

$$1. \textcircled{1} \cdot MRS_{XY} = \frac{2XY}{X^2} = \frac{P_X}{P_Y} = \frac{10}{20} \Rightarrow X = 4Y.$$

$$\textcircled{2} \cdot 10X + \cancel{20} \times \frac{1}{4}X = 15X \Rightarrow X = \frac{17}{15}$$

$$\textcircled{3} \cdot \text{Max } V = f(X, Y) = X^2Y$$

$$\text{subject to } 300 = P_X X + 20Y$$

$$MRS_{XY} = \frac{2Y}{X} = \frac{P_X}{20} \Rightarrow Y = \frac{P_X}{40} X$$

$$300 = P_X X + 20 \left(\frac{P_X X}{40} \right) \Rightarrow X = \frac{200}{P_X}$$

$\textcircled{4}$ X 財質為正常品, X 財質符合需求法則.