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a) Yes, the ratings of any customer can be expressed exactly in terms of 3 taste vectors.

We can express $r = T^T W$ for taste vector T & weight vectors.

$$b) r_{100} = [t_r \quad t_h \quad t_f] \begin{bmatrix} w_1 \\ w_2 \\ w_3 \end{bmatrix}$$

where w_1, w_2 & w_3 are weights corresponding to tastes of road, hybrid & fat bike riders.

$$T^T = [t_r \quad t_h \quad t_f] \quad W = \begin{bmatrix} w_1 \\ w_2 \\ w_3 \end{bmatrix}$$