Midterm 1, partial credits for problem 1

Note: The following break down for partial credits is for one possible solution only. There are other possible solutions, and the corresponding partial credits are calculated fairly, with respect to the follows. If any calculation mistake or a similar one, -1 pt.

1 (a) 2 pts are given if you showed that we need to start from $E(\tilde{\beta}_1) = E(\sum d_i y_i)$ and that $E(\sum d_i y_i) = E(\sum d_i(\beta_0 + \beta_1 x_i)) = \sum d_i \beta_0 + \sum d_i x_i \beta_1$.

1 (b) 2 pts are given if you showed $Cov(\tilde{\beta}_1 - \hat{\beta}_1, \hat{\beta}_1) = \sum_i c_i(d_i - c_i)\sigma^2$. Note: If you directly obtained $Cov(\tilde{\beta}_1 - \hat{\beta}_1, \hat{\beta}_1) = \sum_i c_i \sum_i (d_i - c_i)\sigma^2$, or $Cov(\tilde{\beta}_1, \hat{\beta}_1) = \sum_i c_i \sum_i d_i \sigma^2$, it is considered wrong.