Subject:

Q4: $\qquad$ $x = x_1, x_2, \dots, x_n$

$$P(y \mid x) = \frac{P(x \mid y) \, P(y)}{P(x)}$$

$x_1, x_2, x_3 = yes, yes, yes$

$$P(yes \mid x_1, x_2, x_3) = \frac{P(x_1, x_2, x_3 \mid yes) \times P(yes)}{P(x_1, x_2, x_3)}$$

$$= \frac{P(x_1 \mid yes) \times P(x_2 \mid yes) \times P(x_3 \mid yes) \times P(yes)}{P(x_1) \, P(x_2) \, P(x_3)}$$

$$= \frac{\frac{2}{5} \times \frac{4}{5} \times \frac{3}{5} \times \frac{1}{2}}{\frac{1}{2} \times \frac{3}{5} \times \frac{1}{2}} = 0/64$$

$$P(No \mid x_1, x_2, x_3) = \frac{P(x_1 \mid No) \times P(x_2 \mid No) \, P(x_3 \mid No) \, P(No)}{P(x_1) \times P(x_2) \times P(x_3)}$$

$$= \frac{\frac{3}{5} \times \frac{2}{5} \times \frac{2}{5} \times \frac{1}{2}}{\frac{1}{2} \times \frac{3}{5} \times \frac{1}{2}} = 0/32$$

So $\quad P(yes \mid x_1, x_2, x_3) > P(No \mid x_1, x_2, x_3)$

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