

ECON 001
Spring 2018
Final Exam
May 8, 2018

Time Limit: 120 Minutes

Name (Print): _____

Recitation Section: _____

Name of TA: _____

- This exam contains 13 pages (including this cover page) and 17 questions. Check to see if any pages are missing.
- The exam is scheduled for 2 hours.
- This is a closed-book, closed-note exam, no calculator exam.
- Answer the multiple choice questions by writing the letter of the correct answer on the line provided. Make sure that your answer is clearly written or it will be marked incorrect.
- Write your answers to the other questions in the spaces provided below them. If you don't have enough space, continue on the back of the page and state clearly that you have done so.
- Do not remove any pages or add any pages. No additional paper is supplied
- Show your work. Answers that show no work will receive no credit.
- You must use a pen instead of a pencil to be eligible for remarking.
- 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 _____

Question	Maximum	Grade
MC (Q1-14)	39	
1st SA (Q15)	20	
2nd SA (Q16)	20	
3rd SA (Q17)	21	
Total	100	

Multiple Choice Questions (best 13 out of 14: 39 points)

1. (3 points) Kevin O'Leary (Mr. Wonderful) from Shark Tank is very busy and successful. He must choose how to prioritize his time. If he does an episode of Shark Tank, he must travel to LA, which costs him \$1,000, and he will get paid \$30,000. If he works on one of his businesses at home in Canada, he can make \$60,000 during that time. If he travels to New York to speak at a business conference, it will cost him \$500, and he will get paid \$61,000. What is Mr. Wonderful's opportunity cost of doing an episode of Shark Tank?

A. \$31,000 B. \$59,000 C. \$61,000 D. \$61,500

1. **D**

2. (3 points) Peter, Sarah, Robert and Amanda live on the same island. They can produce chips or cars. The following table shows the number of hours they can work each day and how many chips and cars they produce per hour:

	Peter	Sarah	Robert	Amanda
Hours	8	6	4	6
Chips per hour	3	6	2	3
Cars per hour	3.5	2	3	2

_____ has an *absolute* advantage at producing *chips*; _____ has a *comparative* advantage at producing *cars*.

A. Sarah; Sarah B. Sarah; Robert C. Robert; Sarah D. Robert; Robert

2. **B**

3. (3 points) Which of the following statements is true?
- A. Price Elasticity of Demand is positive for most goods
 B. Cross price elasticity is negative for complements
 C. Income elasticity is negative for normal goods
 D. Price Elasticity of Supply always ranges from 0 to 1

3. **B**

4. (3 points) Rainy island was previously a closed economy. The demand for umbrella is $P = 30 - 2Q_D$, the supply for umbrellas is $P = Q_S$. The unit for quantity is pair. Now Rainy island opens to global trade. The price of each umbrella on the global market is \$14. How many umbrellas will Rainy island import or export?

A. Import; 14 B. Export; 14 C. Import; 6 D. Export; 6

4. **D**

5. (3 points) Suppose you own a cellphone company that is the only one cellphone producer in a market. There is an increase in labor wage level that makes cellphone production costlier. Compared to before, what will happen to the total revenue of the firm?

- A. Increase B. Not change C. Decrease D. Not enough information

5. **C**

6. (3 points) Consider a monopoly that engages in perfect price discrimination. Which of the following statements is true about the level of output that the perfectly price discriminating monopolist produces at?

- A. It is the same output produced in the perfectly competitive market
 B. It is the same output produced when single-price monopolistic that faces average cost pricing
 C. Both A and B are true D. Both A and B are false

6. **A**

7. (3 points) A single price monopoly faces a linear downward sloping demand curve and a constant positive marginal cost. The monopoly is currently selling 100 units of the good a price of \$5. The government worried that the market is trading at an inefficient quantity, provides the firm with a lump-sum subsidy of \$5000. Which of the following is a result of the lump sum subsidy?

- I. The monopoly's profit increases
 II. More units of the good are traded
 III. The Deadweight Loss increases
- A. I only B. II only C. III only D. I and II
 E. II and III F. I and III G. I, II and III H. None

7. **A**

8. (3 points) In the game below, the row player can play top (T) or bottom (B) while the column player can play left (L) or right (R). In each cell the row player gets the first payoff and the column player gets the second payoff.

	L	R
T	1, 1	3, 0
B	0, 3	x, x

In which case does this game have a unique Nash Equilibrium that is not the Pareto efficient outcome?

- A. $x = 4$ B. $x = 2$ C. $x = 0$ D. None of the above

8. **B**

9. (3 points) Since apples are so high in nutritional density, they generate a positive externality for consumers. Suppose that the government wants to provide a per-unit subsidy to apple farmers in order to achieve the socially efficient consumption of apples. Assume that the demand in the market for apples is perfectly inelastic and supply is upward sloping. Which of the following statements is true regarding the implementation of this subsidy?

- I. Quantity of apples consumed increases
 II. The price paid by consumers decreases

III. The price received by apple farmers decreases

- A. Only I B. Only II C. Only III D. I and II E. I and III F. I, II and III G. None

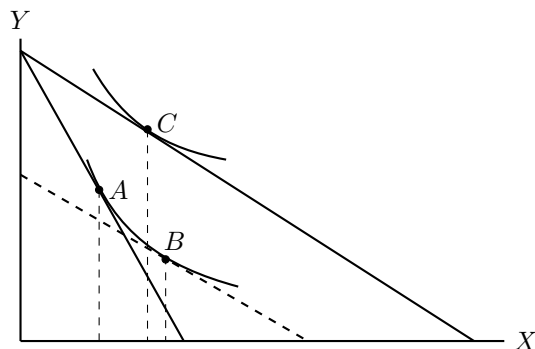
9. **B**

10. (3 points) James Clarkson is an environmentalist that argues that in order to reduce the pollution created by cars, we would need to replace all cars with electric vehicles. His friend, Jeremy Hammond, disagrees and says there are other ways of decreasing pollution without replacing all cars. Which of the following is NOT one of these ways?

- A. A per unit tax per gallon of petrol
 B. Nationalizing the car industry, making it a monopoly
 C. Impose an effective price ceiling on public transportation
 D. Nationalizing the ride sharing industry, making it a monopoly

10. **D**

11. (3 points) As shown on the graph below, when the price of good X falls, the consumer moves from consumption point A to consumption point C. The change from A to B shows the substitution effect and the change from B to C shows the income effect.



What type of goods are X and Y?

- A. X is a normal good and Y is a normal good B. X is a normal good and Y is an inferior good
 C. X is an inferior good and Y is a normal good D. X is an inferior good and Y is an inferior good

11. **C**

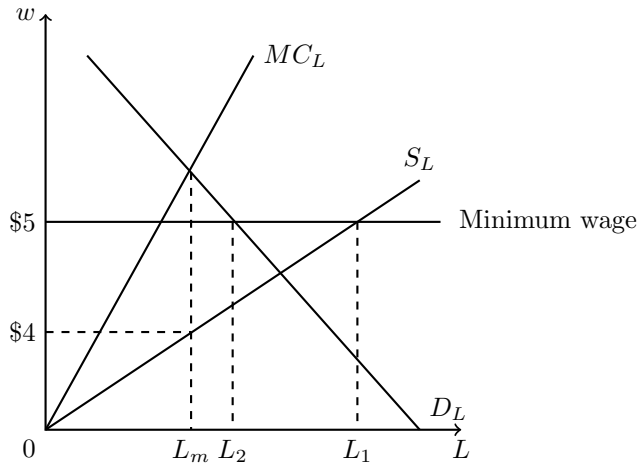
12. (3 points) Rachel can either spend her time working as a buyer for Ralph Lauren or hanging out in her friend's apartment. Rachel's boss is so impressed with her work that he decides to promote her to Merchandising Manager, which results in a huge raise for Rachel. After getting that raise, Rachel decides to spend less time on work and more time on leisure. Which of the following statements is true regarding Rachel's preferences for labor and leisure?

- A. Leisure must be a normal good for which the income effect outweighs the substitution effect
 B. Leisure must be an inferior good for which the income effect outweighs the substitution effect
 C. Leisure must be an inferior good for which the substitution effect outweighs the income effect

- D. Leisure must be a normal good for which the substitution effect outweighs the income effect
- E. None of the above

12. **A**

13. (3 points) A monopsonistic labor market is currently in equilibrium. Suppose the government places a minimum wage at the level shown below. What can be concluded?



- I. The market is efficient
 - II. There is a shortage of labor
 - III. There is unemployment
 - IV. More workers are employed
- A. I B. I and IV C. III D. III and IV

13. **D**

14. (3 points) Intel is a *monopoly* in the market for processors. The market demand for processors is $P = 100 - Q$. The marginal cost of producing processors is $MC = 3Q$. Intel needs to hire workers on the labor market. Marginal productivity of labor is $MP_L = 10 - 0.1L$. Suppose the equilibrium wage is \$300. How many workers will Intel hire?

- A. 50 B. 60 C. 70 D. 125

14. **A**

Short Answer Questions (61 points total)

To get any point you must show your work.

15. Cary is a city that only has one producer and seller of strawberries called Dale and Sons. Dale and Sons hires farmers in Cary to produce the strawberries, and it is the only firm that hires farmers in Cary. Assume that in the market for strawberries, demand is downward sloping and marginal cost is upward sloping. Assume that in the market for farmers, the labor demand is downward sloping and the labor supply is upward sloping.

- (a) What sort of labor market is the labor market for farmers in Cary? Why is the Marginal Cost of labor above the labor supply in this market?

Solution: The market is a monopsony. The marginal cost is above supply because in order to hire one more worker the firm must increase the wage, even to workers who are already hired.

- (b) Plot the labor market for farmers and the product market for strawberries below. Label the wage w and employment L level in the market for farmers, and the equilibrium price P and quantity Q of strawberries. Be sure to label all of the curves. Label the deadweight loss in each market (if any) and unemployment in the farmers market (if any).

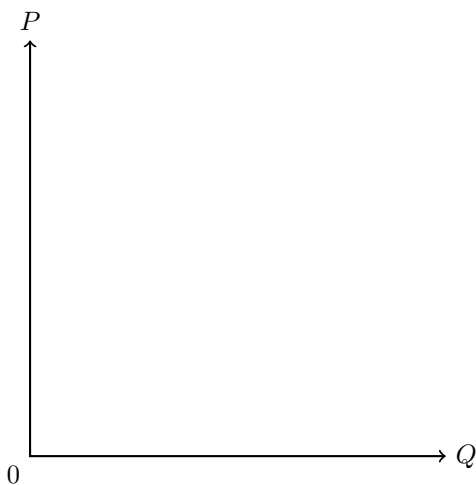


Figure 1: Market for strawberries

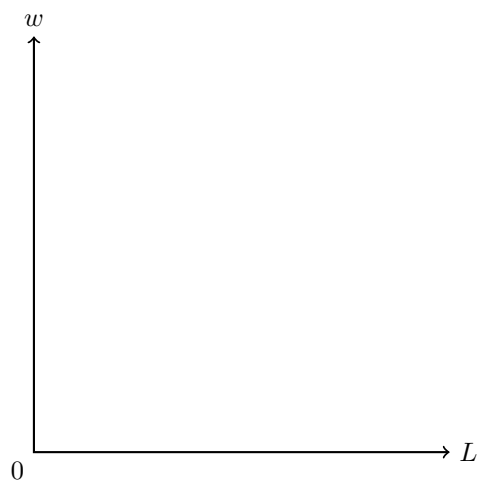
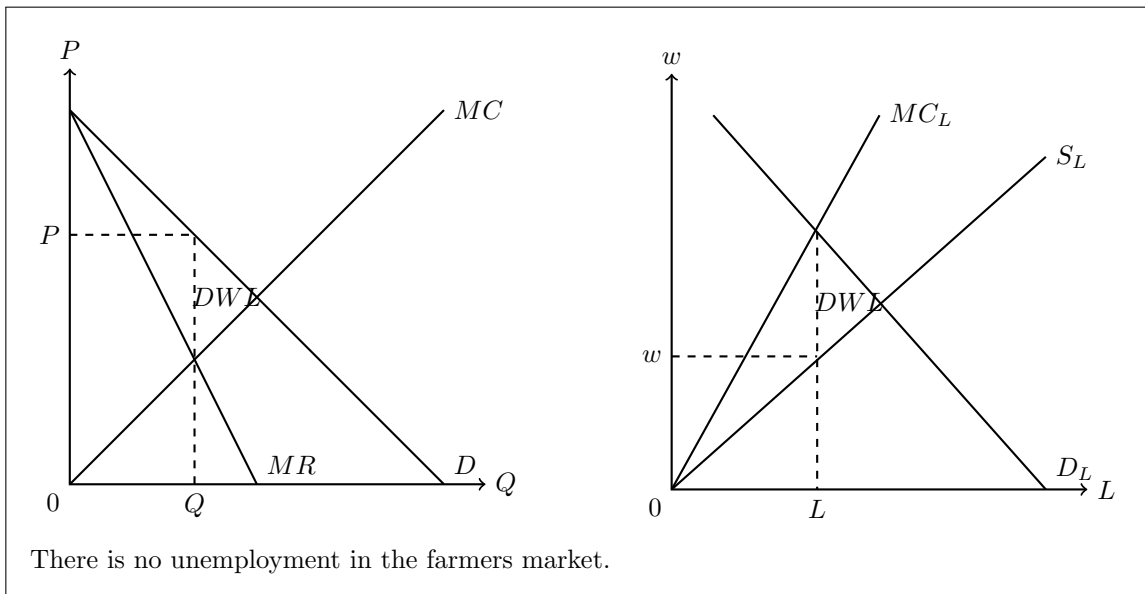


Figure 2: Market for farmers

Solution:



- (c) The mayor of Cary is concerned that the level of employment in the market for farmers is inefficient. He is considering imposing a minimum wage. You are the Cary Economics Advisor so the mayor asks for your advice. Can a minimum wage increase employment and reduce the inefficiency? Why or why not? Explain how it might affect the strawberry market. *Note: You can ignore the feedback effect.*

Solution: In a monopsony market, a minimum wage can increase employment and reduce the inefficiency if it is set between the monopsony wage and the wage where D_L and MC_L intersect. In this range, the minimum wage increases employment, which gets closer to the efficient (perfectly competitive) employment, so the deadweight loss shrinks. The inefficiency (and the DWL) even disappears and the minimum wage leads to efficiency if it is set at the perfectly competitive wage.

The impact of the minimum wage is an increase in the wage, which implies that the marginal cost of producing strawberries increases. Therefore the MC of strawberries shifts up, which increases the price of strawberries and decreases the quantity sold.

Now assume that there are many farms in Cary, that all take the strawberry price as given and that all hire farmers at a given wage of \$10. This will be true for the rest of the question.

- (d) The mayor's constituents are asking him to institute a minimum wage of \$15. What will this do to the wage, employment and unemployment? What will it do to the efficiency of the labor market? Explain.

Solution: A minimum wage at \$15 will be effective, and will increase the wage, create unemployment and reduce the level of employment. It will be inefficient as the level of employment moves away from the efficient employment and it creates a DWL.

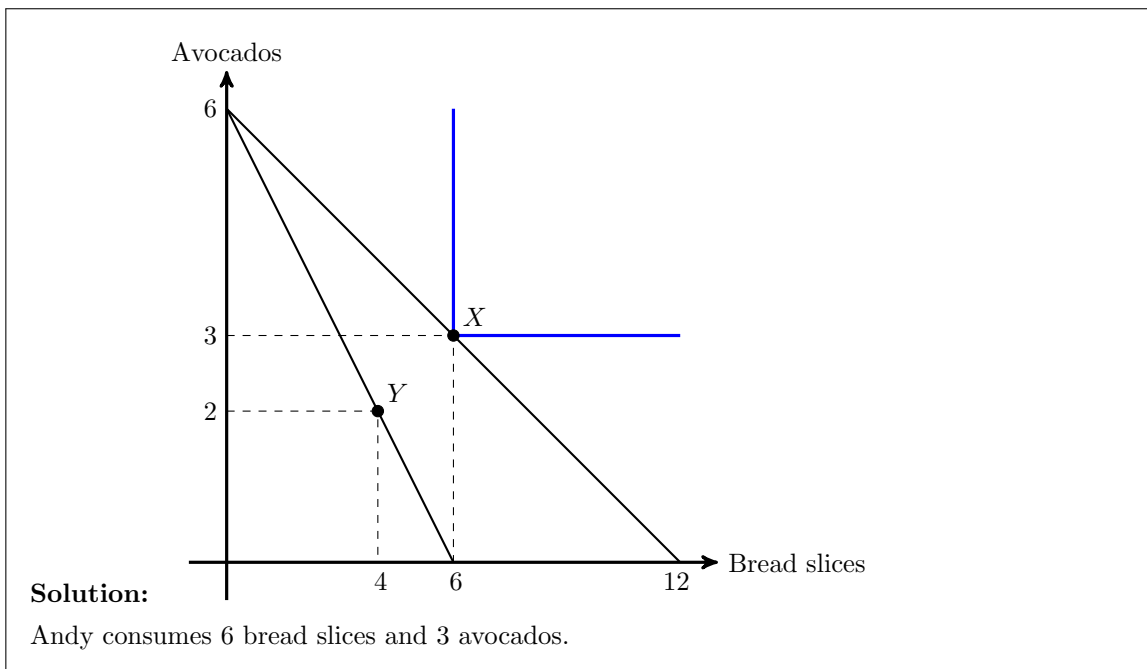
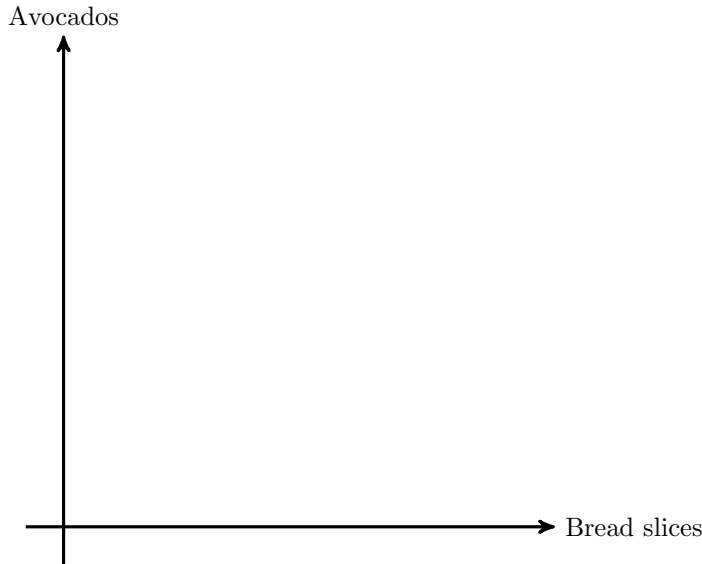
- (e) Another advisor suggests that instead of imposing an effective price floor in the market for farmers, the mayor should impose an effective price floor in the market for strawberries. Describe how that

policy would impact both markets in terms of efficiency. *Note: You can ignore the feedback effect.*

Solution: An effective price floor in the market for strawberries would increase the price of strawberries. That would rotate out the demand for farmers and increase the wage of farmers. The market for farmers would still be efficient, as the level of employment would still be such that D_L intersects S_L . However it would create excess supply and would lead to inefficiency and a DWL in the strawberry market.

16. Suppose Andy prefers to have avocado and bread together. He only likes to have it in the ratio: for every two slices of bread, he has 1 avocado. Assume the price of an avocado is $P_a = \$2$ and the price of a slice of bread is $P_b = \$1$. Andy's income is \$12.

- (a) On the graph below, label Andy's optimal consumption point X , and draw the indifference curve going through X well as the budget line. How many avocados and bread slices does Andy consume at the optimal consumption point? *Note: feel free to draw more than one indifference curve if it helps.*



- (b) Suppose price of a slice of bread goes up to \$2 due to a bad wheat crop. This will be true for the remainder of the question.

- i. On the graph from part (a), draw the new budget line and label the new optimal consumption point Y . How many avocados and bread slices does Andy consume at the new optimal consumption point?

Solution: The new budget line is has a y-intercept of 6 and an x-intercept of 6. At the new optimal consumption point Andy consumes 4 bread slices and 2 avocados.

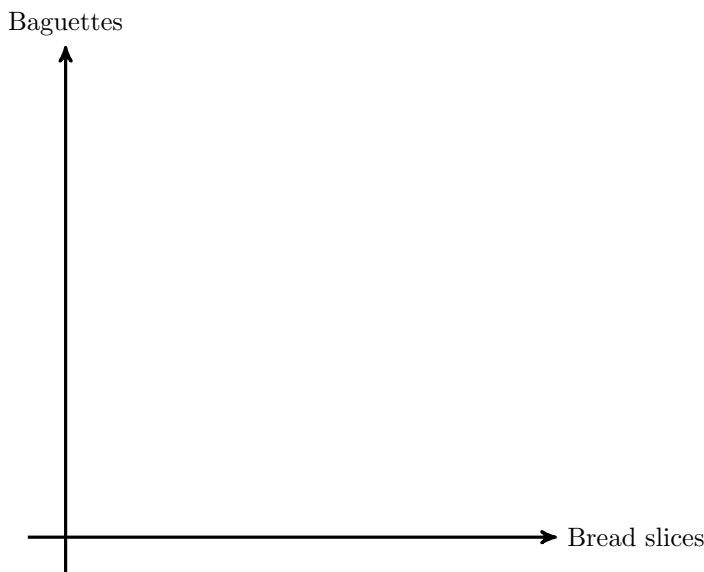
- ii. Between a price of \$1 and a price of \$2 a slice, is the demand for bread elastic or inelastic? Explain.

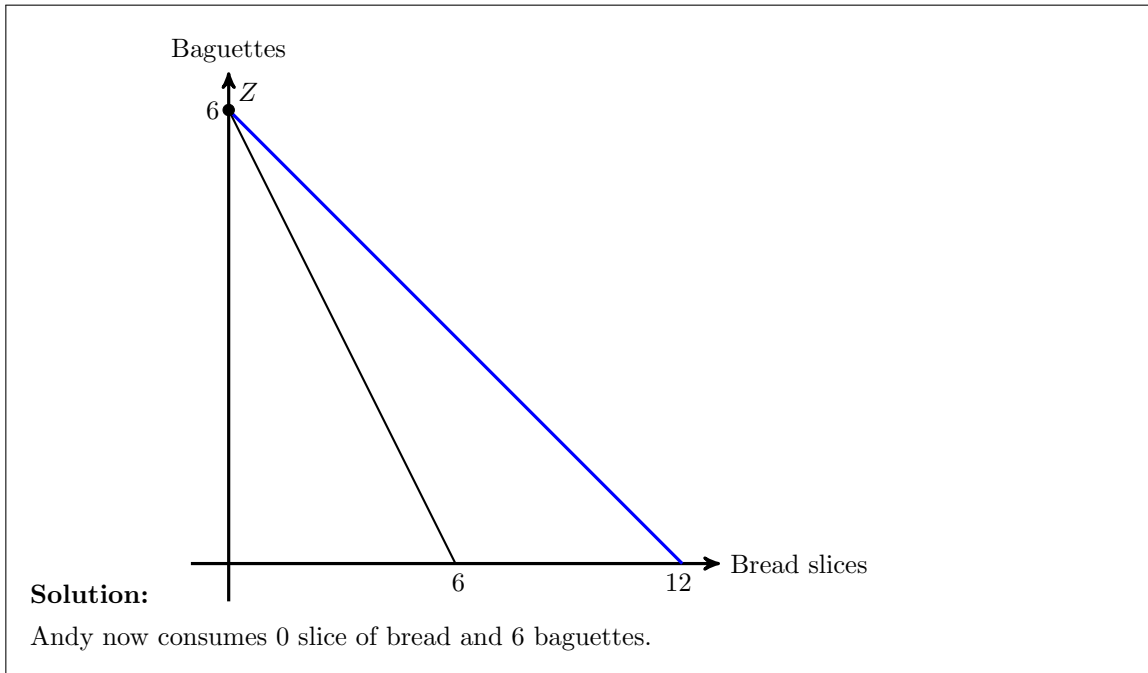
Solution: The percentage change in price is $\Delta P = (2 - 1)/1.5 = 2/3$. The percentage change in quantity is $\Delta Q = (6 - 4)/5 = -0.4$. The price elasticity of demand for bread is $\epsilon_P = 0.4/(2/3) = 0.6 < 1$ so the demand for bread is inelastic.

- iii. As the price of bread increases, Andy decreases his bread consumption. How much of that decrease is due to the income effect, and how much is due to the substitution effect? Explain.

Solution: As bread and avocados are perfect complements, there is no substitution effect: Andy does not substitute between the two goods. Therefore, the entire decrease in bread consumption is due to the income effect.

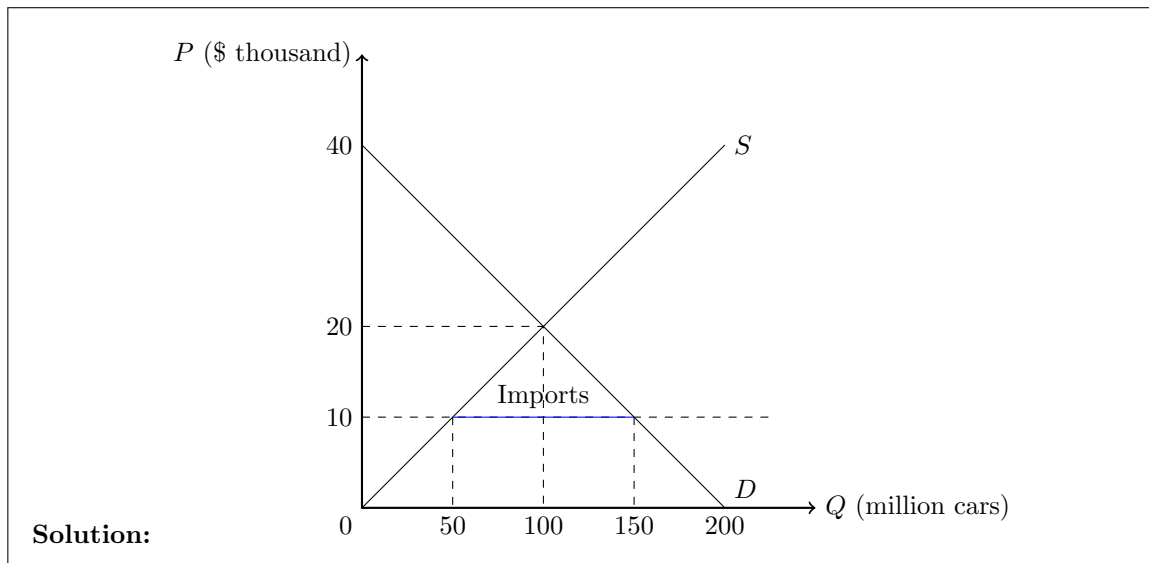
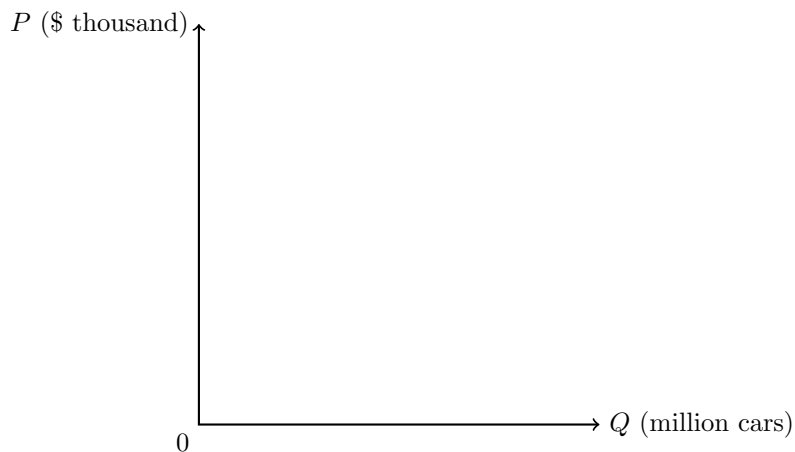
- (c) The store where Andy shops is now out of avocados, but offers two types of bread: sliced bread and baguette. Two slices of bread give Andy exactly the same level of utility as 1 baguette. Assume the price of a slice of bread is \$2 and the price of a baguette is \$2. Andy's income is still \$12. On the graph below, label Andy's optimal consumption point Z , and draw the indifference curve going through Z well as the budget line. How many baguettes and bread slices does Andy consume at the optimal consumption point?





17. After World War II, the US converted much of their armament manufacturing plants into factories that produced consumer goods such as automobiles. Suppose during this period, the market for cars was perfectly competitive, with the supply given by $P = Q/5$, and the demand given by $P = 40 - Q/5$, where P is price of a car (in thousand dollars) and Q is the number of cars per year (in millions).

- (a) On the graph below, draw the supply and demand for cars, and calculate and plot the equilibrium price and quantity of cars in the US market during this period. Be sure to label your graph.



After the occupation of Japan and the Korean War ended in the 1950s, automobile manufacturing became a driving force for growth and development in East Asia.

- (b) Suppose the price of a car coming out of East Asia was \$10 thousands, which could be freely imported into the US and no matter how many was imported the price would stay the same.
- i. At this new price, what is the quantity of cars supplied by domestic producers, what is the quantity of cars demanded by domestic consumers?

Solution: The domestic quantity supplied is 50 million cars and the domestic quantity demanded is 150 million cars.

- ii. How many cars does the US import? Show imports on the graph you drew in part (a).

Solution: The number of cars imported is $150 - 50 = 100$ million. See graph in part (a).

- iii. Do domestic producers and consumers benefit from these imports? Explain. *No calculation needed.*

Solution: Domestic producers now sell a lower quantity (50 instead of 100 million cars) at a lower price (\$10,000 instead of \$20,000) so they are worse off. Domestic consumers now buy a larger quantity (150 instead of 100 million cars) at a lower price (\$10,000 instead of \$20,000) so they are better off.

- (c) After the global financial crisis in 2008, the US saw the rise of popular political candidates, like Senator Bernie Sanders and President Donald Trump, who were cynical of the benefit of international trade. Suppose that to protect the domestic car industry, the US government decides to ban car imports, so the market is back to its initial situation from part (a). Consumer lobbies complain that this will increase car prices, so the government decides to also subsidize the car industry.

- i. What is the per-unit subsidy that the government should grant to guarantee that consumers will be just as well off as before the import ban?

Solution: The per-unit subsidy will shift supply down or demand up by the subsidy, so that the new equilibrium quantity is such that $40 - Q/5 + s = Q/5$. For that quantity to be 150, the subsidy must be equal to \$20,000.

- ii. With that subsidy, what are the price paid by consumers and the price received by producers?

Solution: The price paid by consumers is \$10,000 and the price received by producers is \$30,000.

- iii. What is the total government expenditure with the subsidy?

Solution: The government expenditure is $\$20,000 \times 150\text{million} = 3\text{trillion}$

- iv. Suppose you work at the Council of Economic Advisers. Based on the criteria of efficiency and equity, compare the two policies.

Solution: Different answers are possible here. The answer should mention that

- In terms of efficiency, the policy from part (c) is inefficient and creates a DWL.
- In terms of equity, domestic consumer surplus is the same with both policies but domestic producer surplus is higher with the ban/subsidy.

If we focus on efficiency, imports as in part (b) may be preferred. But if you want to favor domestic producers, the policy from part (c) may be preferred.