

6. Kim's utility function is given by $U = 5X + 2Y$, where $MU_X = 5$ and $MU_Y = 2$.
- Suppose that at the prices P_X and P_Y of good X and good Y , respectively, Kim is consuming (optimally) some positive amount of good X and some positive amount of good Y . What is the price of good X in terms of the price of good Y ?
 - How will her consumption change if P_X doubles, while P_Y does not change?
 - Given the utility function in this problem, show that the marginal products are as given using calculus.
 - Suppose instead that Kim's utility function is $U = XY$. Normalize the price of good Y to equal 1 and assume that the relationship between the two prices is as in (a). Also, assume that Kim's income is 1,000. What are Kim's optimal consumption bundle and utility at these prices before any price change?
 - Maintaining the utility function from (d), what does Kim consume at the optimum after the price of X doubles and the price of Y remains the same?
 - Maintaining the utility function from (d), find the substitution effect, the income effect, and the total effect of the price change.
 - Maintaining the utility function from (d), is good X a normal or an inferior good for Kim?
 - Maintaining the utility function from (d), derive Kim's Marshallian demand curve for X , and show that the Law of Demand is satisfied using calculus.
 - Maintaining the utility function from (d), derive Kim's Hicksian demand curve for X using calculus.