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CPA Exam analytics definitions and valuation metrics

Many ratios and metrics used by accountants can be calculated in more than one way. The Analytics Definitions and Valuation Metrics below provide the formulas used for many of the ratios and metrics tested in Core and Discipline sections of the Uniform CPA Examination. This resource provides the formulas used in the questions unless a question explicitly states otherwise.

These formulas are not provided with the multiple-choice questions (MCQs) in the first two testlets but are eligible for testing to the extent they are relevant to an Area, Group, Topic, or representative task in the Blueprints. The applicable formulas are provided in specific task-based simulations (TBSs) and candidates should use the formulas given in the TBS to complete the task.

Analytics definitions

Analytic	Formula
Accounts receivable turnover	Sales (net) ÷ Average accounts receivable (net)
Asset turnover	Sales (net) ÷ Average total assets
Basic earnings per share	Income available to common shareholders ÷ Weighted-average common shares outstanding
Cash conversion cycle	Days sales in accounts receivable + Days in inventory − Days of payables outstanding
Current ratio	Current assets ÷ Current liabilities
Days in inventory	Ending inventory ÷ (Cost of goods sold ÷ 365)
Days of payable outstanding	Ending accounts payable ÷ (Cost of goods sold ÷ 365)
Days sales in accounts receivable	Ending accounts receivable (net) ÷ (Sales (net) ÷ 365)
Debt to equity	Total liabilities ÷ Total equity
Dividend payout	Cash dividends ÷ Net income
Equity multiplier	Total assets ÷ Total equity
Gross margin (Gross profit margin)	(Sales (net) − Cost of goods sold) ÷ Sales (net)
Inventory turnover	Cost of goods sold ÷ Average inventory
Operating cash flow ratio	Cash flow from operations ÷ Ending current liabilities
Price earnings ratio	Price per share ÷ Basic earnings per share
Profit margin	Net income ÷ Sales (net)
Quick ratio	(Cash and cash equivalents + Short-term marketable securities + Receivables (net)) ÷ Current liabilities
Return on assets	Net income ÷ Average total assets
Return on equity	Net income ÷ Average total equity
Return on sales	Income before interest income, interest expense, and taxes ÷ Sales (net)
Times interest earned	Income before interest expense and taxes ÷ Interest expense or Earnings before interest and taxes ÷ Interest expense
Total debt ratio	Total liabilities ÷ Total assets

Valuation metrics

Metric	Formula

Capital Asset Pricing Model (CAPM)	$E_r = R_f + B \times (R_m - R_f)$ where:
	  E_r = Expected return on an asset or portfolio of assets
	  R_f = Risk-free rate of return
	  R_m = Expected return on a market portfolio
	  B = Beta

Discounted cash flow valuation	$PV = CF_1 \div (1 + r)^1 + CF_2 \div (1 + r)^2 + CF_3 \div (1 + r)^3 + ... + CF_t \div (1 + r)^t$ where:
	  PV = Present value
	  CF = Cash flow
	  r = Discount rate
	  t = Final period

Dividend discount model	$P_0 = D_1 \div (1 + r)^1 + D_2 \div (1 + r)^2 + D_3 \div (1 + r)^3 + ... + D_t \div (1 + r)^t$ where:
	  P_0 = Stock price
	  D = Dividend
	  r = Discount rate
	  t = Final period

Dividend growth model	$P_0 = [D_0 \times (1 + g)] \div (r - g)$ where:
	  P_0 = Current price of a stock
	  D_0 = Current dividend
	  r = Discount rate
	  g = Dividend growth rate

Economic Value Added (EVA)	After-tax operating income − [Weighted-average cost of capital × (Total assets − Current liabilities)]

Gross Domestic Product (GDP) - Nominal	C + I + G + X where:
	  C = Personal consumption expenditures
	  I = Gross private domestic investment
	  G = Government purchases
	  X = Net exports

GDP - Real	Nominal GDP ÷ GDP Deflator
Internal growth rate	(Return on assets × Retention) ÷ (1 − Return on assets × Retention) where: Retention = Addition to retained earnings ÷ Net income
Internal rate of return	Discount rate that makes the Net Present Value (NPV) of an investment zero
Net Present Value (NPV)	Discounted cash flow valuation (see formula above) − Initial investment

Valuation metrics (continued)

Metric	Formula
Payback period	Initial investment ÷ Annual incremental cash flow where: The cash flow per period is even
Profitability index	Present value of cash flows ÷ Cost of investment
Residual income	Income − (Required rate of return × Investment)

Value of a levered firm	Value of an unlevered firm + Present Value (PV) of the interest tax savings where:
	    Interest tax savings = $T_c \times (r_{debt} \times D)$
	    PV of the interest tax savings = $T_c \times (r_{debt} \times D) \div r_{debt}$ assuming the debt is permanent
	    T_c = Corporate tax rate
	    r_{debt} = Rate of interest on the debt
	    D = Amount of debt

Weighted-average cost of capital	$(E \div V) \times R_e + (P \div V) \times R_p + (D \div V) \times R_d \times (1 - T)$ where:
	    E = Market value of common stock equity
	    V = E + P + D
	    R_e = Required return on common stock equity
	    P = Market value of preferred stock equity
	    R_p = Required return on preferred stock equity
	    D = Market value of debt
	    R_d = Required return on debt
	    T = Corporate tax rate