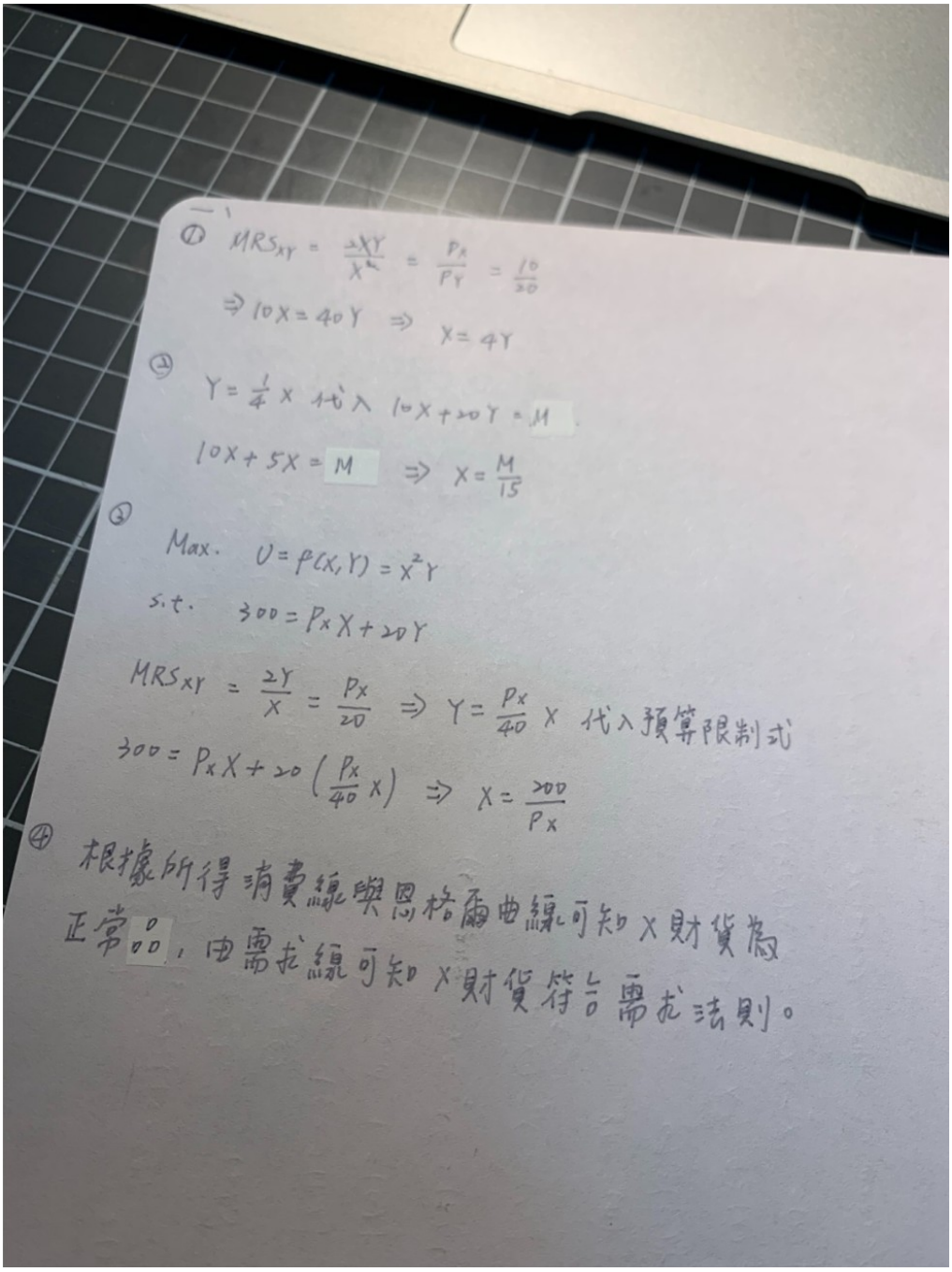

① $MRS_{XY} = \frac{2XY}{X^2} = \frac{P_X}{P_Y} = \frac{10}{20}$

$\Rightarrow 10X = 40Y \Rightarrow X = 4Y$

② $Y = \frac{1}{4}X$ 代入 $10X + 20Y = M$

$10X + 5X = M \Rightarrow X = \frac{M}{15}$

③

Max. $U = P(X,Y) = X^2Y$

s.t. $300 = P_X X + 20Y$

$MRS_{XY} = \frac{2Y}{X} = \frac{P_X}{20} \Rightarrow Y = \frac{P_X}{40}X$ 代入預算限制式

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

④ 根據所得消費線與恩格爾曲線可知 X 財貨為正常財，由需求線可知 X 財貨符合需求法則。