



- Name: \_\_\_\_\_
  - Date: \_\_\_\_\_
  - Section: \_\_\_\_\_
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## **ECON 300: Intermediate Price Theory**

### **Problem Set #1**

#### **Budget Constraints**

#### **INSTRUCTIONS:**

- Problems #4 and #5 are considered to be advanced level questions.

**Problem 1. Formalizing the Budget Constraint**

Suppose that in a local cafe, a cup of coffee costs \$2, and a sandwich costs \$4, and that you have \$24 to spend on coffee and sandwiches.

1.A. If you spend ALL of your budget on coffee, how many cups of coffee and sandwiches can you purchase?

1.B. If you spend ALL of your budget on sandwiches, how many cups of coffee and sandwiches can you purchase?

1.C. If you already know that you have to buy two sandwiches, with the remaining budget, how many cups of coffee can you purchase?

1.D. Why can't you purchase 6 cups of coffee and 4 sandwiches?

1.E. Would you be spending all of your budget if you purchase 7 cups of coffee and 2 sandwiches?

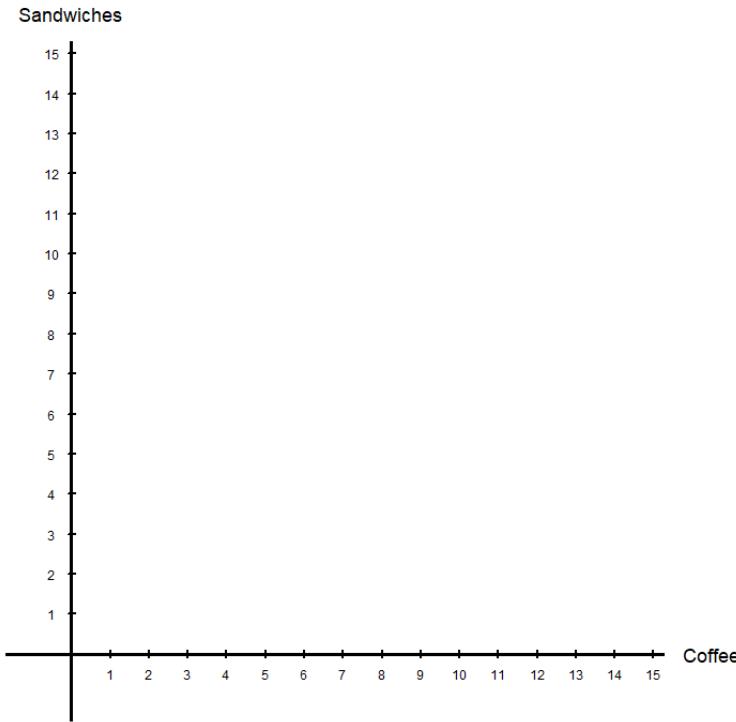
1.F. The budget constraint can be formally expressed as:

$$\text{Price of Coffee} \times \# \text{ Coffee} + \text{Price of Sandwiches} \times \# \text{ Sandwich} = \text{Budget}$$

Using the relevant numbers, express your budget constraint as a mathematical equation.

1.G. Using the empty chart given below, plot your budget constraint with coffee on the horizontal ( $x$ ) axis, and sandwiches on the vertical ( $y$ ) axis.

- Plot the point that corresponds to your answer from Problem 1.A., 1.B, and 1.C.
- Linking these three points will give you the “budget line.”



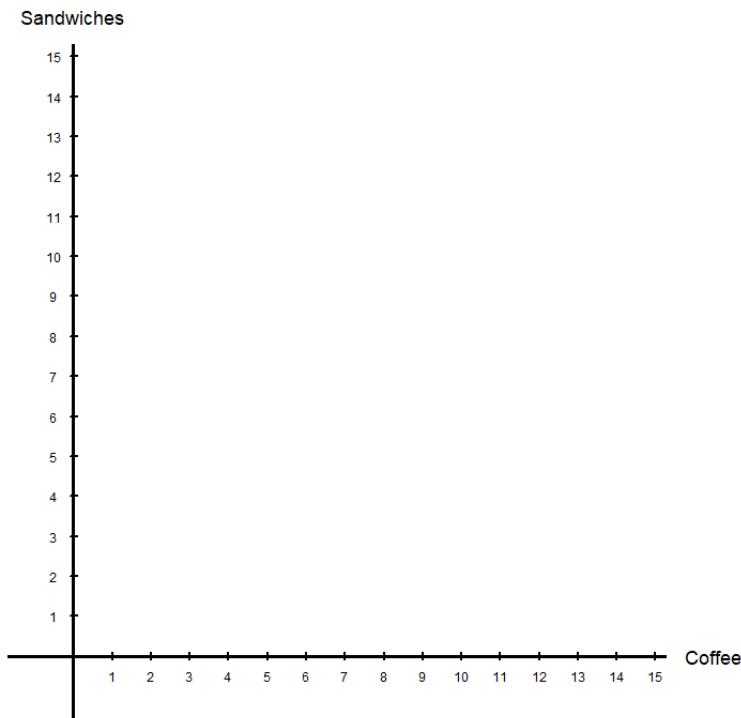
1.H. What is the slope of the budget line?

(Hint: The slope can be calculated as “rise / run.”)

**Problem 2. Changes to the Budget Constraint**

Due to the price of coffee beans increasing, the local cafe decides to increase their prices. Now, a cup of coffee costs \$3, and a sandwich costs \$4, and that you still have \$24 to spend on coffee and sandwiches.

- 2.A. In the empty chart below, plot and label the old (from Problem 1) and new budget constraints.



- 2.B. What happened to the “budget set”?

- 2.C. What is the slope of the new budget line?

**Problem 3. Interpreting the Budget Constraint**

We return to the world before the price increase. A cup of coffee costs \$2, and a sandwich costs \$4, and that you have \$24 to spend on coffee and sandwiches. (Same setup as Problem 1)

- 3.A. You have already placed an order for 2 cups of coffee and 5 sandwiches, spending all of your budget. If you then decide to get one more cup of coffee, how many sandwiches do you have to cancel?  
*(Hint: Assume that you can order “fractions” of coffee or sandwiches!)*

- 3.B. How many sandwiches have “the same worth” as one cup of coffee?

- 3.C. Are you happy with this trade-off? Why? Why not?  
*(Hint: There is no “correct” answer for this one.)*

**Problem 4. Unconventional Budget Constraints Part 1**

Suppose that in a local cafe, a cup of coffee costs \$2, and a sandwich costs \$4, and that you have \$24 to spend on coffee and sandwiches. However, due to overwhelming demand for coffee, the cafe decided to limit the number of cups of coffee that any customer can purchase to 6 cups.

4.A. If you spend all of your money on coffee, how many cups can you purchase?

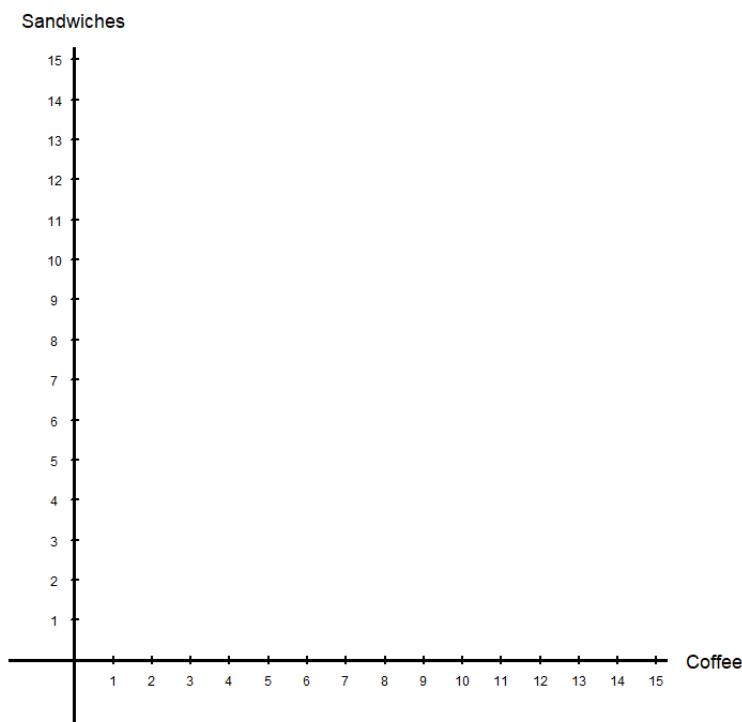
4.B. If you spend all of your money on sandwiches, how many can you purchase?

4.C. Can you purchase 6 cups of coffee and 3 sandwiches?

4.D. Can you purchase 8 cups of coffee and 2 sandwiches?

4.E. Can you purchase 10 cups of coffee and 1 sandwich?

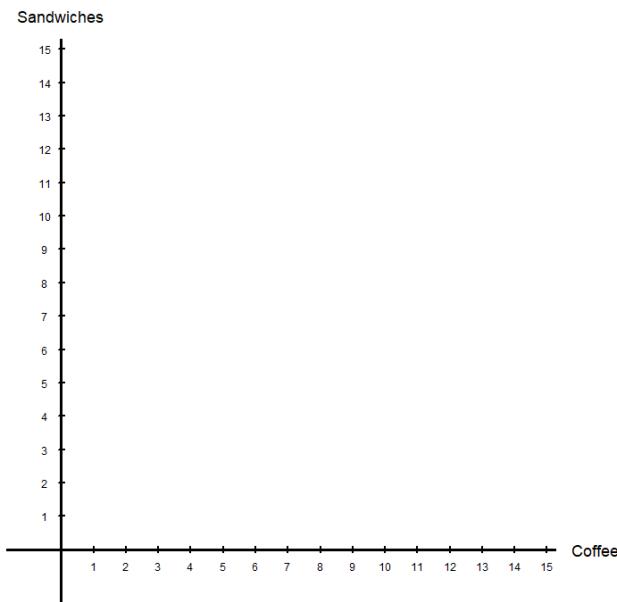
4.F. Using your answers from 4.A. ~ 4.E., plot your budget constraint.



**Problem 5. Unconventional Budget Constraints Part 2**

Suppose that in a local cafe, a cup of coffee costs \$2, and a sandwich costs \$4. Instead of having a budget of \$24, you now have 6 cups of coffee and 3 sandwiches that you can “trade” in the cafe. Since a cup of coffee costs \$2, and a sandwich costs \$4, you can trade in one of your sandwiches for two cups of coffee, or you can trade in one cup of your coffee for half of a sandwich.

5.A. Plot your budget constraint.



5.B. What happens when the price of a cup of coffee rises to \$4?

