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## Equations in Select Chapters

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</tr>
<tr>
<td>Breakeven volume (multiproduct)</td>
<td>[ \text{Fixed costs} \times \frac{1}{\text{Weighted unit contribution margin}} ]</td>
</tr>
<tr>
<td>Breakeven revenue</td>
<td>[ \frac{\text{Fixed costs}}{\text{Contribution margin ratio}} ]</td>
</tr>
<tr>
<td>Breakeven revenue (multiproduct)</td>
<td>[ \frac{\text{Fixed costs}}{\text{Weighted contribution margin ratio}} ]</td>
</tr>
<tr>
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<td>[ \text{Revenue} - \text{Total variable costs} ]</td>
</tr>
<tr>
<td>Contribution margin ratio</td>
<td>[ \frac{\text{Unit contribution margin}}{\text{Price}} ] \quad \text{or} \quad \frac{\text{Contribution margin}}{\text{Revenue}}</td>
</tr>
<tr>
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<tr>
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<tr>
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<td>[ \left( \frac{\text{Price} - \text{Unit variable cost}}{\text{Sales volume in units}} \right) \times \text{Fixed costs} ] \quad \text{or} \quad \left( \frac{\text{Unit contribution margin} \times \text{Sales volume in units}}{\text{Fixed costs}} \right) \times \text{Fixed costs} \quad \text{or} \quad (\text{Contribution margin} - \text{Fixed costs}) \times \text{Fixed costs} \quad \text{or} \quad \frac{\text{Contribution margin ratio}}{\text{Revenue}} \times \text{Revenue} - \text{Fixed costs}</td>
</tr>
<tr>
<td>Profit after taxes</td>
<td>[ \text{Profit before taxes} \times (1 - \text{Tax rate}) ]</td>
</tr>
<tr>
<td>Unit contribution margin</td>
<td>[ \text{Price} - \text{Variable cost per unit} ] \quad \text{or} \quad \frac{(\text{Revenue} - \text{Variable costs})}{\text{Units sold}}</td>
</tr>
<tr>
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<td>[ \sum(% \text{ of sales in units} \times \text{Unit contribution margin}) ]</td>
</tr>
<tr>
<td>Weighted contribution margin ratio</td>
<td>[ \sum(% \text{ of revenues} \times \text{Contribution margin ratio}) ]</td>
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</tr>
<tr>
<td>Flexible budget quantity</td>
<td>[ \text{Actual sales quantity} \times \text{Quantity of input budgeted for 1 unit of sales} ]</td>
</tr>
<tr>
<td>Flexible budget variance</td>
<td>[ \text{Actual profit} - \text{Flexible budget profit} ]</td>
</tr>
<tr>
<td>Input price variance</td>
<td>[ (\text{Budgeted price per unit of input} - \text{Actual price per unit of input}) \times \text{Actual input quantity} ]</td>
</tr>
<tr>
<td>Input quantity variance</td>
<td>[ (\text{Flexible budget quantity of input} - \text{Actual quantity of input}) \times \text{Budgeted price per unit of input} ]</td>
</tr>
</tbody>
</table>

(Continued)
### Chapter 8 (Variance Analysis) (continued)

<table>
<thead>
<tr>
<th>Variance Type</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market share variance</td>
<td>Actual market size ( \times (\text{Actual market share} - \text{Budgeted market share}) \times \text{Budgeted unit contribution margin}</td>
</tr>
<tr>
<td>Market size variance</td>
<td>(Actual market size ( - ) Budgeted market size) ( \times ) Budgeted market share ( \times ) Budgeted unit contribution margin</td>
</tr>
<tr>
<td>Sales mix variance</td>
<td>Actual total sales ( \times (\text{WUCM}<em>{\text{flexible budget}} - \text{WUCM}</em>{\text{master budget}}) )</td>
</tr>
<tr>
<td>Sales price variance</td>
<td>(Actual sales price ( - ) Budgeted sales price) ( \times ) Actual sales quantity</td>
</tr>
<tr>
<td>Sales quantity variance</td>
<td>(Actual total sales ( - ) Budgeted total sales) ( \times ) WUCM_{master budget}</td>
</tr>
<tr>
<td>Sales volume variance</td>
<td>Flexible budget profit ( - ) Master budget profit ( (Actual sales quantity ( - ) Budgeted sales quantity) \times ) Budgeted unit contribution margin</td>
</tr>
<tr>
<td>Total profit variance</td>
<td>Actual profit ( - ) Master budget profit</td>
</tr>
</tbody>
</table>

### Chapter 11 (Capital Budgeting)

<table>
<thead>
<tr>
<th>Financial Measure</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting rate of return</td>
<td>Average annual income ( / ) Average annual investment</td>
</tr>
<tr>
<td>Depreciation tax shield</td>
<td>Depreciation expense ( \times ) Tax rate</td>
</tr>
<tr>
<td>Future value of $1</td>
<td>((1 + r)^n)</td>
</tr>
<tr>
<td>Future value of an annuity of $1 in arrears</td>
<td>(\frac{(1 + r)^n - 1}{r})</td>
</tr>
<tr>
<td>Present value of $1</td>
<td>(\frac{1}{(1 + r)^n})</td>
</tr>
<tr>
<td>Present value of an annuity of $1 in arrears</td>
<td>(\frac{1 - (1 + r)^{-n}}{r})</td>
</tr>
</tbody>
</table>

### Chapter 12 (Performance Evaluation)

<table>
<thead>
<tr>
<th>Financial Measure</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset turnover</td>
<td>Sales ( / ) Investment</td>
</tr>
<tr>
<td>Economic value added (EVA)</td>
<td>Net operating profit after taxes ( - ) [Weighted average cost of capital ( \times ) (Invested capital ( - ) Current liabilities)]</td>
</tr>
<tr>
<td>Profit margin</td>
<td>(1 - ) (Operating expenses ( / ) Sales)</td>
</tr>
<tr>
<td>Residual income (RI)</td>
<td>Profit ( - ) (Required return ( \times ) Investment)</td>
</tr>
<tr>
<td>Return on investment (ROI)</td>
<td>Profit ( / ) Investment</td>
</tr>
<tr>
<td>Minimum transfer price acceptable to selling division (TP_{MIN})</td>
<td>Variable cost of transfer ( + ) Selling division’s opportunity cost of capacity</td>
</tr>
<tr>
<td>Maximum transfer price the buying divisions is willing to pay (TP_{MIN})</td>
<td>Buying division’s opportunity cost</td>
</tr>
</tbody>
</table>

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