Economics 102
Summer 2018
Quiz #0

Name ANNOTATED KEY

To get full credit on this quiz you must show your work and you must do your work neatly.

1. (2 points) You are told that the two points (X, Y) = (10, 20) and (40, 50) sit on a straight line. Write the y-intercept form of the equation that contains these two points.

$\text{slope} = \frac{\Delta Y}{\Delta X} = \frac{20-50}{10-40} = \frac{-30}{-30} = 1$

$y = mx + b$

$y = x + b$

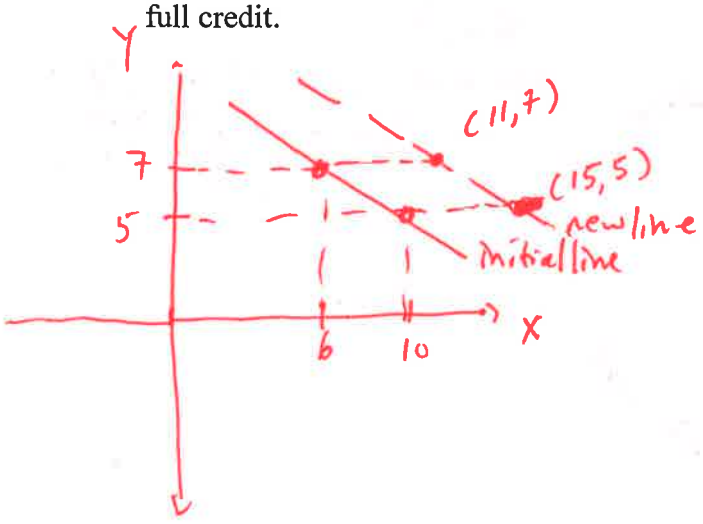
use a "known point" to find b: (X, Y) = (10, 20)

$20 = 10 + b$

$b = 10$

$\Rightarrow \boxed{Y = X + 10}$

2. (2 points) You are told that the initial straight line contains the two points (X, Y) = (6, 7) and (10, 5). The new line is related to this first line: for every y value the new x value is 5 units bigger. What is the equation in slope-intercept form for this new line? Show all your work to get full credit.



Option One:

$(X', Y') = (11, 7)$ and $(15, 5)$

$\text{slope} = \frac{7-5}{11-15} = \frac{2}{-4} = -\frac{1}{2}$

$Y' = mX' + b$

$Y' = (-\frac{1}{2})X' + b$

$7 = -\frac{1}{2}(11) + b$

$14 = -11 + 2b$

$25 = 2b$

$\frac{25}{2} = b$

$\boxed{Y = (-\frac{1}{2})X + \frac{25}{2}}$

Option Two:

Initial line: (X, Y) = (6, 7) and (10, 5)

$\text{slope} = \frac{7-5}{6-10} = \frac{2}{-4} = -\frac{1}{2}$

$Y = mX + b$

$Y = (-\frac{1}{2})X + b$

$7 = -\frac{1}{2}(6) + b$

$10 = b$

$Y = (-\frac{1}{2})X + 10$ original line

$X = 20 - 2Y$ original line in X-intercept form

new line: $X = (20+5) - 2Y \Rightarrow X = 25 - 2Y$

$\boxed{Y = \frac{25}{2} - \frac{1}{2}X}$

Option 3:

original line: $Y = (-\frac{1}{2})X + 10$ see option 2

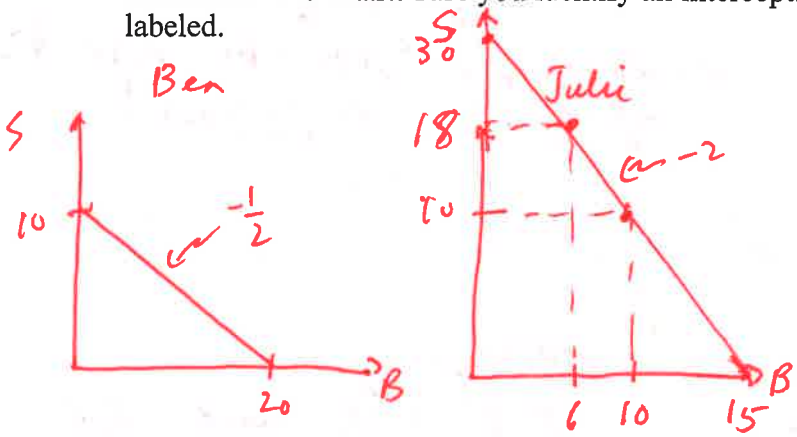
new line: $Y = -\frac{1}{2}(X-5) + 10$

$Y = (-\frac{1}{2})X + \frac{5}{2} + 10$

$\boxed{Y = (-\frac{1}{2})X + \frac{25}{2}}$

3. Ben and Julie produce basketballs (B) and scissors (S). They each have the same amount of resources to devote to the production of these two goods. In a day, Ben can produce either 20 basketballs or 10 pairs of scissors or any combination that lies on the line that contains these two points. In a day, Julie can produce 10 basketballs and 10 pairs of scissors or 6 basketballs and 18 scissors or any combination that lies on the line that contains these two points.

a. (2 points) In the space below draw two graphs. In the first graph represent Ben's production possibility frontier measuring basketballs on the horizontal axis. In the second graph represent Julie's production possibility frontier measuring basketballs on the horizontal axis. Make sure you identify all intercepts and that your graphs are well labeled.



Slope of Julie's PPF = $-\frac{8}{4} = -2$

$S = -2B + b$

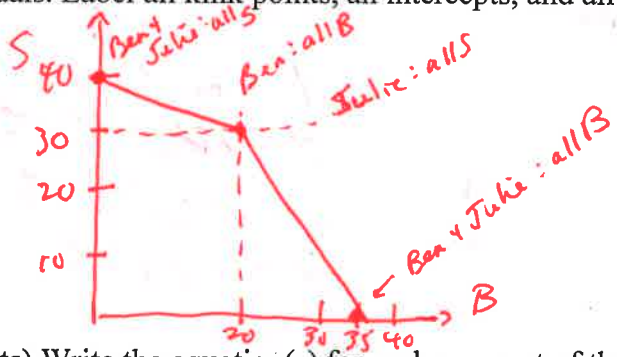
if $B = 10$, $S = 10$

$10 = -2(10) + b$

$b = 30$

$\left.\begin{array}{l} \text{y-intercept is } (0, 30) \\ \text{x-intercept is } (15, 0) \end{array}\right\}$ for slope $= -2$

b. (2 points) In the space below draw the joint production possibility frontier for these two individuals. Label all kink points, all intercepts, and all axes in your graph.



c. (2 points) Write the equation(s) for each segment of the joint production possibility frontier and include a relevant domain or range for each segment.

Top segment: $S = 40 - \frac{1}{2}B$ for $0 \le B \le 20$ or for $30 \le S \le 40$

Lower segment: $S = b - 2B$

if $B = 35$ and $S = 0$

$\Rightarrow 0 = b - 2(35)$

$b = 70$

$S = 70 - 2B$ for $20 \le B \le 35$ or for $0 \le S \le 30$