Problem 1: Ms. CD has the following preferences for xylophones\((x)\) and yams\((y)\): 
\[ U(x,y) = xy. \] Ms. CD has $800 to spend on the two goods, the price of a xylophone, \(p_x\), is $1, and the price of a yam, \(p_y\), is $1. The price of a xylophone suddenly increases to $2 \((p_x')\).

a) Before the price change how many xylophones and yams does Ms. CD buy.

b) How many xylophones and yams does she buy at the new price?

c) How large would Ms. CD’s income, \(m'\), be if she after the increase in \(p_x\) exactly could afford her old consumption bundle?
d) How many xylophones and yams would she buy if she was faced with $p_x'$, $p_y$ and $m'$?

e) Draw three budget lines on the graph below. One illustrating the budget line before the price decrease, one after the price decrease, and finally the budget line she would face if she had income $m'$ and the new prices. Denote her original consumption bundle by A, the final bundle by C, and the bundle she would buy at $(p_x', p_y, m')$ by B.

f) How large a decrease in the total demand for x is due to the income effect? and how large a decrease in the demand for x is due to the substitution effect?