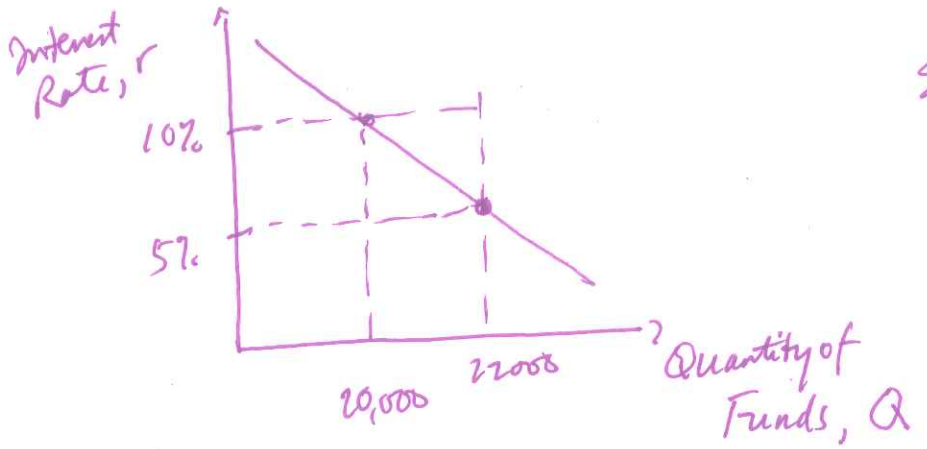
Economics 102
Summer 2018
Quiz #1

Name ANNOTATED KEY

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

1. (1 point) You are told that there is a linear relationship between the interest rate and the quantity of funds demanded. When the interest rate is 10%, the quantity of funds demanded is equal to $20,000 and when the interest rate is 5%, the quantity of funds demand is equal to $22,000. Measure the interest rate as the y variable and write an equation for the demand for funds as a function of the interest rate. Use Q as the symbol for the quantity of funds and r as the symbol for the interest rate. Write this equation in y-intercept form. Show your work. The interest rate should appear in the equation as a whole number (so if the interest rate is 10% then it would appear in the equation as 10).



Slope-intercept form

$Y = mX + b$

$\Downarrow \quad \Downarrow$

$r = mQ + b$

$\text{slope} = m = \frac{\Delta r}{\Delta Q} = \frac{-5}{2000}$

$\text{slope} = -\frac{1}{400}$

$r = \left[-\frac{1}{400}\right]Q + b$

Use a "known point" to find the value of b:

$(Q, r) = (5; 22000)$ or $(10; 20,000)$

$10 = \left[\frac{-1}{400}\right]20,000 + b$

$\frac{20,000}{400} = 50$

$10 = -50 + b$

$60 = b$

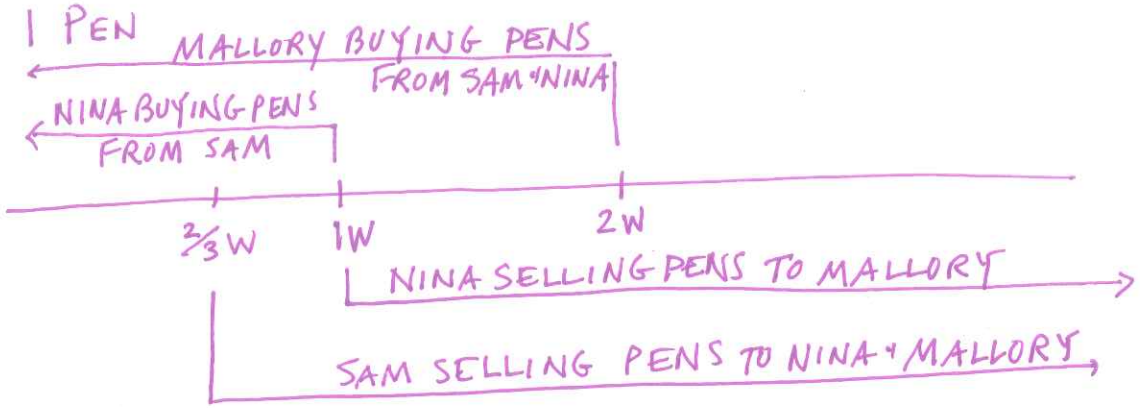
$r = \left[-\frac{1}{400}\right]Q + 60$

Check: if $Q = 22,000$ what is r?

$r = \left[-\frac{1}{400}\right]\left[22,000\right] + 60$

$r = -55 + 60 = 5\%$!

c. (2 points) Provide a depiction of the acceptable trading range of prices for 1 pen in the space below. Make sure you identify the various prices and whether the individual is selling or buying the pen. Use the number line approach presented in class. Make sure your depiction is clearly and completely labeled.



d. (2 points) For each of the following production points determine i) if the production point is feasible given the joint PPF for these three individuals and ii) how many Pens and Watches will be produced by each of the individuals. Fill in the provided table. If the point is not feasible provide the production levels that get us as close to this point as possible and insure that we get the whole amount of either the pens or the watches. **(Grading rubric: 1/6 point for each cell.)**

2nd option

(P, W) = (45, 27) NOT FEASIBLE (13, 7) (0, 20) (30, 0)

Production Point	Feasible/Not Feasible	Nina's (P, W) Production	Mallory's (P, W) Production	Sam's (P, W) Production
(P, W) = (15, 50)	FEASIBLE	(0, 20)	(0, 20)	(15, 10)
(P, W) = (34, 32)	FEASIBLE	(4, 12)	(0, 20)	(30, 0)
(P, W) = (45, 27)	NOT FEASIBLE	(0, 20)	(15, 5)	(30, 0)

1st option

(P, W) = (15, 50)
if P = 15 ⇒
$W = 60 - \frac{2}{3}(15)$
$W = 60 - 10 = 50$ ⇒ FEASIBLE

SAM'S PRODUCTION:
P = 15 ⇒ if P = 15, THEN W:
$W = 20 - (\frac{2}{3})P$
$W = 20 - (\frac{2}{3})(15) = 10$

(P, W) = (34, 32)
SAM PRODUCES 30 P, 0 W
NINA PRODUCES 4P
IF NINA PRODUCES 4 P
THEN $W_{NINA} = 12$
MALLORY PRODUCES 0 P
AND ∴ $W_{MALLORY} = 20$
TOTAL PEN PRODUCTION = 34
TOTAL WATCH PRODUCTION =
12 + 20 = 32

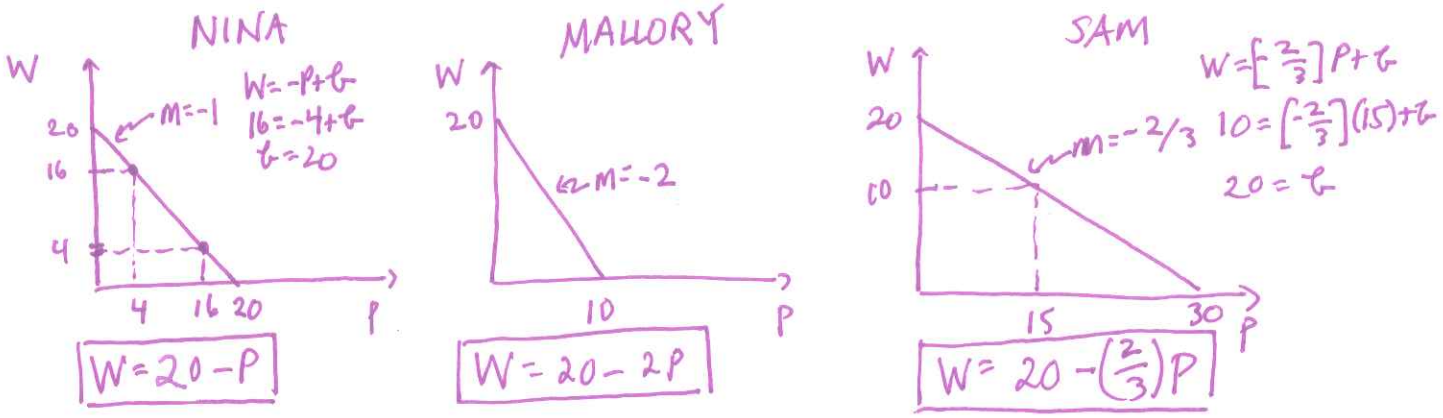
NOTE: NINA IS ABLE TO PRODUCE (P, W) = (4, 16) ⇒ SO WHEN SHE PRODUCES (P, W) = (4, 12) THIS IS NOT EFFICIENT
(P, W) = (34, 36) IS ON PPF
(P, W) = (34, 32) IS INSIDE PPF

FIRST OPTION:
(P, W) = (45, 27)
SAM PRODUCES 30 P & 0 W
NINA PRODUCES 15 P & 5 W
MALLORY PRODUCES 0 P & 20 W
TOTAL PEN PRODUCTION = 45
TOTAL WATCH PRODUCTION = 25
NOT FEASIBLE TO PRODUCE (45, 27)!

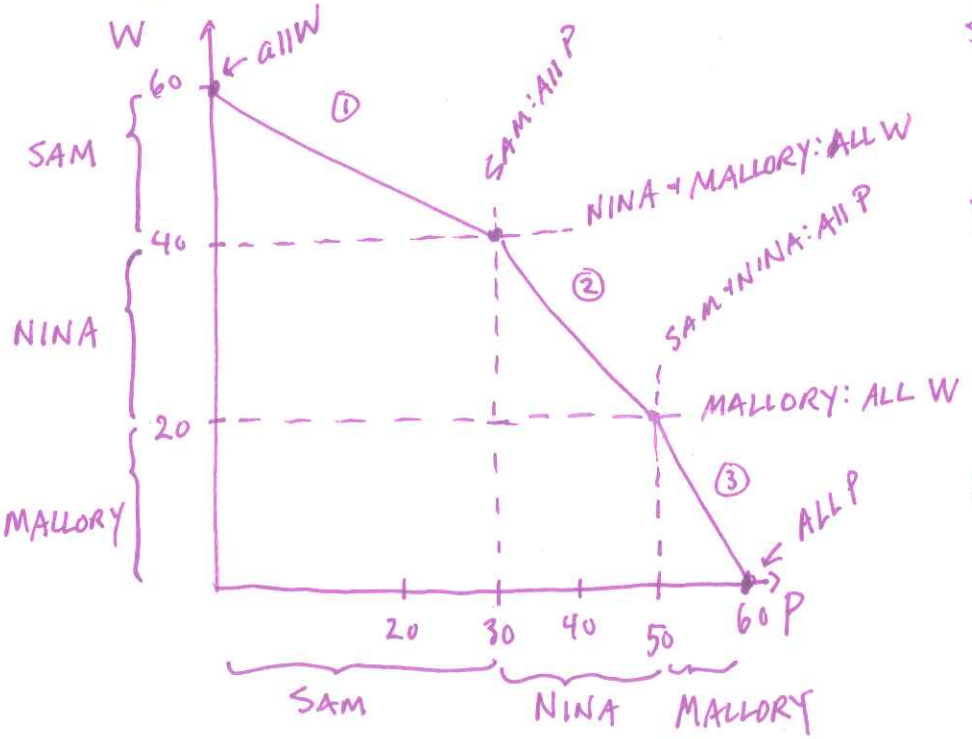
SECOND OPTION:
(P, W) = (45, 27)
MALLORY PRODUCES 20 W & 0 P
NINA PRODUCES 7 W & 13 P
SAM PRODUCES 0 W 30 P
TOTAL PEN PRODUCTION = 43
TOTAL WATCH PRODUCTION = 27
NOT FEASIBLE TO PRODUCE (45, 27)!

2. (8 points total) There are three individuals in this economy: Nina, Mallory, and Sam. These three individuals produce watches (W) and pens (P) and all three have linear production possibility frontiers. Nina can produce (P, W) = (4, 16) and (16, 4) or any other combination of points that lies on the line that contains these two points. Mallory can produce a maximum of 20 watches or 10 pens. Sam can produce (P, W) = (15, 10) and he finds that for each additional pen that he produces he must give up 2/3 watch.

a. (1.5 points) In the space below draw three separate graphs. Label each graph carefully and completely. In the first graph represent Nina's PPF (label it clearly as hers!); in the second graph represent Mallory's PPF; and in the third graph represent Sam's PPF. Make sure all intercepts are labeled. Below each graph write the equation for each individual's PPF in slope-intercept form measuring watches on the vertical axis. **(Grading rubric: 1/2 point for each graph and equation combination: to get this 1/2 point all parts must be complete and accurate.)**



b. (3.5 points) In the space below draw the joint PPF for Nina, Mallory and Sam. Label all axes, the intercepts, the coordinates of any "kink points". Then provide an equation for each segment of the joint PPF. These equations should all be written in y-intercept form where watches are measured on the y-axis and the relevant ranges for each equation should be provided. **(Grading rubric: 1/2 point for each kink point properly labeled, 1/2 point for each intercept properly labeled, 1/2 point for each equation provided.)**



SEGMENT ①:

$W = 60 - (\frac{2}{3})P$

for $40 \le W \le 60$

SEGMENT ②:

$W = b - P$

$40 = b - 30$

$70 = b$

$W = 70 - P$

for $20 \le W \le 40$

SEGMENT ③:

$W = b - 2P$

$20 = b - 2(50)$

$120 = b$

$W = 120 - 2P$

for $0 \le W \le 20$