① $MRS_{xy} = \dfrac{2xY}{x^2} = \dfrac{P_x}{P_Y} = \dfrac{10}{20} \Rightarrow x = 4Y$

② 將 $Y = \dfrac{1}{4}x$ 代入 $10x + 20Y = M$

$10x + 5x = M \qquad x = \dfrac{M}{15}$

③ $U = f(x,Y) = x^2Y$

$300 = P_x x + 20Y$

$MRS_{xy} = \dfrac{2Y}{x} = \dfrac{P_x}{20} \Rightarrow Y = \dfrac{P_x}{40}x$

將 $Y = \dfrac{P_x}{40}x$ 帶回

$300 = P_x x + 20\left(\dfrac{P_x}{40}x\right) \Rightarrow x = \dfrac{200}{P_x}$

④ 由所得消費線和恩格爾曲線可知
x財貨為正常品，需求線可知 x財貨
符合需求法則

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