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$$\text{Max} = U^2(x, y) = x^2 y^3$$

$$\text{sub to } 300 = 20x + 10y$$

$$\text{① 所得提高 MRS}_{xy} = \frac{y}{x} = 2 \quad y = 4x \quad x = \frac{M}{4}$$

$$\text{② 恩格尔系数 } 40\% \times 20x + 10y = M \quad 6x = M \quad x = \frac{M}{6}$$

$$\text{③ 奢侈消费 MRS}_{xy} = \frac{y}{x} = \frac{p_x}{p_y}$$

$$x = \frac{Y}{20p_x}$$

$$\text{④ } U = f(x, y) = x^2 y^3$$

$$300 = 20x + 10y$$

$$\text{MRS}_{xy} = \frac{y}{x} = \frac{p_x}{p_y}$$

$$y = \frac{p_x}{p_y} x$$

$$300 = 20x + 10 \left( \frac{p_x}{p_y} x \right)$$