$U = X^{\frac{2}{3}} Y^{\frac{1}{3}}$, $300 = 10X + 20Y$

$MRS_{xy} = \frac{\frac{2}{3}X^{-\frac{1}{3}}Y^{\frac{1}{3}}}{\frac{1}{3}X^{\frac{2}{3}}Y^{-\frac{2}{3}}} = 2X^{-1}Y = \frac{2Y}{X}$

$\frac{Y}{X} = \frac{10}{20} \times \frac{1}{2}$ $5X = 20Y$, $X = 20$ $Y = 5$

將 P_X 提高到 \$20

$U = X^{\frac{2}{3}} Y^{\frac{1}{3}}$, $300 = 20X + 20Y$.

$\frac{2Y}{X} = \frac{20}{20}$ $\frac{Y}{X} = \frac{1}{2}$ $2Y = X$, $40Y + 20Y = 300$

$60Y$

$Y = 5$.

$X = 10$.

可知 P_X 的價格上升對 X 的消費量影響的總效果為 -10 個單位，接下來將價格上升的總效果分 < 替代效果 / 所得效果.

$U = X^{\frac{2}{3}} Y^{\frac{1}{3}} = (20)^{\frac{2}{3}}(5)^{\frac{1}{3}} = (400)^{\frac{1}{3}}(5)^{\frac{1}{3}} = (2000)^{\frac{1}{3}}$

在價格變動後，$Y = \frac{1}{2}X$ 帶入.

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

① 替代效果：由 $(X, Y) = (20, 5)$ 到

X 替代效果 $= (4000)^{\frac{1}{3}} - 20 \Leftarrow (4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}}$

② 所得效果：由 $(X, Y) = ((4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}})$ 到 $(10, 5)$

$\frac{1}{2}X^3 = 2000$

$X^3 = 4000$, $X = (4000)^{\frac{1}{3}}$

$Y = (500)^{\frac{1}{3}}$