1. Myrtle has $800 per month to spend on Transit (X) and all other goods (Y). She currently buys a bus pass for $100 and rides 75 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 $40. 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 $50 per month (flat rate), where she would again choose to ride the bus 75 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 Ans: -60

   (c) Calculate her EV. Ans: -50

Graph for CV-EV
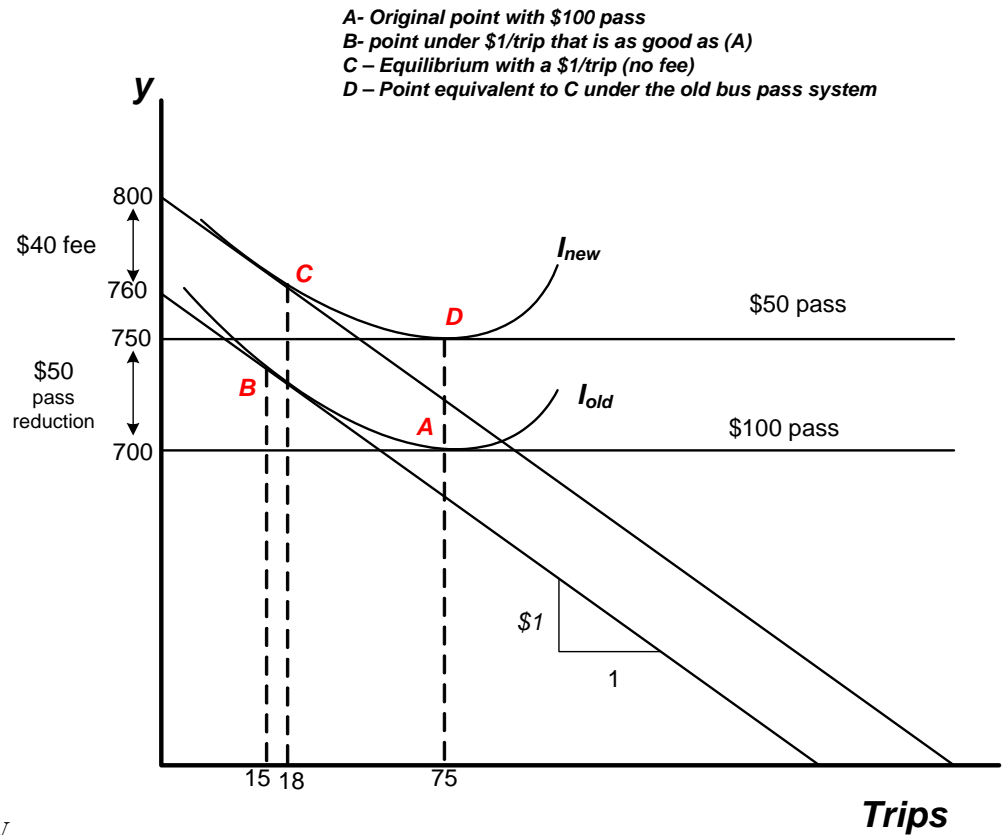
2. Skippy has the following utility function: $u = x^{1/3}y^{2/3}$ and faces the budget constraint: $M = p_x x + p_y y$.

(a) Find Skippy's demand functions, indirect utility and expenditure.

$$x = \frac{M}{3p_x}, y = \frac{2M}{3p_y}$$

indirect utility function is

$$U_i = \left(\frac{M}{3p_x}\right)^{1/3} \left(\frac{2M}{3p_y}\right)^{2/3} = \frac{2^{2/3}M}{4p_x^{1/3}p_y^{2/3}}$$

U_i tells you the utility number for any given budget and prices. The Expenditure Function is

$$E = \frac{3p_x^{1/3}p_y^{2/3}}{2^{2/3}} \cdot U_i \qquad i = old, new$$

$$E = 1.89p_x^{1/3}p_y^{2/3}U_i$$

(b) Suppose $M = 120$, $P_y = 1$ 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

$$x_{old} = 10, y_{old} = 80, u_{old} = 40$$
$$x_{new} = 20, y_{new} = 80, u_{new} = 50.4$$

(c) What is the most Skippy would pay to have P_x lowered to 2? **USE EXPENDITURE FUNC-TION** with new p_x and old utility

$$E = 1.89p_x^{1/3}p_y^{2/3}U_i$$
$$E = 1.89p_x^{1/3}U_i \qquad (p_y = 1)$$
$$U_{i=old} = 40, \qquad p_x = 2$$
$$CV = 120 - E$$
$$CV = 120 - 1.89(2)^{1/3}(40) = 24.74$$

(d) Suppose $M = 120$, $P_y = 1$ 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? **USE EXPENDITURE FUNCTION** with old p_x and new utility

$$E = 1.89p_x^{1/3}p_y^{2/3}U_i$$
$$E = 1.89p_x^{1/3}U_i \qquad (p_y = 1)$$
$$U_{i=new} = 50.4, \qquad p_x = 4$$
$$EV = E - 120$$
$$EV = 1.89(4)^{1/3}(50.4) - 120 = 31.2$$