

## **1 Working with CV and EV**

1. Myrtle has \$200 per month to spend on Transit (X) and all other goods (Y). She currently buys a bus pass for \$50 and rides 40 times per month. If she didn't buy the pass, bus rides would cost \$2/ride. Myrtle is offered to join a Transit program that would allow her to pay a membership fee and then could ride the bus for \$1 per trip. The most Myrtle would pay for the membership is \$20. and then she would ride 15 times a month. If she were given the membership for free, she would ride the bus 18 times per month. Myrtle also reveals that she would be indifferent between a free membership (and \$1 per ride) versus simply having the traditional bus pass reduced to \$25 per month (flat rate), where she would again choose to ride the bus 40 times a month.
  - (a) Using all the information provided, draw all the relevant budget constraints and indifference curves. Be sure to label all equilibrium points and have a legend that explains each point (in one or two sentences).
  - (b) Calculate her CV (compensating variation) difference between the Pass, and the most she would pay for \$1 rides
  - (c) Calculate her EV (equivalent variation)
2. Skippy has the following utility function:  $u = \sqrt{xy}$  and faces the budget constraint:  $M = p_x x + p_y y$ .
  - (a) Use Lagrange to derive Skippy's demand functions, indirect utility function and expenditure function
  - (b) Suppose  $M = 48$ ,  $P_y = 1$  and  $P_x = 4$ . What is Skippy's optimal  $x$ ,  $y$  and utility number? If the price of  $x$  was lowered to 2 what would be her  $x$ ,  $y$  and utility number
  - (c) What is the most Skippy would pay to have  $P_x$  lowered to 2?
  - (d) Suppose  $M = 48$ ,  $P_y = 1$  and  $P_x = 4$ . How much additional income would Skippy need to be as well off as if the price of  $x$  had fallen to 2?
  - (e) Graph your answer carefully, label all equilibrium points, intercepts and slopes. Be sure to indicate CV and EV on the graph (graph must be 1/2 page minimum in size)