

$$2. (1) MRS_{XY} = \frac{2Y}{X} = \frac{P_X}{P_Y} = \frac{20}{20} = 1$$

$$Y = \frac{1}{2}X \quad \text{最適消費量} : X=10, Y=5$$

總效果分為替代效果 & 所得效果

$$U = X^{\frac{2}{3}} Y^{\frac{1}{3}} = (20)^{\frac{2}{3}} (5)^{\frac{1}{3}} = 2000^{\frac{1}{3}} \#$$

(2) 價格變動後的所得消費線:

$$Y = \frac{1}{2}X \text{ 代入 } U = (2000)^{\frac{1}{3}}$$

$$U = X^{\frac{2}{3}} Y^{\frac{1}{3}} = \left[\frac{1}{2}X^3 \right]^{\frac{1}{3}} = (2000)^{\frac{1}{3}}$$

$$\text{得 } X = (4000)^{\frac{1}{3}} \approx 15.87401, Y = (500)^{\frac{1}{3}}$$

替代效果: 由 $(X, Y) = (20, 5)$ 到 $[(4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}}]$

$$X \text{ 的替代效果} = (4000)^{\frac{1}{3}} - 20 < 0$$

(3) 所得效果: 由 $(X, Y) = [(4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}}]$ 到 $(10, 5)$