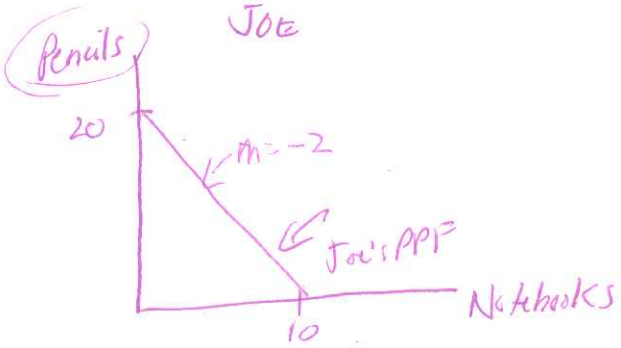
Economics 102
Summer 2017
Quiz #1

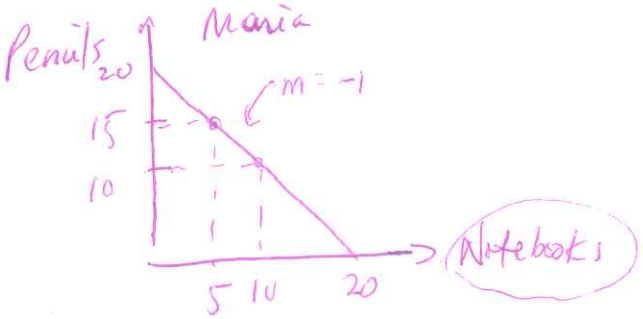
Name ANNOTATED KEY

1. Joe and Maria both produce pencils (P) and notebooks (N). They each have linear production possibility frontiers. You are told the following information about their production of these two goods. Joe can produce a maximum of 20 pencils or 10 notebooks. Maria can produce 15 pencils and 5 notebooks or 10 pencils and 10 notebooks.

a. (1 point) In the space below draw a graph representing Joe's production possibility frontier measuring Pencils on the vertical axis and Notebooks on the horizontal axis. Identify the numeric value of the intercepts of this PPF. Incompletely labeled graphs will not receive full credit.



b. (1 point) In the space below draw a graph representing Maria's production possibility frontier measuring Pencils on the vertical axis and Notebooks on the horizontal axis. Identify the numeric value of the intercepts of this PPF. Incompletely labeled graphs will not receive full credit.



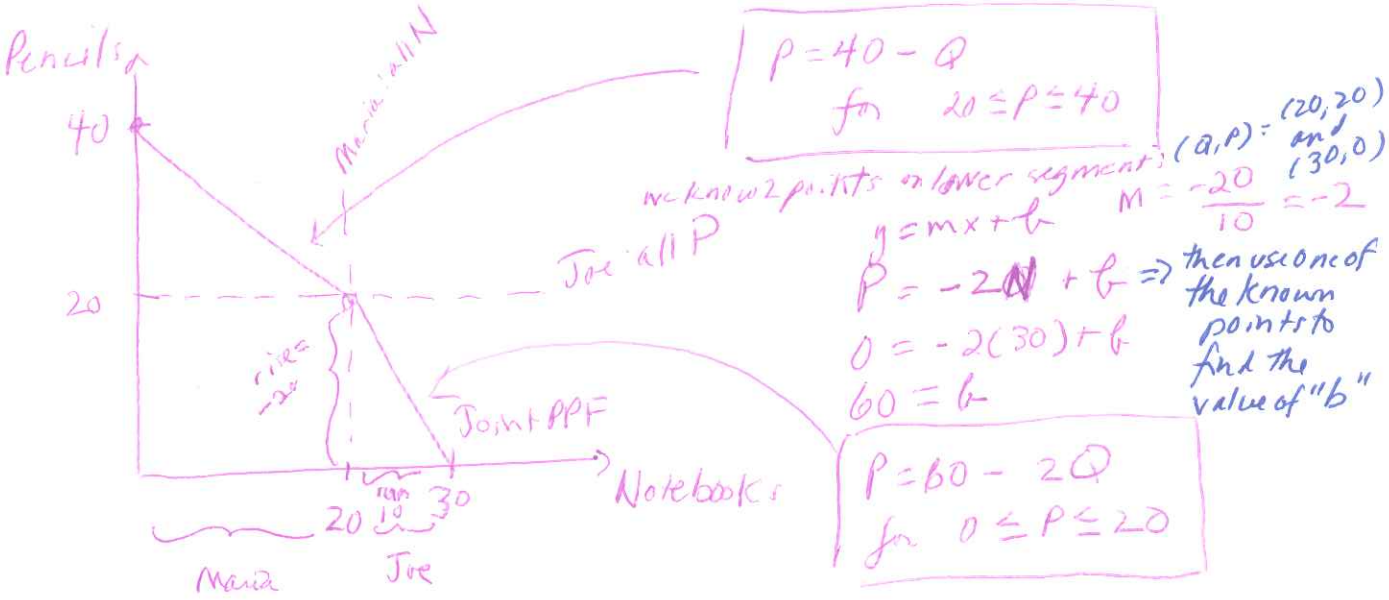
c. (1 point) Write an equation in slope-intercept form for Joe's PPF with Pencils the variable measured on the vertical axis. Write an equation in slope-intercept form for Maria's PPF with Pencils the variable measured on the vertical axis.

P = Pencils
N = Notebooks

Equation for Joe's PPF: $P = 20 - 2N$

Equations for Maria's PPF $P = 20 - N$

d. (2 points) In the space below draw a graph of the joint PPF for Joe and Maria measuring Pencils on the vertical axis and Notebooks on the horizontal axis. Identify any intercepts as well as coordinates for any kink points. Then write an equation or equations for the joint PPF being sure to identify where necessary any ranges.

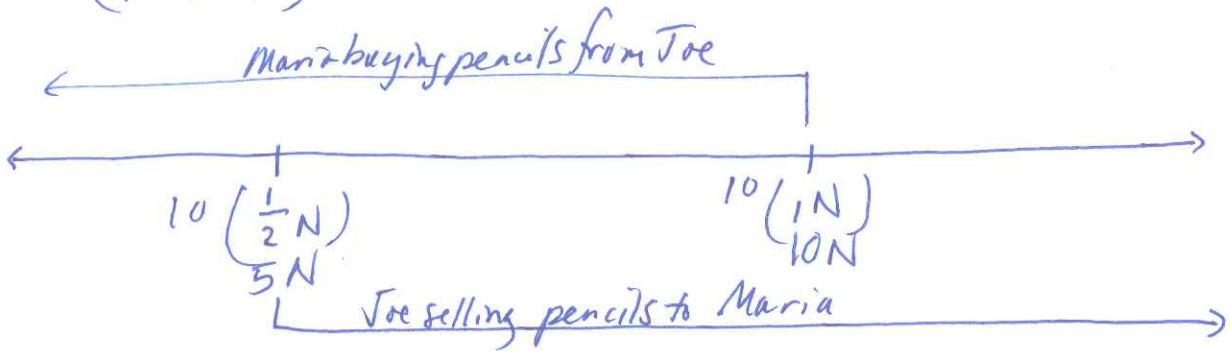


e. (1 point) What is the range of trading prices in terms of notebooks that is acceptable for 10 pencils? Use the number line approach from the lecture to represent this trading range and make sure your answer indicates Joe's perspective as well as Maria's perspective clearly.

Joe: OC of 1N is 2P
OC of 1P is $\frac{1}{2}$N

Maria: OC of 1N is 1P
OC of 1P is 1N

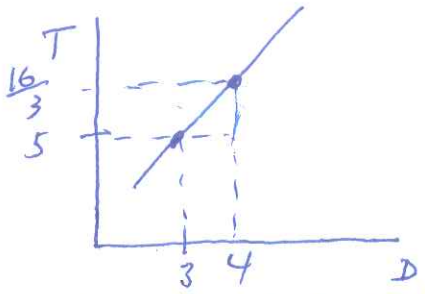
Acceptable range of trading prices for 10 pencils is between 5N and 10N.



2. (2 points) Lindsay is a candy maker. Lindsay can produce 5 dark chocolate truffles in one day if she receives 3 dollars. It is also known that, for each extra dollar received, Lindsay produces a third of a dark chocolate truffle. Write an equation that describes Lindsay's offer of dark chocolate truffles (T) in terms of dollars (D). View T as the variable measured on the vertical axis. Show your work.

5 truffles : 3 dollars

$\frac{16}{3}$ truffles : 4 dollars



$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\frac{1}{3}}{1} = \frac{1}{3}$

$y = mx + b$

$T = \frac{1}{3}D + b$

Use one of the known points $(D, T) = (3, 5)$ or $(4, \frac{16}{3})$ to find the value of b: $5 = \frac{1}{3}(3) + b$

$4 = b$

$\boxed{T = \frac{1}{3}D + 4}$

3. (2 points) Which of the following statements is true?

a. If we shift the line y = 3*x – 10, two units to the right we get the line y = 3*x – 8.

b. If we shift the line y = 3*x – 10, two units to the right we get the line y = 3*x – 12 and the equation in x-intercept form is x = 4 + y/3.

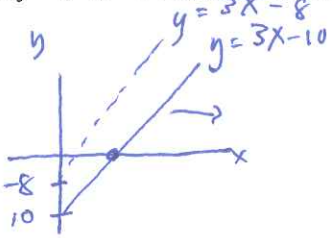
c. Suppose that the supply curve is initially given as Q = (1/3)P – (10/3). If the costs of producing the good increases by \$4 per unit then the new supply curve is Q = (1/3)P – (14/3).

d. Suppose the line y = 3*x – 1 shifts 2 units to the left. This new line intersects the line y = 2/3 – x/5 when y = 10/3.

a. $y = 3x - 10$

vs

$y = 3x - 8$

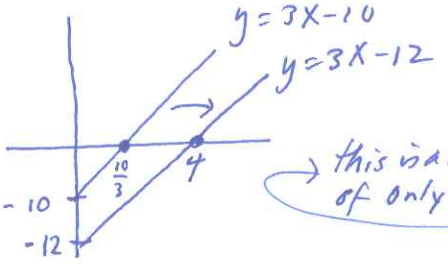


↳ this line is shifting left and NOT RIGHT! (a) is not true ✗

b. $y = 3x - 10$

vs

$y = 3x - 12$



→ this is a shift to the right of only $\frac{2}{3}$ units!

if $y = 0 \Rightarrow 0 = 3x - 10$, $10 = 3x$, $\frac{10}{3} = x$

$\frac{10}{3} + 2 = \frac{10}{3} + \frac{6}{3} = \frac{16}{3} \neq 4$

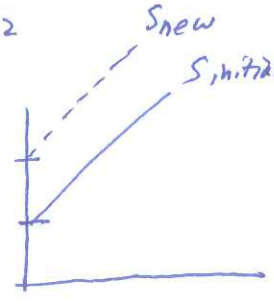
(b) is not true ✗

if $y = 0 \Rightarrow 0 = 3x - 12$, $12 = 3x$, $4 = x$

c. $Q = \frac{1}{3}P - \frac{10}{3}$

$\frac{1}{3}P = Q + \frac{10}{3}$

$P = 3Q + 10$



new Supply curve:

$P = 14 + 3Q$

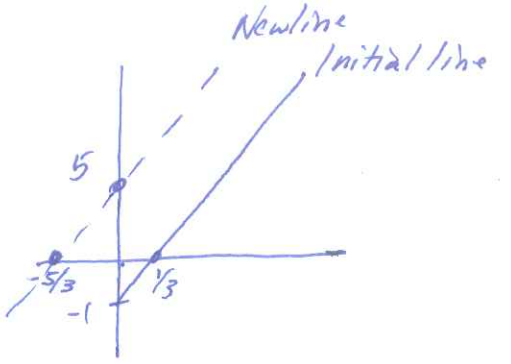
or $3Q = P - 14$

$\boxed{Q = \frac{1}{3}P - \frac{14}{3}}$

(c) is true ✓

Could stop here if confident!!

d. $y = 3x - 1$



if $y = 0$

$0 = 3x - 1$

$1 = 3x$

$\frac{1}{3} = x$

Newline is 2 units to left of initial line : x-intercept is therefore $-5/3$ $\Rightarrow$ Equation for newline

$y = 3x + b$

Use known point $(-5/3, 0)$ to find b:

$0 = 3\left(\frac{-5}{3}\right) + b$

$5 = b$

Newline : $\boxed{y = 3x + 5}$

Equation for other line : $y = \frac{2}{3} - \frac{x}{5}$

if $y = \frac{10}{3}$ $\Rightarrow$ x value for Newline

$3\left[\frac{10}{3} = 3x + 5\right]$

$10 = 9x + 15$

$-5 = 9x$

$-5/9 = x$

if $y = \frac{10}{3}$ $\Rightarrow$ x value for other line

$3\left[\frac{10}{3} = \frac{2}{3} - \frac{x}{5}\right]$

$10 = 2 - \frac{3}{5}x$

$\frac{3}{5}x = -8$

$x = -8\left[\frac{5}{3}\right] = \frac{-40}{3}$

These 2 lines do Not intersect when $y = 10/3$ since their x values are different for this given y value

(d) is not true X