(2) $u_A(x,y) = y + 60x - 2x^2$ $\qquad$ $u_B(x,y) = y + 30x - x^2$

$MRS_A = 60 - 4x_A$ $\qquad$ $MRS_B = 30 - 2x_B$

$(\mathring{x}_A, \mathring{y}_A) = (12, 100)$; $\mathring{MRS}_A = 12$ $\qquad$ $(\mathring{x}_B, \mathring{y}_B) = (3, 100)$; $\mathring{MRS}_B = 24$

$\mathring{u}_A = 100 + 720 - (2)(144) = 532$ $\qquad$ $\mathring{u}_B = 100 + 90 - 9 = 181$

(a) AFTER BILL RECEIVES ONE x-UNIT FROM AL THEIR MRS's WILL BE $MRS_A = 16$ AND $MRS_B = 22$. THEREFORE ANY PAYMENT t FROM BILL TO AL THAT SATISFIES $16 \leqq t \leqq 22$ WILL MAKE BOTH OF THEM BETTER OFF THAN IF THEY HADN'T TRADED. BUT NOTE THAT IF t IS VERY CLOSE TO $\mathring{MRS}_A = 12$ OR TO $\mathring{MRS}_B = 24$, THEN ONE PERSON WILL BE <u>WORSE</u> OFF:

IF $t = 12$: $u_A = 112 + 660 - (2)(121) = 530 < \mathring{u}_A$.

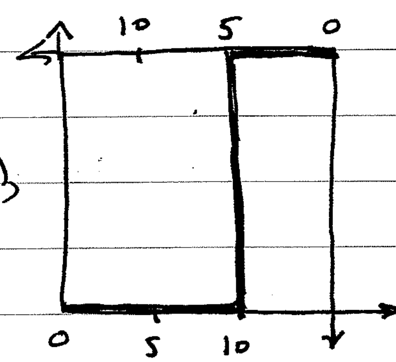
IF $t = 24$: $u_B = 76 + 120 - 16 = 180 < \mathring{u}_B$.

THIS IS AN IMPORTANT POINT TO UNDERSTAND.

(b) $MRS_A = MRS_B$ (INTERIOR): $60 - 4x_A = 30 - 2(15 - x_A) = 30 - 30 + 2x_A$

i.e., $6x_A = 60$; $\boxed{x_A = 10,\ x_B = 5.}$

ANY DISTRIBUTION OF THE y-GOOD IS CONSISTENT w/ PARETO.



IF $y_A = 0$, PARETO REQUIRES THAT

$MRS_A > MRS_B$; i.e., $60 - 4x_A > 30 - 2(15 - x_A)$,

i.e., $6x_A < 60$; $x_A < 10$.

IF $y_B = 0$, PARETO REQUIRES THAT

$MRS_A < MRS_B$; i.e., $60 - 4x_A < 2x_A$,

i.e., $6x_A > 60$; $x_A > 10$.

(c) LET $p_y = 1$.

AL'S DEMAND FOR X: $60 - 4x_A = p_x$; i.e., $4x_A = 60 - p_x$

$x_A = 15 - \frac{1}{4}p_x$.

BILL'S DEMAND FOR X: $30 - 2x_B = p_x$; i.e., $2x_B = 30 - p_x$

$x_B = 15 - \frac{1}{2}p_x$

AGGREGATE DEMAND FOR X: $X = (15 - \frac{1}{4}p_x) + (15 - \frac{1}{2}p_x) = 30 - \frac{3}{4}p_x$.

$X = \mathring{X}$: $30 - \frac{3}{4}p_x = 15$

i.e., $\frac{3}{4}p_x = 15$; $\underline{\underline{p_x = 20}}$. ← EQUIL'M PRICE OF X (w/ $p_y = 1$).

$\therefore$ $\left.\begin{array}{l} x_A = 10, \ y_A = 100 + (20)(2) = 140 \\ x_B = 5, \ y_B = 100 - (20)(2) = 60 \end{array}\right\}$ ← EQUIL'M ALLOCATION