

### Question #80

Answer: B

$$\begin{aligned} {}_2|q_{\overline{80:84}} &= {}_2|q_{80} + {}_2|q_{84} - {}_2|q_{80:84} \\ &= 0.5 \times 0.4 \times (1 - 0.6) + 0.2 \times 0.15 \times (1 - 0.1) \\ &= 0.10136 \end{aligned}$$

Using new  $p_{82}$  value of 0.3

$$\begin{aligned} 0.5 \times 0.4 \times (1 - 0.3) + 0.2 \times 0.15 \times (1 - 0.1) \\ = 0.16118 \end{aligned}$$

$$\text{Change} = 0.16118 - 0.10136 = 0.06$$

Alternatively,

$$\begin{aligned} {}_2P_{80} &= 0.5 \times 0.4 = 0.20 \\ {}_3P_{80} &= {}_2P_{80} \times 0.6 = 0.12 \\ {}_2P_{84} &= 0.20 \times 0.15 = 0.03 \\ {}_3P_{84} &= {}_2P_{84} \times 0.10 = 0.003 \\ {}_2P_{\overline{80:84}} &= {}_2P_{80} + {}_2P_{84} - {}_2P_{80} {}_2P_{84} \text{ since independent} \\ &= 0.20 + 0.03 - (0.20)(0.03) = 0.224 \\ {}_3P_{\overline{80:84}} &= {}_3P_{80} + {}_3P_{84} - {}_3P_{80} {}_3P_{84} \\ &= 0.12 + 0.003 - (0.12)(0.003) = 0.12264 \\ {}_2|q_{\overline{80:84}} &= {}_2P_{\overline{80:84}} - {}_3P_{\overline{80:84}} \\ &= 0.224 - 0.12264 = 0.10136 \end{aligned}$$

Revised

$$\begin{aligned} {}_3P_{80} &= 0.20 \times 0.30 = 0.06 \\ {}_3P_{\overline{80:84}} &= 0.06 + 0.003 - (0.06)(0.003) \\ &= 0.06282 \\ {}_2|q_{\overline{80:84}} &= 0.224 - 0.06282 = 0.16118 \\ \text{change} &= 0.16118 - 0.10136 = 0.06 \end{aligned}$$