1 + r)^t]$$

$$\text{Annuity present value} = C \times \left(\frac{1 - \text{Present value factor}}{r} \right) \quad [6.1]$$

$$= C \times \left\{ \frac{1 - 1/(1 + r)t}{r} \right\}$$

$$\text{Annuity due value} = \text{Ordinary annuity value} \times (1 + r) \quad [6.1]$$

$$\text{EAR} = [1 + (\text{Quoted rate}/m)]^m - 1 \quad [6.2]$$

$$\text{EAR} = e^q - 1 \quad [6.3]$$

$$\text{Bond value} = C \times (1 - 1/(1 + r)^t)/r + F/(1 + r)^t \quad [7.1]$$

$$1 + R = (1 + r) \times (1 + h) \quad [7.2]$$

$$1 + R = (1 + r) \times (1 + h) \quad [7.3]$$
$$R = r + h + r \times h$$

$$R \approx r + h \quad [7.4]$$

$$\text{NPV} = (c_o - c_N)/c_N \times \$1{,}000 - CP \quad [7B.1]$$

$$P_0 = (D_1 + P_1)/(1 + r) \quad [8.1]$$

$$P_0 = D/r \quad [8.2]$$

$$P_0 = \frac{D_0 \times (1 + g)}{r - g} = \frac{D_1}{r - g} \quad [8.3]$$

$$P_t = \frac{D_t \times (1 + g)}{r - g} = \frac{D_t + 1}{r - g} \quad [8.4]$$

$$(r - g) = D_1/P_0 \quad [8.5]$$
$$r = D_1/P_0 + g$$

$$\begin{aligned} S - VC &= FC + D \\ P \times Q - v \times Q &= FC + D \\ (P - v) \times Q &= FC + D \\ Q &= (FC + D)/(P - v) \end{aligned} \quad [11.1]$$

$$\begin{aligned} \text{OCF} &= \text{EBIT} + D - \text{Taxes} \\ &= (S - C - D) + D - (S - C - D) \times T_c \\ &= \$200 + 600 - 80 = \$720 \end{aligned} \quad [10.1]$$

$$\begin{aligned} \text{OCF} &= (S - C - D) + D - (S - C - D) \times T_c \\ &= (S - C - D) \times (1 - T_c) + D \\ &= \text{Project net income} + \text{Depreciation} \\ &= \$120 + 600 \\ &= \$720 \end{aligned} \quad [10.2]$$

$$\begin{aligned} \text{OCF} &= (S - C - D) + D - (S - C - D) \times T_c \\ &= (S - C) - (S - C - D) \times T_c \\ &= \text{Sales} - \text{Costs} - \text{Taxes} \\ &= \$1{,}500 - 700 - 80 = \$720 \end{aligned} \quad [10.3]$$

$$\begin{aligned} &\text{OCF} = (S - C - D) + D - (S - C - D) \times T_c \\ &= (S - C) \times (1 - T_c) + D \times T_c \end{aligned} \quad [10.4]$$

$$\begin{aligned}\text{OCF} &= [(P - v) \times Q - FC - D] + D \\ &= (P - v) \times Q - FC\end{aligned} \quad \textbf{[11.2]}$$

$$Q = (FC + OCF)/(P - v) \quad \textbf{[11.3]}$$

$$\text{Total dollar return} = \text{Dividend income} + \text{Capital gain (or loss)} \quad \textbf{[12.1]}$$

$$\begin{aligned}\text{Total cash if stock is sold} &= \text{Initial investment} + \text{Total return} \\ &= \$3{,}700 + 518 \\ &= \$4{,}218\end{aligned} \quad \textbf{[12.2]}$$

$$Var(R) = (1/(T-1))\ [(R_1 - \overline{R})^2 + \ldots + (R_T - \overline{R})^2] \quad \textbf{[12.3]}$$

$$\begin{aligned}\text{Risk premium} &= \text{Expected return} - \text{Risk-free rate} \\ &= \text{E}(R_U) - R_f \\ &= 20\% - 8\% \\ &= 12\%\end{aligned} \quad \textbf{[13.1]}$$

$$\text{E}(R) = \sum_j O_j \times P_j \quad \textbf{[13.2]}$$

$$\sigma^2 = \sum_j [O_j - \text{E}(R)]^2 \times P_j \quad \textbf{[13.3]}$$

$$\text{E}(R_P) = x_1 \times \text{E}(R_1) + x_2 \times \text{E}(R_2) + \ldots + x_n \times \text{E}(R_n) \quad \textbf{[13.4]}$$

$$\sigma^2_P = x^2_L \sigma^2_L + x^2_U \sigma^2_U + 2x_L \times_U \text{CORR}_{L,U} \sigma_L \sigma_U \quad \textbf{[13.5]}$$

$$\begin{aligned}\text{Total return} &= \text{Expected return} + \text{Unexpected return} \\ R &= \text{E}(R) + U\end{aligned} \quad \textbf{[13.6]}$$

$$\text{Announcement} = \text{Expected part} + \text{Surprise} \quad \textbf{[13.7]}$$

$$R = \text{E}(R) + \text{Systematic portion} + \text{Unsystematic portion} \quad \textbf{[13.8]}$$

$$\text{Total risk} = \text{Systematic risk} + \text{Unsystematic risk} \quad \textbf{[13.9]}$$

$$\text{E}(R_i) = R_f + [\text{E}(R_M) - R_f] \times \beta_i \quad \textbf{[13.10]}$$

$$R = \text{E}(R) + \beta_I \text{F}_I + \beta_{GNP} F_{GNP} + \beta_r F_r + \epsilon \quad \textbf{[13.11]}$$

$$\begin{aligned}\text{E}(R) = R_F &+ \text{E}[(R_1) - R_F]\beta_1 + \text{E}[(R_2) - R_F]\beta_2 \\ &+ \text{E}[(R_3) - R_F]\beta_3 + \ldots \text{E}[(R_K) - R_F]\beta_K\end{aligned} \quad \textbf{[13.12]}$$

$$\sigma^2_P = x^2_L \sigma^2_{\text{L}} + x^2_U \sigma^2_U + 2x_L x_U \text{CORR}_{L,U} \sigma_L \sigma_U \quad \textbf{[13A.1]}$$

$$\sigma^2_P \sum_{\text{i}=1}^{\text{N}} \sum_{\text{j}=1}^{\text{N}} x_j \sigma_{ij} \quad \textbf{[13A.2]}$$

$$\frac{\delta \sigma^2_P}{\delta x_2} = 2\sum_{j=1}^{N} x_j \sigma_{i2} = 2[x_1 \text{COV}(R_1, R_2) + x_2 \sigma^2_2 + x_3\ \text{COV}(R_3, R_2) + \ldots + x_N \text{COV}(R_N, R_2)] \quad \textbf{[13A.3]}$$

$$\beta_2 = \frac{\text{COV}(R_2, R_M)}{\sigma^2(R_M)} \quad \textbf{[13A.4]}$$

$$R_E = (D_1/P_0) + g \quad \textbf{[14.1]}$$

$$R_E = R_f + \beta_E \times [R_M - R_f] \quad \textbf{[14.2]}$$

$$R_P = D/P_0 \quad \textbf{[14.3]}$$

$$V = E + D \quad [14.4]$$

$$100\% = E/V + D/V \quad [14.5]$$

$$\text{WACC} = (E/V) \times R_E + (D/V) \times R_D \times (1 - T_C) \quad [14.6]$$

$$f_A = (E/V) \times f_E + (D/V) \times f_D \quad [14.7]$$

$$\text{Degree of financial leverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBIT}} \quad [16.1]$$

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}} \quad [16.2]$$

$$V_u = EBIT/R_E^u = V_L = E_L + D_L \quad [16.3]$$
$$= 60\% \times .10 + 40\% \times .05$$
$$= 8\%$$

$$\beta_{Portfolio} = \beta_{Levered\ firm} = \frac{\text{Debt}}{\text{Debt} + \text{Equity}} \times \beta_{Debt} + \frac{\text{Equity}}{\text{Debt} + \text{Equity}} \times \beta_{Equity} \quad [14A.1]$$

$$\beta_{Unlevered\ firm} = \frac{\text{Equity}}{\text{Debt} + \text{Equity}} \times \beta_{Equity} \quad [14A.2]$$

$$\beta_{Unlevered\ firm} = \frac{\text{Equity}}{\text{Equity} + (1 - T_C) \times \text{Debt}} \times \beta_{Equity} \quad [14A.3]$$

$$\text{Number of new shares} = \text{Funds to be raised/Subscription price} = \$5{,}000{,}000/\$10 = 500{,}000 \text{ shares} \quad [15.1]$$

$$\text{Number of rights needed to buy a share of stock} = \text{Old shares/New shares} = 1{,}000{,}000/500{,}000 = 2 \text{ rights} \quad [15.2]$$

$$R_o = (M_o - S)/(N + 1) \quad [15.3]$$

$$M_e = M_o - R_o \quad [15.4]$$

$$R_e = (M_e - S)/N \quad [15.5]$$

$$R_E = R_A + (R_A - R_D) \times (D/E) \quad [16.4]$$

$$\beta_E = \beta_A \times (1 + D/E) \quad [16.5]$$

$$\text{Value of the interest tax shield} = (T_C \times R_D \times D)/R_D = T_C \times D \quad [16.6]$$

$$V_L = V_U + T_C \times D \quad [16.7]$$

$$R_E = R_U + (R_U - R_D) \times (D/E) \times (1 - T_C) \quad [16.8]$$

$$\text{Net working capital} + \text{Fixed assets} = \text{Long-term debt} + \text{Equity} \quad [18.1]$$

$$\text{Net working capital} = (\text{Cash} + \text{Other current assets}) - \text{Current liabilities} \quad [18.2]$$

$$\text{Cash} = \text{Long-term debt} + \text{Equity} + \text{Current liabilities} - \text{Current assets (other than cash)} - \text{Fixed assets} \quad [18.3]$$

$$\text{Operating cycle} = \text{Inventory period} + \text{Accounts receivable period} \quad [18.4]$$

$$\text{Cash cycle} = \text{Operating cycle} - \text{Accounts payable period} \quad [18.5]$$

$$\text{Cash collections} = \text{Beginning accounts receivable} + 1/2 \times \text{Sales} \quad \textbf{[18.6]}$$

$$\text{Average daily float} = \text{Average daily receipts} \times \text{Weighted average delay} \quad \textbf{[19.1]}$$

$$\text{Opportunity costs} = (C/2) \times R \quad \textbf{[19A.1]}$$

$$\text{Trading costs} = (T/C) \times F \quad \textbf{[19A.2]}$$

$$\begin{aligned}\text{Total cost} &= \text{Opportunity costs} + \text{Trading costs} \\ &= (C/2) \times R + (T/C) \times F\end{aligned} \quad \textbf{[19A.3]}$$

$$C^* = \sqrt{(2T \times F)/R} \quad \textbf{[19A.4]}$$

$$C^* = L + (3/4 \times F \times \sigma^2/R)^{1/3} \quad \textbf{[19A.5]}$$

$$U^* = 3 \times C^* - 2 \times L \quad \textbf{[19A.6]}$$

$$\text{Average cash balance} = (4 \times C^* - L)/3 \quad \textbf{[19.A7]}$$

$$\text{Accounts receivable} = \text{Average daily sales} \times \text{ACP} \quad \textbf{[20.1]}$$

$$\begin{aligned}\text{Cash flow (old policy)} &= (P - v)Q \\ &= (\$49 - 20) \times 100 \\ &= \$2{,}900\end{aligned} \quad \textbf{[20.2]}$$

$$\begin{aligned}\text{Cash flow (new policy)} &= (P - v)Q' \\ &= (\$49 - 20) \times 110 \\ &= \$3{,}190\end{aligned} \quad \textbf{[20.3]}$$

$$PV = [(P - v)(Q' - Q)]/R \quad \textbf{[20.4]}$$

$$\text{Cost of switching} = PQ + v(Q' - Q) \quad \textbf{[20.5]}$$

$$\text{NPV of switching} = -[PQ + v(Q' - Q)] + (P - v)(Q' - Q)/R \quad \textbf{[20.6]}$$

$$\text{NPV} = 0 = -[PQ + v(Q' - Q)] + (P - v)(Q' - Q)/R \quad \textbf{[20.7]}$$

$$\text{NPV} = -v + (1 - \pi)P'/(1 + R) \quad \textbf{[20.8]}$$

$$\text{NPV} = -v + (1 - \pi)(P - v)/R \quad \textbf{[20.9]}$$

$$\text{Score} = \text{Z} = 0.4 \times [\text{Sales/Total assets}] + 3.0 \times \text{EBIT/Total assets} \quad \textbf{[20.10]}$$

$$\begin{aligned}\text{Total carrying costs} &= \text{Average inventory} \times \text{Carrying costs per unit} \\ &= (Q/2) \times CC\end{aligned} \quad \textbf{[20.11]}$$

$$\begin{aligned}\text{Total restocking cost} &= \text{Fixed cost per order} \times \text{Number of orders} \\ &= F \times (T/Q)\end{aligned} \quad \textbf{[20.12]}$$

$$\begin{aligned}\text{Total costs} &= \text{Carrying costs} + \text{Restocking costs} \\ &= (Q/2) \times CC + F \times (T/Q)\end{aligned} \quad \textbf{[20.13]}$$

$$\begin{aligned}&\text{Carrying costs} = \text{Restocking costs} \\ &(Q^*/2) \times CC = F \times (T/Q^*)\end{aligned} \quad \textbf{[20.14]}$$

$$Q^{*2} = \frac{2T \times F}{CC} \quad \textbf{[20.15]}$$

$$Q^* = \sqrt{\frac{2T \times F}{CC}} \quad \textbf{[20.16]}$$

$$Q^* = \sqrt{\frac{2T \times F}{CC}} \quad [20.17]$$

$$\text{EOQ}^* = \sqrt{\frac{2T \times F}{CC}} \quad [20.18]$$

$$\text{Net incremental cash flow} = P'Q \times (d - \pi) \quad [20A.1]$$

$$\text{NPV} = -PQ + P'Q \times (d - \pi)/R \quad [20A.2]$$

$$(\text{E}[S_1] - S_0)/S_0 = h_{FC} - h_{CDN} \quad [21.1]$$

$$\text{E}[S_1] = S_0 \times [1 + (h_{FC} - h_{CDN})] \quad [21.2]$$

$$\text{E}[S_t] = S_0 \times [1 + (h_{FC} - h_{CDN})]^t \quad [21.3]$$

$$F_1/S_0 = (1 + R_{FC})/(1 + R_{CDN}) \quad [21.4]$$

$$(F_1 - S_0)/S_0 = R_{FC} - R_{CDN} \quad [21.5]$$

$$F_1 = S_0 \times [1 + (R_{FC} - R_{CDN})] \quad [21.6]$$

$$F_t = S_0 \times [1 + (R_{FC} - R_{CDN})]^t \quad [21.7]$$

$$\text{E}[S_1] = S_0 \times [1 + (R_{FC} - R_{CDN})] \quad [21.8]$$

$$\text{E}[S_1] = S_0 \times [1 + (R_{FC} - R_{CDN})] \quad [21.8]$$

$$R_{CDN} - h_{CDN} = R_{FC} - h_{FC} \quad [21.10]$$

$$\text{NPV} = V^*_B - \text{Cost to Firm A of the acquisition} \quad [23.1]$$

$$C_1 = 0 \text{ if } (S_1 - E) \leq 0 \quad [25.1]$$

$$C_1 = S_1 - E \text{ if } (S_1 - E) > 0 \quad [25.2]$$

$$C_0 \leq S_0 \quad [25.3]$$

$$C_0 \geq 0 \text{ if } S_0 - E < 0 \quad [25.4]$$
$$C_0 \geq S_0 - E \text{ if } S_0 - E \geq 0$$

$$S_0 = C_0 + E/(1 + R_f) \quad [25.5]$$
$$C_0 = S_0 - E/(1 + R_f)$$

$$\text{Call option value} = \text{Stock value} - \text{Present value of the exercise price} \quad [25.6]$$
$$C_0 = S_0 - E/(1 + R_f)^t$$

$$C_0 = S_0 \times N(d_1) - E/(1 + R_f)^t \times N(d_2) \quad [25A.1]$$

$$d_1 = [\ln(S_0/E) + (R_f + 1/2 \times \sigma^2) \times t]/[\sigma \times \sqrt{t}] \quad [25A.2]$$