

$$\begin{aligned}
 1. \text{ Material Cost Variance} &= \text{Standard} - \text{Actual} \\
 &= SP * SQ - AP * AQ
 \end{aligned}$$

Adding and Subtracting AQ, [AQ-AQ=0] – always the quantity factor, and not price

$$\begin{aligned}
 &= SP * [SQ - AQ + AQ] - AP * AQ \\
 \text{Expanding} &= SP * SQ - SP * AQ + SP * AQ - AP * AQ \\
 &= SP * [SQ - AQ] + [SP - AP] * AQ \\
 &= \text{Material usage var.} + \text{Material price var.} \\
 &= SP * [SQ - RSQ + RSQ - AQ] + \text{Material price var.} \\
 &= SP * [SQ - RSQ] + SP * [RSQ - AQ] + \text{Material price var.} \\
 &= \text{Material yield var.} \\
 &\quad \text{Material mix var.} + \text{Material price var.}
 \end{aligned}$$

{hope, you traced out the logic and will find it easy to develop the formulae for other variances; labour, overheads, sales }