1) Consider the following utility function:

\[ U(x, y) = xy + (1/4)x^2 \]

a) Derive an expression for the MRS
b) Solve for the demand functions.
c) Find the consumer optimum bundle if Income = $18, P_x = $3, and P_y = $6.

2) Suppose the consumer is not at a tangency point. The comparison between the slope of the budget line and the MRS tells us in which direction along the budget line the consumer will wish to move.

a) Suppose \( MRS = 5 \) and \( P_x/P_y = 3 \). Is the consumer at a tangency point? If not, will the consumer prefer a market basket on the budget line with more X or more Y?

b) Suppose \( MRS = 2 \) and \( P_x/P_y = 3 \). Is the consumer at a tangency point? If not, will the consumer prefer a market basket on the budget line with more X or more Y?

3) Emre’s marginal rate of substitution of candy for chocolate is 3/2, no matter how many units of each he is currently consuming. Draw several of his indifference curves. If his allowance is $10, P_c = $0.50, and P_{choc} = $1.00, what is his budget line? What will be his preferred consumption bundle?

4) From Hirschey and Pappas, Problems 4.4. and 4.10.