ECON 0100
Fall 2023
Midterm 1
October 4, 2023
Time Limit: 60 Minutes

Name (Print): _____

Penn ID number: _____
(8 digits)

- This exam contains 9 pages (including this cover page) and 10 questions. Check to see if any pages are missing.
- The exam is scheduled for 1 hour.
- The total score is 24 points.
- This is a closed-book, closed-note, no calculator exam.
- Answer each multiple-choice question by filling in the bubble for the answer you select. Make sure that the bubble is clearly filled in, or it will be marked incorrect.
- Write your answers to the short answer questions in the spaces provided for them. Do not write your answers outside of the boxes.
- Do not remove any pages or add any pages. No additional paper is supplied
- Show your work when asked. Label all graphs carefully.
- This exam is given under the rules of Penn's Honor system.

My signature certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination.

Please sign here _____ Date _____

Multiple Choice Questions (best 7 out of 8: 10.5 points)

1. (1½ points) Jonesy spent 100 gold on a Med Mist that he values at the same price. The Med Mist is resellable at 50% of its face value. Upon arriving at Frenzy Farms, Remedy gives him three options:

   (*i*) Keep the Med Mist

   (*ii*) Keep the Med Mist and spend 400 gold on a Slurp Juice, which he values at 600 gold

   (*iii*) Give up the Med Mist and spend 700 gold on a Chug Cannon, which he values at 900 gold

   What is the opportunity cost of option (*i*)?

   ◯ 100 gold
   ◯ 200 gold
   ◯ 250 gold
   √ **300 gold**

2. (1½ points) Amanda has the following preferences: she gets the same additional satisfaction from one espresso cup as she does from 3 cups of green tea.

   Which of the following is correct?

   I. Amanda will only buy the cheaper good.

   II. Her marginal rate of substitution between the two goods is constant.

   ◯ I. only
   √ **II. only**
   ◯ Both I. and II.
   ◯ Neither I. nor II.

3. (1½ points) Eric is a firm believer that "one apple a day keeps the doctor away", so he buys 7 apples per week at a price of $1 per apple. To his great dismay, this week the price was up to $2 per apple, so he decided that the saying just applied to weekdays and purchased 5 apples.

   What is his price elasticity of demand for apples between these two prices?

   ◯ -2
   ◯ $-3/2$
   √ $-1/2$
   ◯ $-1/3$

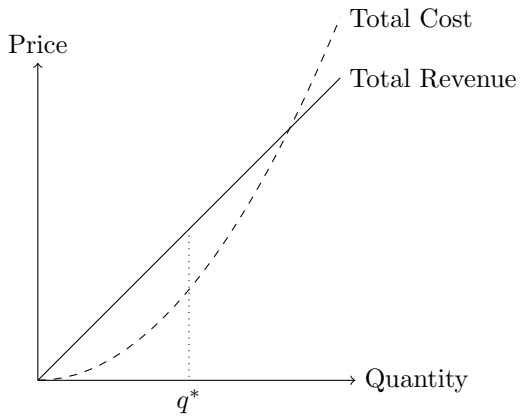
4. (1½ points) Homer only consumes two goods: beer and donuts. Suppose that donuts are an inferior good for Homer. Which of the following statements can be true for Homer?

   I. Beer and donuts are complements

II. Donuts are an ordinary good

- ◯ I. only
- √ **II. only**
- ◯ Both I. and II.
- ◯ Neither I. nor II.

5. (1½ points) Consider the figure below.



Which of the following can we conclude from the figure?

- ◯ The firm is in a short run equilibrium of a monopolistically competitive market.
- √ **The firm is in a short run equilibrium of a perfectly competitive market.**
- ◯ The firm is in a long run equilibrium of a monopolistically competitive market.
- ◯ The firm is in a long run equilibrium of a perfectly competitive market.

6. (1½ points) Sam is opening a cheesesteak restaurant in Philadelphia, Sam's Steaks. He prides himself in offering top-quality cheesesteaks made with fresh, local ingredients to distinguish himself from his competitors. He pays a weekly rent of \$300 for his storefront and faces a constant marginal cost $MC = \$10$. His weekly inverse demand is $P = 20 - 0.1q$. He has already signed his lease until the end of the year. Which of the following is true?

- ◯ He should shut down in the short-run and not renew his lease at the end of the year.
- ◯ He should operate in the short-run and renew his lease at the end of the year.
- √ **He should operate in the short-run and not renew his lease at the end of the year.**
- ◯ He generates positive profits in the long run.

7. (1½ points) Sheila has a small peach orchard in rural Pennsylvania. Every Saturday she sells her locally grown peaches at the Rittenhouse Farmer's Market along with multiple other peach vendors. The farmer's market demand and supply for peaches are given by $Q_D = 8000 - 3200P$ and $Q_S = 800P$. Assume all vendors face the same marginal cost is $MC = 0.1q$ and average variable cost $AVC = 0.05q$, and that the cost of renting a stall is \$40.

In the short-run equilibrium, how many total peach vendors are there, and what should Sheila do?

◯ There are 8 total peach vendors and Sheila should sell 200 peaches.

√ **There are 80 total peach vendors and Sheila should sell 20 peaches.**

◯ There are 8 total peach vendors and Sheila will sell 1200 peaches.

◯ There are 80 total peach vendors and Sheila should shut down.

8. (1½ points) Suppose the perfectly competitive market for carpets in Philadelphia is in the long run equilibrium. Following flooding in the dorms, Penn decides to buy a large stock of carpet for the affected rooms. Which of the following is true in the short-run?

◯ Price of carpets will rise.

◯ Market quantity is higher.

◯ Firms' profits are positive

√ **All of the above.**

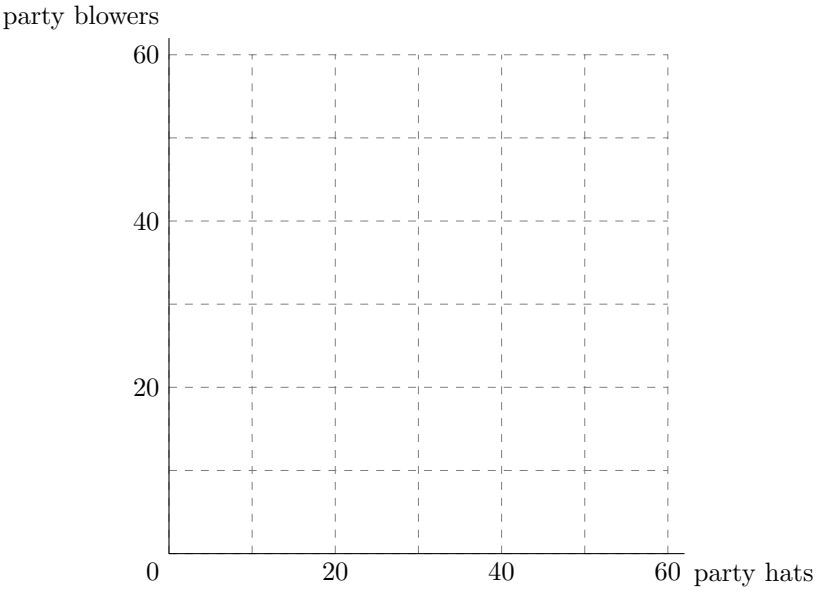
Short Answer Questions (13.5 points total)

To get any point you must show your work

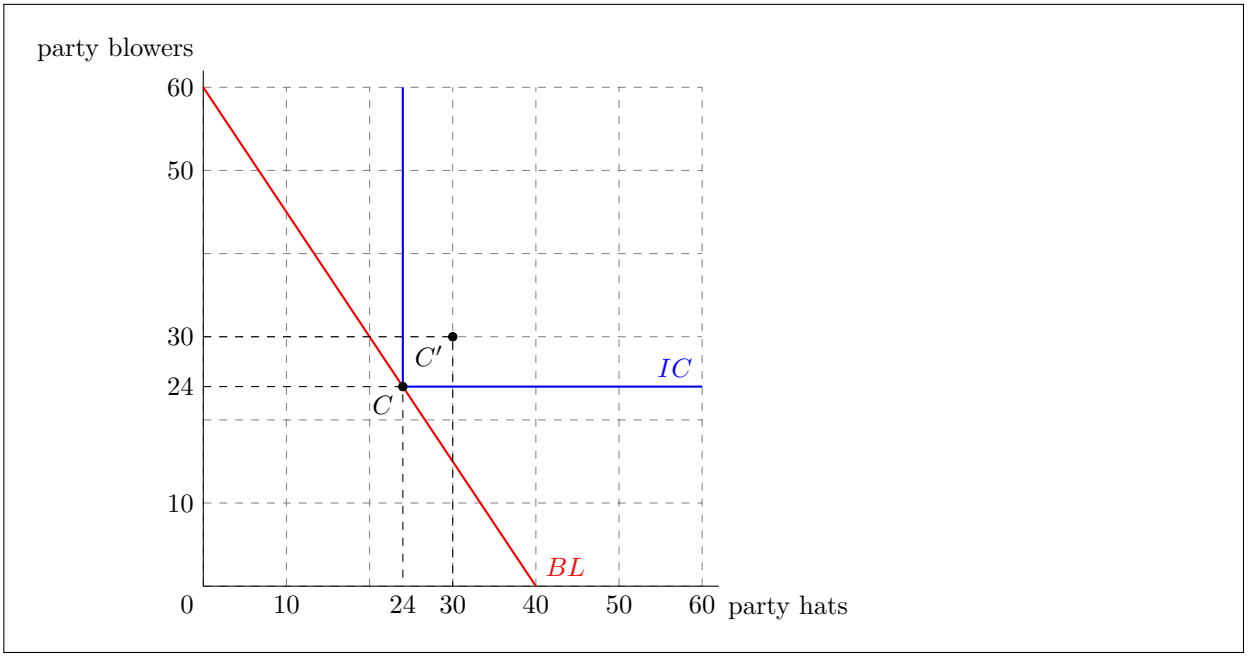
9. Javiera is hosting a small party at her house. She wants to give party bags to her guest, with one party hat and one party blower per bag. Her total income is \$120. There is a party store in her neighborhood where the price of a hat is \$3 and the price of a blower is \$2.

   (a) In the graph below:

   - Draw Javiera's budget line, label it BL and label its intercepts.
   - Label her optimal consumption bundle C and label its x-and y- coordinates
   - Draw the indifference curve that is consistent with her optimal choice and label it IC.



Solution:
Javiera's budget line's equation is $Y = \frac{\text{income}}{P_Y} - \frac{P_X}{P_Y}X$, i.e. $Y = 60 - \frac{3}{2}X$.



(b) Given her budget constraint and preferences, Javiera will be able to make **24** party bags.

(c) Javiera's friend tells about another party store, that sells pre-packed party bags with 1 hat and 1 blower in each, for \$4 per bag.

i. If Javiera goes to that store, she will buy **30** party bags.

ii. On the graph from part (a), label her new optimal consumption bundle C' and label its x-and y-coordinates.

iii. Comparing Javiera's total expenditure with and without the store's special offer, what can you conclude about the elasticity of her demand for party bags? Explain in the box below.

Solution: Her total expenditure on party bags stays the same, at \$120, so her demand is unit-inelastic. Another method is to calculate the price elasticity of demand: $\epsilon_D = \frac{\%\Delta Q_D}{\%\Delta P} = \frac{(30-24)/27}{(4-5)/4.5} = -1$.

(d) Unfortunately, the store her friend told her about is on the other side of town. The cab ride there and back costs \$20 total. Is it worth paying the cab ride, or should Javiera go to her neighborhood store instead? Please explain in the box below.

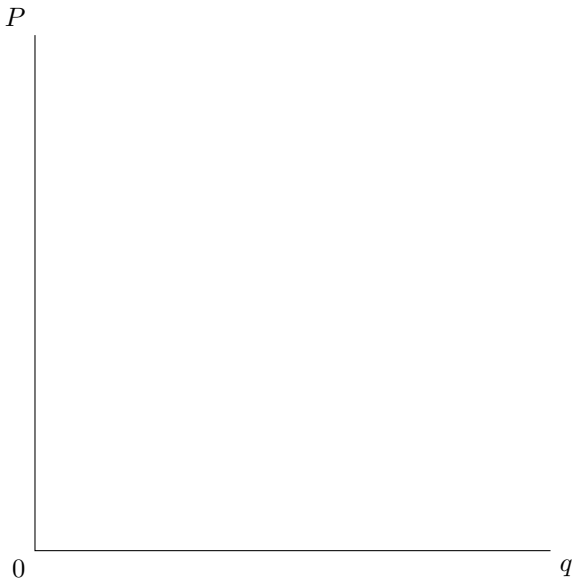
Solution: If Javiera pays the cab ride, her remaining income is \$100. She can buy 25 party bags, which is more than what she can buy at the neighborhood store.

(e) Cab drivers are on strike, so Javiera has no choice but to go to her neighborhood store. To her surprise, there is a special "buy one, get one free" offer on party blowers.

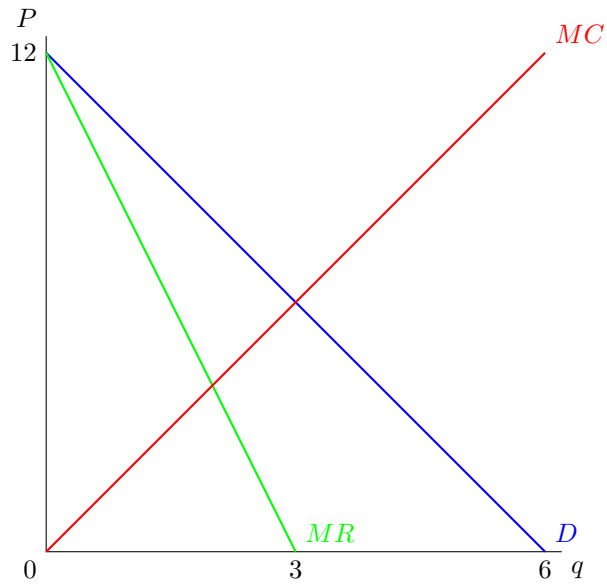
Javiera will be able to make _____**30**_____ party bags.

10. Consider a firm in the monopolistically competitive market for daily U.S. newspapers. The firm faces an inverse demand curve given by: $P = 12 - 2q$, where the quantity q is measured in millions and the price P is measured in dollars. The total cost function of the firm is given by $TC(q) = q^2 + 5$ and the marginal cost is given by $MC(q) = 2q$.

(a) In the graph below, draw the firm's demand function, marginal revenue and marginal cost. Make sure to label each curve and each intercept.



Solution:



(b) To maximize its profit, the firm should:

- Produce a quantity $q =$ **2** million copies.
- Charge a price $P =$ **8** dollars per copy.

(c) At the firm's equilibrium:

- Producer surplus is $PS =$ **12** million dollars.
- Consumer surplus is $CS =$ **4** million dollars.
- The firm's markup is equal to **1** dollars per copy.

Solution: Profit is maximized when $MR = MC$. From the demand curve given, we know that marginal revenue should be given by: $MR = 12 - 4q$. Then, $MR = MC$ can be solved to obtain the quantity at which profit is maximized. This is $q = 2$. Plugging this quantity into the inverse demand function we can find the price: $p = 8$. To find the profit we can compute total revenues and total costs and find the difference. Total revenues are given by $P \times q = 16$. In turn, we can plug q in the variable cost function to obtain $VC(2) = 4$. This means that producer surplus is $PS = TR - VC = 12$ million dollars. Consumer surplus is the area below demand above $P = 8$, all the way to $q = 2$: $CS = (12 - 8) \times 2 \times 0.5 = 4$.The markup of the firm is the difference between price and marginal cost, divided by the marginal cost: $(P - MC)/MC = (8 - 4)/4 = 1$

(d) Is the firm producing the efficient quantity? Explain in the box below.

Solution: At $q = 2$, marginal benefit is $MB = 8$ while $MC = 4$: the firm is not producing the efficient quantity, because $MB > MC$.

(e) At the firm's equilibrium, its demand is ___**elastic**___ *(elastic / inelastic / unit-elastic)*

Solution: The profit maximizing price is always in the elastic portion of the demand curve.

(f) At the efficient output, the firm's demand is __**unit-elastic**__ *(elastic / inelastic / unit-elastic)*

Solution: The efficient quantity is such that $MB = MC$, i.e. $12 - 2q = 2q$ so $q_E = 3$. The marginal revenue at that quantity is $MR = 12 - 4 \times 3 = 0$ so demand is unit elastic.

(g) As the market moves to the long-run equilibrium (complete with *higher / lower / the same*):

- The number of newspapers will be ___**higher**___
- The firm's profit will be ___**lower**___
- The firm's markup will be ___**lower**___

Solution: In a monopolistic competitive market, there is free entry. The firm is making a positive economic profit, so in the LR new firms will join the market, until each firm makes zero economic profit, so profit will go down and the firm's markup ($P - MC$) will shrink.