

$$① \quad MRS_{xy} = \frac{2xy}{x^2} = \frac{p_x}{p_y} = \frac{10}{20} \Rightarrow x = 4y$$

$$② \quad y = \frac{1}{4} \times 10x = 10x + 20y = M \Rightarrow x = \frac{M}{15}$$

$$③ \quad \text{當消費量不變 } 300 = p_x x + 20y$$

$$\text{So 可求得 } MRS_{xy} = \frac{2y}{x} = \frac{p_x}{p_y} = \frac{10}{20} \Rightarrow y = \frac{p_x}{40} x, \text{ 代入 } 300 = p_x x + 20 \left[\frac{p_x}{40} x \right] \Rightarrow x = \frac{200}{p_x}$$

④ 以上可知 x 與 y 為正比例，更替比率 = 2:1。