Intermediate Microeconomics: Interactive Question Bank

Intermediate Microeconomics: Interactive Question Bank

ZHEN HE

Contents

This open resource question bank provides problem sets for students of Intermediate Microeconomics I (Econ2Z03). Questions are also created using H5P, which will allow students to check their understanding of theories efficiently. This question bank can be a supplementary resource for instructors to create interactive quizzes, assignments, exams, and discussion questions. Questions included in this book are revised and edited based on group assignments of Econ2Z03 (C01 & C02, Fall term 2020; and C02, Winter term 2021), Department of Economics, McMaster University.

   This book provides problem sets related to the following topics: demand and supply, consumer theory, theory of firm and production, price and output determination under competition and monopoly, and market power analysis.

Acknowledgements

Questions included in this book are revised and edited based on group assignments of Econ2Z03 (C01 & C02, Fall term 2020; and C02, Winter term 2021), Department of Economics, McMaster University. The author would like to thank the following students and 19 anonymous contributors.

Afzaal, Maham	Jeevahan, Abarna	Tomer, Isha
Alayche, Ahmad	Jiang, Beier	Tran, Jennifer
Alexander, Tyrell	Khan, Shadman	Tsilfidis, Hannah
Anand, Sandhya	Kim, Joshua	Van Den Enden, Audrey
Aslam, Ismail	Lazdins, Quincy	Van Paassen, Robin
Badzioch, Robert	Li, Zhilin	Wang, Maggie
Bi, Jiatong	Liu, Bonnie	Wu, Vicky
Burman, Gagan	Madziak, Ian	Yang, Zhichao
Chen, Justin	Marcelline, Chanel	Ygonia, Marius
Chen, Xinyu	Markous, Rita	Zeng, Steven
Comlekcier, Megan	McIsaac, Jack	Zhang, Gina
Da Silva, Cristina	Mpofu, Cyril	Zhang, Isaac
Fairfield, Jacob	Nadeem, Faris	Zhao, Jingqi
Fusch, Kira	Patel, Krupa	Zhao, Zhe
Gaudet, Thomas	Qi, Cecilia	Zhou, Qian
Giudice, Matthew	Qu, Shangyu	Zhou, Tiffany
Gorchinsky, Aidan	Ren, Selina	Zia, Narmeen
Goyal, Hiya	Repatacodo, Dave Collins	
Gu, Yunming	Ridge, Katherine	
Ha, Eun Soo	Roane, Matthew	
Hastavaram, Vaishnavi	Shi, Aileen	
Heckman, Margaret	Sison, Fatima	
Huang, Chengyu	Smith, Thomas	
Isazadeh, Fatemeh	Sun, Sam	

Topic 1: Supply and Demand

Topic 1 Practice Questions

(Credit: Elekes Andor/ Wikimedia Commons/ CC BY-SA 4.0)

1. Consider the cell phone market. Technological improvements have reduced the costs to produce cell phones. Successful advertising campaigns launched by cell phone companies have made more people want to buy cell phones. The equilibrium price of cell phones will _____.

        A) increase

        B) decrease

        C) stay the same

        D) be ambiguous

Correct Answer: D

Explanation:

- A reduction in production costs will cause a rightward shift of the supply curve.
- Successful advertising campaigns will cause the demand for cell phones to shift to the right.
- With supply and demand increasing, the impact on the equilibrium price will be ambiguous as it will depend on which curve shifts further to the right.

2. Assume that, at current prices, the cross-price elasticity of the demand for Goods A and B is -0.6. When the price of A increases, with other factors remaining the same,_____.

        A) the demand curve for B will shift to the right
        B) the demand curve for B will shift to the left
        C) the demand curve for B will remain the same
        D) the supply curve for B will shift to the right

Correct Answer: B
Hint:

- Since the cross-price elasticity of the demand for Goods A and B is negative, the two goods are implied to be complements.
- When the price of A increases, the demand for B will decrease.

3.
The demand for labour is: $Q_d = 120 - 4P$
The supply of labour is: $Q_s = 30 + 2P$
Now, suppose the government imposes a minimum wage of $20 per hour. This policy represents a _____.

        A) non-binding price floor
        B) binding price ceiling
        C) non-binding price ceiling
        D) binding price floor

Correct Answer: D
Explanation:
Set $Q_d = Q_s$. When the market clears, P = $15.
The minimum wage is set at $20, which is higher than the equilibrium wage.
This policy is considered a binding price floor.

4.
The demand for phones is: $Q_d = 80 - 2p$
The supply of phones is: $Q_s = 6p + 40$
In the above scenario, the quantity of phones sold at market equilibrium is _____ and
the price elasticity of the supply at market equilibrium is _____.

        A) 5, -1/7
        B) 70, 3/7
        C) 55, 1/7
        D) 40, -3/7

Correct Answer: B

Explanation:

Set $Q_d = Q_s$. $80 - 2p = 6p + 40$, then solve for p

At equilibrium, $p = 5$. $Q = 70$

$Es = (\Delta Q_s/\Delta p)*(p/Q_s) = 6*(5/70) = 3/7$

5. The demand and supply in the market for birthday cakes are given by $Q_d = 90 - 4P$ and $Q_s = 10 + P$, respectively, where P is price measured in dollars. What is the equilibrium price for birthday cakes?

        A) $16

        B) $26

        C) $36

        D) $66

Correct Answer: A

Steps:

Set $Q_d = Q_s$

$90 - 4P = 10 + P$

$90 - 10 = P + 4P$

$80 = 5P$

Solve for P. $P = \$16$

6. Over the past few decades, technological improvements in agriculture have led to significantly higher efficiencies in the production of soybean. At the same time, numerous health scientists have advocated for the increased consumption of soy milk.

(1) How will these changes affect the demand and supply of soy milk?

(2) True or False: Assume the demand curve shifts further to the right than the supply curve. We will observe an unambiguous decrease in the price of soy milk and an unambiguous increase in the quantity of soy milk.

Answer:

(1) Both the demand and supply curves will shift to the right.

(2) False. In this scenario, both the equilibrium price and the quantity of soy milk will increase unambiguously.

7. Which of the following scenarios would NOT cause a shift in the demand curve for iPhones?

        A) The price for Android phones decreases

        B) The price for Android phones increases

        C) The price to manufacture iPhones increases

        D) A new research study reveals that smartphones may have negative effects on your future health

Correct Answer: C

Explanation:

All of these scenarios cause the demand curve to shift, except for option C. When the price for Android phones decreases, the demand curve for iPhones will shift to the left since they are substitutes. So, if the price for Android phones increases, the demand curve for iPhones will shift to the right. And if a study proves that all smartphones have negative effects on people's health, fewer people would want an iPhone, causing the demand curve to shift to the left. Nevertheless, if the price to manufacture iPhones increases, the supply curve, rather than the demand curve would shift. Manufacturers would supply fewer phones since it is more costly to do so.

8. The cross-price elasticity of demand for buns and burger patties is -0.8. If the price of buns decreases, what will happen to the demand curve and the equilibrium price for burger patties?

        A) Demand curve shifts to the left and equilibrium price decreases

        B) Demand curve remains unchanged and equilibrium price increases

        C) Demand curve shifts to the right and equilibrium price remains unchanged

        D) Both the demand curve and equilibrium price do not change

        E) Demand curve shifts to the right and the equilibrium price increases

Correct Answer: E

Solution:

The cross-price elasticity of demand is negative, which means that the two goods are complements. When the price of one good decreases, the demand curve for the other good shifts to the right. When the demand curve shifts to the right, the equilibrium price increases.

9. A 10% decrease in the price of Good X causes the quantity demanded for X to increase from 100 units to 120 units. How much will the quantity demanded for X fall if the current price increases by 5%?

Correct Answer: The quantity demanded for X will decrease by 10%.

Solution:

Percentage change in Q_d = (120 − 100) / 100 = 20%

When price decreases by 10%

E_d = %change in quantity demanded / %change in price

E_d = (+20%) / (-10%) = -2

E_d = -2

If the current price increases by 5%

E_d = %change in quantity demanded / %change in price

-2 = %change in quantity demanded / (+5%)

Hence, %change in quantity demanded = -10%

10. Suppose two customers exist in the market for scissors and their individual demand curves are:

Jessica's demand for scissors: Q_D = 12 − P

Audrey's demand for scissors: P = 18 − Q_D

The market supply curve is:

Q_S = 4P − 30

Given the above, what is the market equilibrium price of scissors?

        A) $9

        B) $9.5

        C) $10

        D) $10.5

Correct Answer: C

Explanation:

Summing up individual demand, the market demand curve is:

        Q_D = 12 − P +18 − P

        Q_D = 30 − 2P

At equilibrium, Q_D = Q_S

        30 − 2P = 4P − 30

          60 = 6p

$$10 = p$$

Therefore, the equilibrium price is $10

11. In downtown Hamilton, a hotel exists with more than 500 identical rooms. It can accommodate 1,000 people at the same time. Last year, each hotel room price was $150 per night, and on average, 350 rooms were rented out per day. This year, the hotel saw a drop in revenue when the manager made a price change. Now, each room is rented out at $99 per night. As a result, 378 rooms are being rented each day. Calculate the price elasticity of demand.

Answer:

E_d = % Δ in Q_d / % Δ in P

[(378 − 350) / 350] / [(99 − 150) / 150] = −0.08 / 0.34 or −0.2353

12. Assume the demand for face masks is Q_d = 240 − P and the supply of face masks is Q_s = 7P. At P = $25, which of the following statements is true?

        A) There is a surplus of 40 masks

        B) There is a shortage of 40 masks

        C) There is a shortage of 5 masks

        D) There is a surplus of 5 masks

Correct Answer: B

Explanation:

At P = 25, Q_d = 240 − 25 = 215

Q_s = 7*25 = 175

Q_d − Q_s = 40

There is a shortage of 40 masks

13. The market for keto bread clears when P = $10 and Q = 500. Assume the government enforces a price control, mandating that the bread must be sold at a maximum of $5 per loaf. This type of price control is _____, and it will cause a _____ in the market.

        A) Price floor, shortage

        B) Price floor, surplus

        C) Price ceiling, shortage

        D) Price ceiling, surplus

Correct Answer: C

Explanation:

When P is lower than the equilibrium level, Q_d > Q_s, and a shortage will emerge.

14. Which of the following will cause a shift to the left in the supply curve of apple juice?

        A) An increase in the price of apples

        B) A decrease in the price of apple juice

        C) An increase in the price of orange juice

        D) An improvement in the production technology of apple juice

Correct Answer: A

Explanation/Steps:

The production costs of apple juice increase when the price of apples increases, which causes the supply curve of apple juice to shift to the left.

15. Suppose that at equilibrium, the price elasticity of demand for wheat is -1.5 and the price elasticity of supply is 0.5. If the government imposes a price ceiling that is 12% below the equilibrium price, this price constraint will lead to:

        A) A shortage equal to 24% of the equilibrium quantity

        B) A surplus equal to 24% of the equilibrium quantity

        C) A shortage equal to 2.4% of the equilibrium quantity

        D) A surplus equal to 2.4% of the equilibrium quantity

Correct Answer: **A**

Explanation/Steps:

When the price of wheat decreases by 12%, the quantity of wheat demanded will increase by -1.5*(-12%) = 18%, and the quantity of wheat supplied will decrease by 0.5*12% = 6%.

$Q_d - Q_s$ = (18% + 6%) Qe; i.e., 24% of the equilibrium quantity.

16. True or False: When the price of Product A increases by 1%, the quantity of A demanded will decrease by 5%. Therefore, we can infer that the demand for product A is elastic at the current price.

Correct Answer: **True**

Explanation/Steps:

E_d = (-5%) / (+1%) = -5

17. When the demand curve shifts to the right and the supply curve shifts to the left, what will happen to the equilibrium price and quantity?

Correct Answer:

With supply decreasing and demand increasing, the equilibrium price will increase. The impact on the equilibrium quantity will be ambiguous.

18. Assume the price elasticity of the supply for steak is 0.4. If the price of steak increases by 7%, what is the expected change in the quantity of steak supplied in the market?

        A) -2.8%

        B) +2.8%

        C) -28.0%

        D) +28.0%

Correct Answer: **B**

Explanation/Steps:

E_s = (%Δ in Q_s) / (%Δ in P)

%Δ in Q_s = 0.4 * 7% = 2.8%

19. Milk and bread are complements. An increase in the price of milk will cause _____.

        A) the demand for milk to shift to the right

        B) the demand for bread to shift to the left

        C) the quantity of milk demanded to increase

        D) the quantity of bread demanded to increase

Correct Answer: **B**

Topic 1 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-2

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-3

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-4

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-5

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-6

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-7

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-8

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-9

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-10

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-11

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-109

Topic 1 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=55#h5p-12

Topic 2: Consumer Theory

Topic 2 Practice Questions

(Credit: Unknown Photographer/ the U.S. National Cancer Institute/ Public Domain)

1. Suppose the price of a hamburger is $8 and the price of Coke is $3. Assume that the consumer has spent all of his income. If the marginal utility of a hamburger is 32 and the marginal utility of Coke is 15, is the current consumption bundle optimal?

   Correct Answer: No
   Solution:
   $MU_c / P_c = 15 / 3 = 5$
   $MU_h / P_h = 32 / 8 = 4$
   $MU_c / P_c > MU_h / P_h$
   So, this consumer should purchase fewer hamburgers and more Coke.

2. Tony has a utility function of $U(X,Y) = XY$. The price of a t-shirt (denoted by X) is $10, while the price of a coffee

(denoted by Y) is $5. Tony's budget to spend on t-shirts and coffee is $100. Which of the following represents Tony's optimal basket of t-shirts and coffee? (Note: it must maximize his utility given his income).

    A) X = 7, Y = 3
    B) X = 6, Y = 6
    C) X = 5, Y = 10
    D) X = 0, Y = 15
    E) X = 15, Y = 0

Correct Answer: C
Solution:

$U = XY$

$MU_X = Y$

$MU_Y = X$

Tangency condition: $MRS_{X,Y} = P_X / P_Y$

$MRS_{X,Y} = MU_X / MU_Y = Y / X$

$P_X / P_Y = 10 / 5 = 2$

So Y = 2X

Sub Y = 2X into the budget constraint:

$100 = 10X + 5Y$

$100 = 10X + 5(2X)$

$100 = 20X$

X = 5

Y = 2X = 10

3. If two indifference curves for a single consumer cross each other, which assumption about preferences is violated?

    A) Preferences are complete
    B) Diminishing marginal rate of substitution
    C) The goods are perfect substitutes
    D) Transitivity
    E) More is preferred to less

Correct Answer: D

4. Amy spends her income on two goods: x and y. She considers them to be perfect substitutes. Which of the following is correct? (where "I" is the income level.)

    A) If $MRS_{x, y} < P_X / P_Y$, then the optimal allocation of goods is $X = I / P_X$ and Y= 0
    B) If $MRS_{x, y} > P_X / P_Y$, then the optimal allocation of goods is X = 0 and $Y = I / P_Y$
    C) If $MRS_{x, y} = P_X / P_Y$, then there are only two optimal allocations of goods: $X = I / P_X$ and Y = 0; or X = 0
    and $Y = I / P_Y$
    D) If $MRS_{x, y} > P_X / P_Y$, then the optimal allocation of goods is $X = I / P_X$ and Y = 0

Correct Answer: D

5. When Amanda wakes up in the morning, she will either purchase Timbits (T) or a bagel (B). This is represented by the utility function U(T, B) = 15T + 10B.

In addition, the price of a bagel is $2 and the price of Timbits is $0.50 apiece. Amanda has a daily budget of $5 to spend on breakfast. She is planning to purchase 1 Bagel (B) and 6 Timbits (T). Is this allocation of goods utility-maximizing?

    A) No, Amanda should consume Timbits only and no bagels

B) No, Amanda should consume bagels only and no Timbits

C) Yes, since this bundle lies on Amanda's budget line

D) Yes, since $MU_t/P_t = MU_b/P_b$

Correct Answer: A

Solution:

Step 1: Verify that the budget constraint is satisfied.

$I = P_t*T + P_b*B$

$5 = (0.50 * 6) + (2 * 1)$

$5 = 3 + 2$

$5 = 5$

Step 2: Is it utility-maximizing?

$MU_t = 15$

$MU_b = 10$

$MU_t / P_t = 15 / 0.5 = 30$

$MU_b / P_b = 10 / 2 = 5$

$30 > 5$

The current allocation of goods is not optimal. Amanda should consume Timbits only and no bagels.

6. AJ consumes two goods: fries and soda. Suppose that his marginal utility from drinking soda equals $1 / s$, and his marginal utility from consuming fries is $1 / f$. If the price of soda is $0.50, the price of fries is $4, and AJ's income is $120, how much soda will he purchase?

    A) 12

    B) 24

    C) 0

    D) 120

    E) 48

Correct Answer: D

Solution:

$MRS_{s,f} = (1 / s) / (1 / f) = f / s$

The optimal basket occurs where $MRS_{s,f} = P_s / P_f$

$f / s = 0.5 / 4 = 1 / 8$, so $s = 8f$

The budget constraint is $0.5s + 4f = 120$

Substituting $s = 8f$ into the budget constraint:

$0.5(8f) + 4f = 120$, so $f = 15$

$s = 8*15 = 120$

The optimal quantity of s is 120 units.

7. The price of apples equals one-third the price of oranges. When drawing the budget line for apples and oranges, apples are on the horizontal axis. The slope of this budget line is _____.
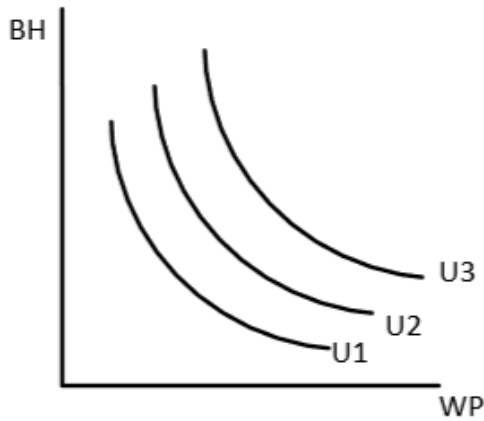
Correct Answer: -1/3

Solution:

The slope of this budget line equals $- (p_a / p_o) = -(1/3)p_o / p_o = -1/3$

8. According to the *Equal Marginal Principle*, when consuming the optimal combination of goods X and Y, a consumer has:

A) $MU_X = MU_Y$

B) $MU_X / P_Y = MU_Y / P_X$

C) $MU_X / P_X = MU_Y / P_Y$

D) Constant $MRS_{X,Y}$

Correct Answer: C

9. Sarah is an environmentalist. She hates pollution. She neither likes nor dislikes meat. Which of the following graphs could be the indifference map for Sarah between beef hamburgers and water pollution? (Assume beef hamburgers are on the vertical axis and water pollution is on the horizontal axis and $U_1 < U_2 < U_3$).
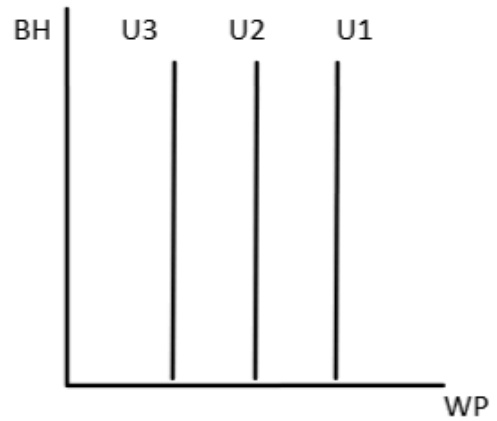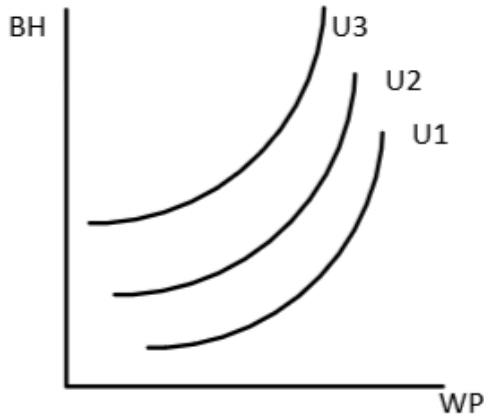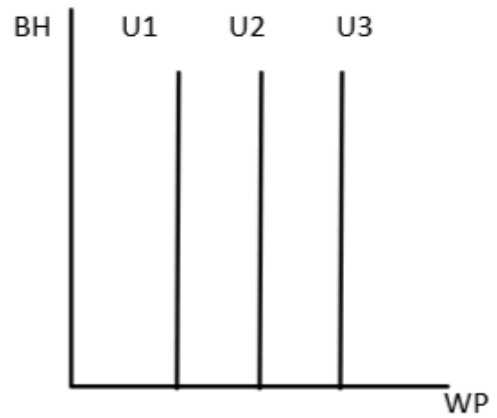
Correct Answer: B

Explanation:

Sarah neither likes nor dislikes meat. The number of beef hamburgers will not influence her utility. Thus, the indifference curves should be vertical. Since summer hates pollution, less water pollution would make her happier.

10. Andrew has always wanted to explore and travel the world. After graduating from McMaster, Andrew was able to

secure a well-paying job, and he could afford to travel once a year. Andrew enjoyed his annual trips but wished he could travel more. Recently, Andrew received a promotion, and he can now afford to travel five times a year. Although Andrew is happy that he can travel more, every additional trip seems to be less and less exciting for him. Which of the following is true about Andrew?

> A) Travel has become an inferior good to Andrew
> B) Andrew's preferences are changing
> C) Andrew would prefer to travel less
> D) Andrew is experiencing diminishing marginal utility
> E) Both B and D are correct

Correct Answer: **D**
Solution:

Diminishing marginal utility is defined as the consumption of additional units of a good that yields smaller additions to total utility as more of the goods are consumed. In this case, travelling provided high utility to Andrew when he could only afford to go once a year since he was doing it infrequently. As Andrew began to travel more, the trips felt less special since they were not as scarce as before, which gave Andrew less incentive to make the most out of each trip. We can see that this scenario fits the above definition and is an example of Andrew's diminishing marginal utility for travelling.

11. A solution to a consumer's optimal choice problem where one good is not being consumed at all (i.e., the optimal basket lies on the axis), is known as:

> A) an endpoint solution
> B) a corner solution
> C) a single optimum solution
> D) an axis solution

Correct Answer: **B**

12. The vending machine in Katherine's office building offers cans of pop and candies. Katherine's utility function is U = 3PC, where P is the amount of pop consumed per week and C is the amount of candy consumed per week. Pop costs $1 and candy costs $0.5 per bag. If Katherine has $10 to spend, what is the optimal combination of pop and candy?

> A) 10 cans of pop
> B) 10 bags of candy and 5 cans of pop
> C) 20 bags of candy
> D) 6 bags of candy and 7 cans of pop
> E) 8 bags of candy and 6 cans of pop

Correct Answer: **B**
Explanation:

The optimal basket occurs when $MU_p / P_p = MU_c / P_c$.

$MU_p = 3C$, $MU_c = 3P$, $P_p = \$1$, $P_c = \$0.5$. We therefore have $3C/1 = 3P/0.5$, which means $1.5C = 3P$, or $C = 2P$. We now know that Katherine should buy twice as many candies as she should pop.

Her budget constraint will be $\$10 = P + 0.5C$. Substituting $C = 2P$ in the budget constraint. Then, solve for P. $P = 5$. $C = 2P = 10$.

Katherine should consume 10 bags of candy and 5 pops.

13. Bailey consumes two goods, X and Y, and has the utility function:

$$U(X,Y) = 3X^{4/5}Y^{4/5}$$

Which of the following conditions **must** be true for the "*more is preferred to less*" assumption to be satisfied for good X?

A) Marginal utility of X is greater than 0 for all positive values of X and Y

B) Marginal rate of substitution is equal to the price ratio

C) Marginal utility of Y is greater than 0 for all positive values of X and Y

D) Marginal utility of X increases as the quantity of good X increases

E) Both A and C

Correct Answer: A

Explanation:

For the "more is preferred to less" to be satisfied for the good X, marginal utility of X (the extra satisfaction a consumer gets from receiving one more unit of X) must always be positive. If it is negative, the consumer would become less satisfied with receiving one more unit of a good. This would mean that more is not preferred to less.

14. When the indifference curves between two goods appear as L-shaped curves, we can say that the goods are:

A) normal goods

B) inferior goods

C) perfect substitutes

D) perfect complements

E) bads

Correct Answer: D

15. Suppose Zia has two goods: cookies and chips. They are perfect substitutes. The price of cookies is $2, and the price of chips is $4. Zia has $8 to spend. The marginal utility of cookies is 1, and the marginal utility of chips is also 1. Which of the following statements is false?

A) Zia should buy only cookies and no chips, in order to reach her optimal consumption basket

B) Zia should buy 4 cookies to reach her optimal consumption basket

C) Zia's optimal basket is a corner solution

D) Zia's budget line is tangent to her indifference curve at her optimal basket. The tangency condition holds

Correct Answer: D

Explanation:

The two goods, cookies and chips, are perfect substitutes with different prices and the same marginal utility. Zia's optimal basket is a corner solution.

$MU_{cookie} / P_{cookie} = 1 / 2$

$MU_{chip} / MU_{chip} = 1/4$

Because $MU_{cookie} / P_{cookie} > MU_{chip} / MU_{chip}$, Zia only consumes cookies and no chips.

Income $/ P_{cookie} = 8 / 2 = 4$. So, Zia will consume 4 units of cookies.

16. Mary uses the entirety of her income to buy face masks (f) and hand sanitizer (h). She currently buys 10 face masks and 1 hand sanitizer. The price per unit of face masks is $0.5, and the price per unit of hand sanitizer is $4. Her marginal utility from face masks is 1, and her marginal utility from hand sanitizer is 8. Is her current basket choice optimal?

A) Yes, her optimal basket contains 10 face masks and 1 hand sanitizer.

B) No, she should buy more of both hand sanitizer and face masks.

C) No, she should buy more hand sanitizer and fewer face masks.

D) No, she should buy less of both.

Correct Answer: **A**

Explanation:

Mary is at her optimal basket. Her $MU_f / P_f = 1/0.5 = 2$. $MU_h / P_h = 8/4 = 2$.

$MU_f / P_f = MU_h / P_h$. Thus, Mary's current consumption basket is optimal.

17. Mark's income is $60. The price of clothing is $1 per unit, and the price of food is $6 per unit. With clothing on the horizontal axis and food on the vertical axis, what is the equation of his budget line, and what is the slope of the budget line?

        A) C = 2 −(4/7)F, 3/8
        B) F = 10 −(1/6)C, −1/6
        C) F = 10 −(1/2)C, 1/6
        D) C = 4 −(2/7)F, −2/7

Correct Answer: **B**

Explanation:

The budget constraint is C + 6F = 60

6F = 60 − C

6F / 6 = 60 / 6 − C / 6

F = 10 − (⅙)C

The slope of the budget line is −1/6

18. Anny has four baskets of goods that she may choose from: A, B, C or D. Anny prefers A to B, and prefers A to D. She is indifferent between B and C, but prefers C to D.

I. B and C lie on the same indifference curve.

II. Her order of preference can be determined as A > B > C > D.

III. There are 3 different utility values associated with the four baskets: A, B, C, D.

        A) I is false, II and III are true.
        B) I and II are true, III is false.
        C) I, II and III are true.
        D) I and III are true and II is false.

Correct Answer: **D**

Explanation:

Basket A has the highest utility as it is preferred to B, C and D.

Since Anny is indifferent between B and C, the two baskets lie on the same indifference curve.

All baskets are preferred to D.

19. Looking at the utility of perfect substitutes, if the slope of the budget line is $-P_x / P_y = -3$, and the $MRS_{x,y} = 7$, what will that tell us about the consumer's optimal choice?

        A) Optimal choice will occur when $Y = I / P_y$ and X = 0.
        B) Optimal choice will occur on any point on the budget line.
        C) Optimal choice will occur when $X = I / P_x$ and Y = 0.
        D) Optimal choice will occur on any point on the indifference curve.

Correct Answer: **C**

Explanation:

Since $MRS_{x,y} > P_x / P_y$, the optimal consumption basket would occur when $X = I / P_x$ and Y = 0.

20. Assume Jim consumes two goods: X and Y. He has a utility function of $U=X^2Y$ on bundles of (X, Y). The price for good X is twice the price of good Y. If Jim bought a combination of the two goods, and in doing so achieved a utility of 1000, how much of good X did Jim buy?

> A) 5
> B) 20
> C) 10
> D) 25

Correct Answer: C

Explanation:

$MRS_{x,y} = MU_x / MU_y = 2XY / X^2 = 2Y / X$

Tangency condition: $MRS_{x,y} = P_x / P_y$

$2Y / X = 2P_y / P_y$

$Y / X = P_y / P_y$

$Y / X = 1$

So, when Jim maximizes his utility, Y = X

$U = X^2Y = 1000$

substitute Y = X into $X^2Y = 1000$

$1000 = X^2Y$

$1000 = X^3$

So, X = 10

21. Robert's utility function on bundles of (x, y) is given by: $U = 2x^4y^5$. What is the value of $MRS_{x,y}$ when x = 3 and y = 2?

> A) 2/7
> B) 1/4
> C) 8/15
> D) 3/4
> E) 5/2

Correct Answer: C

Solution:

$U = 2x^4y^5$

$MU_x = dU / dx = 8x^3y^5$

$MU_y = dU / dy = 10x^4y^4$

$MRS_{x,y} = MU_x / MU_y = 8y/10x=4y/5x$

When x=3 and y=2

$MRS_{x,y}= 4y/5x=8/15$

22. Suppose Eric has a total income of $100. He uses all the income to purchase apples and oranges. Assume the price of apples is $5 per bag, and the price of oranges is $15 per bag. With apples on the horizontal axis and oranges on the vertical axis, what is Eric's budget constraint? Assume the price of oranges dropped by $5, what is the slope of the new budget constraint?

> A) 5X + 15Y = 100; –1/2
> B) 15X + 5Y = 100; –1/2
> C) 5X + 15Y = 100; 1/2
> D) 15X + 5Y = 100; 1/2

Correct Answer: A

Explanation:

Slope of the new budget constraint = $-P_\diamond/P_y$ = -5/(15-5) = -1/2

23. Suppose Jane loves jam but neither likes nor dislikes peanut butter. If jam is plotted on the horizontal axis and peanut butter is plotted on the vertical axis, what is the shape of her indifference curve?

        A) upward sloping

        B) downward sloping

        C) horizontal

        D) vertical

Correct Answer: **D**

Explanation:

Jane's utility solely depends on the quantity of jam. Peanut butter is neutral to her.

24. Claire has two meal options at work to buy for her lunch break: pasta (P) and sushi (S). Pasta costs $5 per meal ($P_p$), and sushi costs $7 per meal ($P_s$). Claire has $35 dollars (I) for this week's lunches. If sushi is on the horizontal axis, which equation represents Claire's budget line? What is the vertical intercept of the budget line?

        A) 7S + 5P = 35, 5

        B) 5S + 7P = 35, 7

        C) 7S + 5P = 35, 7

        D) 7S + 7P = 35, 5

Correct Answer: **C**

Solution:

Claire's budget line is 7S + 5P = 35. The vertical intercept represents the amount of good Y that an individual could have if she only consumed that one good. I/P_p = 35/5 = 7

25. John has separate yearly subscriptions to comic books(C) and auto magazines(M). He spends his income on these two goods. He considers these goods to be perfect substitutes. The cost of comic books is $30, while the cost of auto magazines is $45. The marginal utility for comic books is 40, while the marginal utility for auto magazines is 50. John was recently promoted, which enabled him to have more income and consume more of these goods. To maximize his utility, John should:

        A) Increase comic book consumption and decrease auto magazine consumption

        B) Increase auto magazine consumption and decrease comic book consumption

        C) Use all his income to buy only comic books

        D) Use all his income to buy only auto magazines

        E) Spend his new income equally on comic books and auto magazines

Correct Answer: **C**

Explanation:

MU_c / P_c = 40/30 = 1.33. MU_m / P_m = 50/45 = 1.11

$MU_c / P_c > MU_m / P_m$.

John considers these goods to be perfect substitutes. Thus, John's optimal solution is a corner solution. His optimal choice is to spend all his income on only comic books.

26. Which of the following is FALSE with regards to optimal baskets?

        A) It must be located on the budget line.

        B) A higher level of satisfaction can be attained.

C) It must give the consumer the most preferred combination of goods and services.

D) The marginal utility (x) per dollar spent on one good (x) is equal to the marginal utility (y) per dollar spent on another good (y).

Correct Answer: B

Explanation:

When consuming the optimal basket, a consumer's utility is maximized. A higher level of satisfaction cannot be attained given the current income and prices of the two goods.

27. Diminishing marginal utility is defined as:

A) Additional happiness from consuming one more unit of a good.

B) The consumption of additional units of a good will yield larger additions to utility as more of a good is consumed.

C) The consumption of additional units of a good will yield smaller additions to utility as more of a good is consumed.

D) The amount of a good that a consumer is willing to give up to consume one additional unit of another good.

Correct Answer: C

Explanation:

A is the definition of marginal utility. D is the definition for marginal rate of substitution.

28. Stacey consumes both apples and bananas. Suppose apples are on the x-axis and bananas are on the y-axis. Assume her income remains constant. An increase in the price of apples will affect her budget by:

A) rotating the budget line to the right along the x-axis

B) rotating the budget line to the left along the x-axis

C) shifting the budget line to the right

D) shifting the budget line to the left

Correct Answer: B

Explanation:

Stacey's income is constant. If the price of an item increases, the maximum amount of that item Stacey can purchase will decrease.

29. Which of the following goods would be best represented by indifference curves that are downward sloping straight lines?

A) pancake mix and maple syrup

B) pancake mix and cinnamon buns

C) pancake mix and pizza

D) pancake mix and bacon

Correct Answer: B

Explanation:

Pancakes and cinnamon buns are the main components of a breakfast meal. Most people view them as perfect substitutes in consumption.

30. Every week since lockdown, Jack spends his entire budget to purchase 2 boxes of fried chicken and 3 cream puffs.

Each box of fried chicken costs $8 and each cream puff costs $5. Suppose Jack's marginal utility from fried chicken and cream puffs is 12. What should Jack do if he wants to increase his utility?

> A) Increase fried chicken consumption and reduce cream puff consumption.
>
> B) Increase cream puff consumption and reduce fried chicken consumption.
>
> C) Increase both cream puff and fried chicken consumption.
>
> D) Maintain current consumption.

Correct Answer: **B**

Explanation:

$MU_f / P_f = 12/8 = 1.5$.

$MU_c / P_c = 12/5 = 2.4$.

$MU_c / P_c > MU_f / P_f$. Jack can increase his utility by consuming more cream puffs and less fried chicken.

31. Suppose Judy only consumes hamburgers (H) and pizza (P). Her utility function is given as:

$U = 0.5H^2P^2$

Her weekly salary is $280. The unit price of hamburgers is $5, and the unit price of pizza is $10. Find Judy's optimal daily consumption basket.

Correct Answer:

P = 14, H = 28

Judy should consume 14 pizzas and 28 hamburgers.

Solution:

$MU_h = HP^2$, $MU_p = H^2P$

$MRS_{h,p} = MU_h / MU_p = P / H$

To maximize utility, set $MRS_{h,p} = P_h / P_p$

$P / H = 5/10$

$H = 2P$

Budget constraint: $5H + 10P = 280$

Substituting H = 2P into the budget constraint:

$5*(2P) + 10P = 280$, $P = 14$, $H = 2P = 28$

Topic 2 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-13

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-14

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-15

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-16

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-17

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-18

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-19

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-20

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-21

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-22

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-23

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-24

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-25

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-26

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-89

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-27

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-28

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-29

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-30

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-31

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-32

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-110

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-91

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-93

Topic 2 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=57#h5p-111

Topic 3: Individual Demand and Market Demand

Topic 3 Practice Questions

(Credit: Sonder Quest/ [Wikimedia Commons](#)/ CC BY-SA 4.0)

1. The price-consumption curve:

      A) traces the utility-maximizing combinations of two goods as the price of one good changes, holding income constant.

      B) measures the quantity of a good consumed related to income.

      C) measures the quantity of a good that all consumers in a market will buy for its price.

      D) shows the set of all baskets for which the consumer is indifferent.

Correct Answer: **A**

2. Rachel consumes only two goods, x and y. Her utility function is $U = 2xy$. The initial price of x is $6, but it then drops to $3. The price of y is $2, and her weekly income is $60. Find the initial basket, decomposition basket, and final basket. Round to the nearest whole number.

Answer:

Initially, $P_x = \$6$, $P_y = \$2$, and $I = 60$

First, find the initial optimal basket.

$MRS_{x,y} = MU_x/MU_y = 2y/2x = y/x$

Tangency condition: $MRS_{x,y} = P_x/P_y$

$y/x = 6/2 = 3$, so $y=3x$

Budget constraint: $60 = 6x + 2y$

Sub $y = 3x$ into the budget constraint,

$60 = 6x + 2(3x)$

At the initial optimal basket: $x = 5$, $y = 15$

The initial utility is equal to: $U = 2xy = 2(5)(15) = 150$.

Next, find the new basket with $P_x' = 3$.

The new tangency condition: $y/x = P_x'/P_y = 3/2$, so $y = 3x/2$.

Sub $y = 3x/2$ into the new budget constraint $60 = 3x + 2y$

$60 = 3x + 2(3x/2)$

At the final basket: $x = 10$, $y = 15$.

Find the decomposition basket:

Tangency condition: $MRSx,y = P_x'/P_y$

$y/x = P_x'/P_y = 3/2$, so $y = 3x/2$.

$U = 2xy = 2x(3x/2) = 150 = U(initial)$

So, $3x^2 = 150$

$X = 7.07$, $y = 10.61$

Rounding to the nearest whole number, we have $x = 7$, and $y = 11$.

At the decomposition basket: $x = 7$, and $y = 11$.

3. The demand for packed mix-spring salad is given by $Q = 480 - 0.3P$. The consumer surplus at $P = \$20$ is:

     A) $0

     B) $24

     C) $474

     D) $374,460

     E) $1,600

Correct Answer: **D**

Steps:

When $P = 20$, $Q = 480 - 0.3 \times 20 = 474$

Find the vertical intercept of the demand curve:

Set $Q = 0$, $P = 480/0.3 = 1,600$

$CS = 0.5 *(1,600-20) *474 = 374,460$

4. Suppose that the demand for butter is elastic at the current price. If the price of butter increases, the total expenditure on butter by consumers will _____.

     A) remain unchanged

     B) increase

     C) decrease

     D) none of the above

Correct Answer: **C**

Explanation:

When demand is elastic, price and total expenditure move in opposite directions. An increase in the price will result in a decrease in total expenditure.

5. Suppose that you consume Good A and Good B. Good A is on the x-axis, and Good B is on the y-axis. Assume that the price of Good A decreases.

- The optimal basket before the price change contains $Q_A = 2$ and $Q_B = 4$.
- The optimal basket after the price change contains $Q_A = 4$ and $Q_B = 6$.
- The decomposition basket contains $Q_A = 5$ and $Q_B = 1$.

Based on this information, select the correct statement.
> A) The substitution effect is positive, the income effect is negative, and the substitution effect dominates.
> B) The substitution effect is negative, the income effect is positive, and the substitution effect dominates.
> C) The substitution effect is positive, the income effect is negative, and the income effect dominates.
> D) The substitution effect is negative, the income effect is positive, and the income effect dominates.

Correct Answer: A

Explanation:
Based on the information presented, the substitution effect is $5 - 2 = 3$, and the income effect is $4 - 5 = -1$. Thus, the substitution effect is positive and the income effect is negative. Since the absolute value of the substitution effect is greater than the absolute value of the income effect, the substitution effect dominates.

6. CR7 and Nike released a new shoe called "CR7 edition 6". Once the shoes were released, they quickly became popular among fans of Nike and CR7. After the first week of their release, more and more people wished to own the shoes because others did. The new shoes are subject to the_____ network externality.
> A) negative and positive
> B) negative
> C) positive
> D) neutral

Correct Answer: C

7. Assume that the demand curve for Airpods is given as: $Q = 100 - 0.2P$. What is the consumer surplus at $P = \$219.99$?
> A) $280.01
> B) $7840.56
> C) $7129.92
> D) $219.99

Correct Answer: B

Explanation:
When P = 219.99, Q = 100 − 0.2P = 56.002
Find the vertical intercept of the demand curve:
Set Q = 0, P = 100/0.2 = 500
CS = 0.5 *(500-219.99) *56.002 = $7840.56

8. Which of the following statements is true?
> A) The bandwagon effect tends to decrease a consumer's wishes to buy.
> B) Both the snob effect and bandwagon effect do not influence the consumer's behaviour.

C) The snob effect is illustrated when Bob feels like he should create a TikTok account because all his classmates have one.

D) The bandwagon effect has led people to begin purchasing and wearing a particular clothing style as they see others adopt the same fashions.

E) Both C & D are correct.

Correct Answer: **D**

9. The network externality where consumers wish to own exclusive or unique goods is called the _____. This effect can cause the demand curve to shift to the _____ when the price of the good falls.

A) Bandwagon effect, right
B) Bandwagon effect, left
C) Snob effect, right
D) Snob effect, left

Correct Answer: **D**

Explanation:

The snob effect is a negative network externality where consumers prefer to own exclusive goods leading to a higher demand when the prices are high and lower demand when the prices are low. In this example, the price falls, so fewer people would want to buy the good, causing the demand curve to shift to the left due to the snob effect.

10. Consider a U-shaped price-consumption curve. On which portion of the price-consumption curve are the two goods considered substitutes?

A) Upward sloping portion
B) Downward sloping portion
C) Both A & B
D) Not enough information to determine the answer

Correct Answer: **B**

Explanation:

Good X and Good Y are substitutes on the downward-sloping portion of the price-consumption curve. Over the upward-sloping portion of the price-consumption curve, the two goods are complements.

11. Under what conditions is the network externality classified as a positive network externality?

A) If the quantity of the good demanded by the typical consumer increases in response to the growth in purchases of other consumers.

B) If the quantity of the good demanded by the typical consumer decreases in response to the growth in purchases of other consumers.

C) If the quantity of the good demanded by the typical consumer remains the same in response to the growth in purchases of other consumers.

D) None of the above.

Correct Answer: **A**

12. Suppose that the demand for lamb is given as Q_d = 300 − 6P. What is the price elasticity of demand if the price of lamb is $15 per pound? If the price of lamb is increased to a price slightly above $15, how would total expenditure by consumers change?

A) -0.43. Total expenditures for lamb will rise.

B) -1. Total expenditures for lamb will be unchanged.

C) -0.5. Total expenditures for lamb will decrease.

D) 0. Total expenditures for lamb will increase.

Correct Answer: **A**

Explanation:

The price elasticity of demand E_d= %ΔQ/%ΔP = (ΔQ/ΔP)*(P/Q). At P = 15, Q_d = 300 − 6*15 = 210.

E_d = -6*(15/210) = -0.43. The demand is inelastic at P = 15. When demand is inelastic, price and total expenditure move in the same direction. An increase in the price of a good will result in an increase in total expenditure on it.

13. Which of the following statements is **NOT** true?

      A) If the price of the good on the x-axis decreases, the budget line will rotate outward.

      B) At a point on the price-consumption curve, the slope of the indifference curve is greater than the slope of the budget line.

      C) If the slope of the price-consumption curve is positive, the two goods are complements.

      D) The price-consumption curve traces the optimal bundles as the price of one good changes, holding income constant.

Correct Answer: **B**

Explanation:

Any point on the price-consumption curve is a utility-maximizing combination of two goods. At a particular point, the indifference curve and the budget line that pass through this point should have equal slopes.

14. Arya only consumes two goods: X and Y. When the price of X changes, the income effect and the substitution effect for X move in opposite directions. In addition, the income effect for X dominates the substitution effect. X must be: _____.

      A) a Giffen good for Arya.

      B) an inferior good for Arya.

      C) a normal good for Arya.

      D) perfect substitutes for Arya.

      E) Both a and b are true.

Correct Answer: **E**

15. Marina decides to purchase a ring made from an alloy composed exclusively of gold (G) and titanium (T). The price of gold is $60 per gram, and the price of titanium is $30 per gram. Her total budget for the ring is $600. Her utility function is given by U(G,T)=GT. Suppose the price of titanium falls to $20 per gram.

      (i) Find the initial consumption basket.

      (ii) Find the final consumption basket.

      (iii) Find the decomposition basket.

Steps:

Initially, P_G = $60, P_T = $30, and I = 600

(i) First, find the original optimal basket:

$MRS_{G,T}$ = MU_G/MU_T = T/G

Tangency condition:

$MRS_{G,T}$ = P_G/P_T

T/G = 60/30

T/G = 2

T = 2G

Budget constraint:

600 = 60G + 30T

Sub T = 2G into the budget constraint:

600 = 60G + 30(2G)

600 = 120G

G = 5, T = 10

At the original basket, G = 5, T = 10

(ii) Find the new basket with P_T' = 20.

Tangency condition:

$MRS_{G,T}$ = P_G/P_T'

T/G = 60/20

T/G = 3

T = 3G

Sub T = 3G into the new budget constraint:

600 = 60G + 20T

600 = 60G + 20(3G)

600 = 120G

G = 5, T = 15

At the final basket, G = 5, T = 15.

(iii) Find the decomposition basket:

Consuming the original basket, U = GT = 50

New tangency condition:

T/G = 3

T = 3G

Sub T = 3G into U = GT = 50:

50 = G(3G)

50 = 3G^2

G ≈ 4.08, T ≈ 12.24

At the decomposition basket, G = 4.08, T = 12.24.

16. A 2010 study found that gold's short-run price elasticity of demand in China is -0.4, and the long-run price elasticity of demand is -1.2. Suppose the Chinese government recently increased the price of gold. Consumer expenditures will _____over the short-run and _____over the long-run.

    A) decrease; not change
    B) increase; not change
    C) decrease; increase
    D) increase; decrease
    E) not change; not change

Correct Answer: D

Steps:

- When demand is inelastic, price and total expenditure move in the same direction. An increase in the price of a good will result in an increase in total expenditure for it.

- When demand is elastic, price and total expenditure move in opposite directions. An increase in the price of a good will result in a decrease in total expenditure for it.

17. What happens to the quantity demanded for a good in a particular market when all of the individual demand in this market for this good is cut in half? Assume the price level is unchanged.

A) The result is no change to the market demand curve as the new individual demand curves are still proportional to their original demand curves.

B) This results in ½ the quantity demanded in the market demand curve.

C) This results in ⅛ the quantity demanded in the market demand curve.

D) The result is no change to the market demand curve as the market demand curve is independent of the change in individual demand curves.

Correct Answer: B

Steps:

The market demand curve is derived by horizontally adding the individual demand curves in the market.

18. Suppose that the burger market consists of three firms: McDonald's, Wendy's, and Burger King. The demand curves for their burgers are:

McDonalds: $Q_{MC} = 7 - 0.3P$

Wendy's: $Q_{WE} = 6 - 0.2P$

Burger King: $Q_{BK} = 4 - 0.4P$

Derive the market demand curve. What is the quantity demanded in the market (Q_{Total}) when the price of a burger is $4?

A) $Q_{Total} = 17.6$

B) $Q_{Total} = 13.6$

C) $Q_{Total} = 13.4$

D) $Q_{Total} = 13.8$

E) $Q_{Total} = 17.2$

Correct Answer: C

Steps:

Add the individual firms' demand curves horizontally:

The market demand function is: $Q_{Total} = 17 - 0.9P$

At P = $4, $Q_{Total} = 13.4$.

Substituting P = $4 into individual demand function, $Q_{MC} = 5.8$, $Q_{WE} = 5.2$, $Q_{BK} = 2.4$

Topic 3 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-34

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-35

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-36

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-37

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-38

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-39

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-40

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-41

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-95

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-96

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-97

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-98

Topic 3 Quiz (a)

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-94

Topic 3 Quiz (b)

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=58#h5p-42

Topic 4: Firms and their Production Decisions

Topic 4 Practice Questions

*(Credit: Bahnfrend/[Wikimedia Commons](#)/ CC BY-SA 3.0)*

1. In the short-run, the marginal product of labour curve is bell-shaped. Which of the following is NOT a reason for the marginal product of labour curve to slope upwards?

        (A) Workers are specializing in certain tasks.
        (B) The factory is not being fully used, therefore more workers can be hired.
        (C) More capital is purchased.
        (D) Managers are organizing the production process more efficiently.

Correct Answer: **C**
Explanation: We assume that capital is fixed in short-run production.

2. The production process shown in the figure exhibits _____.
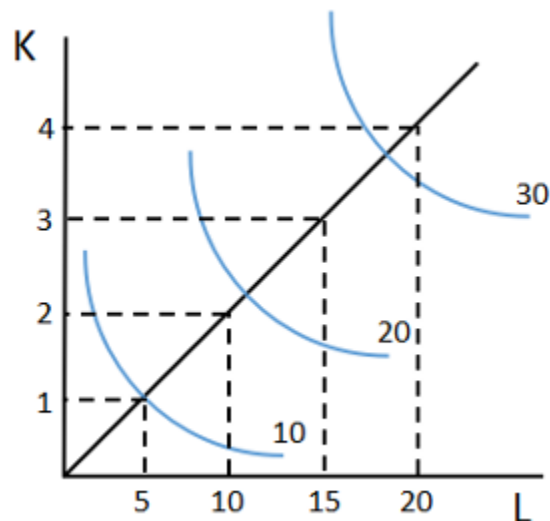
    (A) decreasing returns to scale.
    (B) constant returns to scale.
    (C) increasing returns to scale.
    (D) none of the above.

Correct Answer: A

Explanation:

This production process exhibits decreasing returns to scale because doubling inputs results in less than double the output.

3. Candy owns a tea house. Assume the production function is: Q = 6KL, where Q is the number of drinks made per hour, K is the number of tea machines (capital), and L is the number of employees hired per hour (labour). What is the marginal product of labour?

    (A) $MP_L = 6$
    (B) $MP_L = 6K$
    (C) $MP_L = 6L$
    (D) $MP_L = 6K/L$

Correct Answer: B

Explanation:

The marginal product of labour is the additional output produced as the labour input is increased by one unit. $MP_L = \Delta Q/\Delta L = 6K$

4. Which of the following is not possible regarding production in the short-run?

    (A) Total product increases when average product decreases.
    (B) When the marginal product is less than the average product, the total product is increasing.
    (C) When the total product is decreasing, marginal product is greater than the average product.
    (D) When the marginal product reaches the maximum, total product continues to increase.

Correct Answer: C

Explanation:
If the total product is decreasing, the marginal product must be negative and lower than the average product.

5. Assume Apple uses K units of machinery and L units of labour to produce AirPods. The production function is given as: $A = L^{0.5}K^{0.8}$. This production function exhibits _____.
          (A) decreasing returns to scale.
          (B) constant returns to scale.
          (C) increasing returns to scale.
          (D) none of the above.

Correct Answer: C
Steps:
$A = L^{0.5}K^{0.8}$
Multiply each input by $\diamond$, ($\diamond > 1$)
$f(\diamond L, \diamond K) = (\diamond L)^{0.5}(\diamond K)^{0.8} = \diamond^{0.5}L^{0.5} \cdot \diamond^{0.8}K^{0.8} = \diamond^{1.3} L^{0.5} K^{0.8}$
$\diamond q = \diamond L^{0.5} k^{0.8}$
Since $\diamond > 1$, $f(\diamond L, \diamond K) > \diamond q$
This production function exhibits increasing returns to scale.

6. Which of the following statements is FALSE regarding production in the short-run? (with labour being the only variable input)
          (A) The AP_L is at its maximum point when it is equal to MP_L.
          (B) The TP is at its maximum when $MP_L = 0$.
          (C) When MP_L is greater than AP_L, the AP_L of labour is increasing.
          (D) AP_L will always decrease when MP_L decreases.

Correct Answer: D

7. Firm X draws a curve where the absolute value of the slope at any point is equal to the ratio of marginal product of labour to the marginal product of capital. Firm X has drawn the ____ curve.
          (A) isocost
          (B) LS
          (C) LM
          (D) isoquant

Correct Answer: D
Explanation:
An isoquant curve shows all combinations of inputs that yield the same level of output. The absolute value of the slope of the isoquant at any given point measures the marginal rate of technical substitution (MRTS). $MRTS_{L,K} = MP_L / MP_K$.

8. A firm has a production function $q(L,K) = 7L + 9K$. Which of the following statements is correct?
          (A) This production function exhibits increasing returns to scale.
          (B) This production function exhibits constant returns to scale.
          (C) This production function exhibits decreasing returns to scale.
          (D) None of the above.

Correct Answer: B
Steps:

q(L,K) = 7L + 9K

Multiply each input by $\diamond$, ($\diamond$ >1)

f ($\diamond$L, $\diamond$K) = 7$\diamond$L+ 9$\diamond$K = $\diamond$(7L+9K)=$\diamond$q

Since f ($\diamond$L, $\diamond$K) = $\diamond$q, this production function exhibits constant returns to scale.

9. What is the difference between short-run production and long-run production?

    (A) Short-run is less than one year while long-run is more than one year.

    (B) At least one input in production is fixed in the short-run, whereas no inputs are fixed in the long-run.

    (C) Economies of scale are present in the short-run, and constant returns to scale are present in the long-run.

    (D) No inputs are fixed in the short-run, whereas at least one input is fixed in the long-run.

    (E) The firm must cover its fixed costs in the short-run and its variable costs in the long-run.

Correct Answer: **B**

Explanation:

The short-run is the period of time when quantities of one or more production factors cannot be changed, while the long-run is the period of time needed to make all production inputs variable.

10. Given the production function Q(L) = $20L^3$ + 60L, the MP_L is:

    (A) $20L^4$ + $60L^2$

    (B) 20L

    (C) $60L^2$ + 60

    (D) 60L + 60

    (E) 60L

Correct Answer:**C**

Explanation:

$MP_L = \Delta Q/\Delta L = 60L^2 + 60$

11. We know that for linear isoquants the MRTS is constant. What does that mean for their inputs and outputs?

    (A) One unit of an input can be exchanged for less than one unit of the other input, and the output remains constant.

    (B) One unit of an input can be exchanged for more than one unit of the other input, and the output remains constant.

    (C) The same number of units from one input can be exchanged for a unit of the other input while holding output constant.

    (D) The same number of units from one input cannot be exchanged for units of the other input, while holding output constant.

    (E) The same number of units from the output can be exchanged for one unit of the input, while holding the output constant.

Correct Answer: **C**

12. In a situation where the marginal product of labour is greater than the average product of labour, which of the following is true about the average product of labour?

    (A) It is decreasing.

    (B) It is increasing.

(C) It is constant.

(D) None of the above.

Correct Answer: **B**

13. Consider an ice cream factory with the production function: Q = 100KL, where Q is the number of ice cream bars, K is the number of machines used, and L is the number of employees hired per hour. Assume this factory uses 3 employees and 5 ice cream machines and can produce 1000 ice cream bars per hour. We know that this factory operates _____.

(A) inefficiently.

(B) efficiently.

(C) optimally.

(D) proficiently.

Correct Answer: **A**

Explanation:

The production function shows the highest output produced by a firm for every specified input combination; in this case, when L = 3, K = 5, q = 100KL = 1,500. Nevertheless, this factory can only produce 1,000 ice cream bars, which shows that the production process is inefficient.

14. Which of the following statements regarding production in the short-run is FALSE?

(A) TP_L reaches its maximum when MP_L is zero.

(B) When $MP_L = AP_L$, AP_L reaches its maximum.

(C) When $MP_L > AP_L$, AP_L is decreasing.

(D) As the use of an input increases, with other inputs fixed, MP_L will eventually decrease.

Correct Answer: C

Explanation:

When $MP_L > AP_L$, AP_L is increasing.

15. Which of the following statements are FALSE?

(A) If the MRTS is constant, labour and capital are perfect complements in production.

(B) When isoquants are L-shaped, labour and capital must be used in fixed proportions during production.

(C) When isoquants are straight lines, the MRTS is constant. The rate at which capital and labor can be substituted for each other is always the same, independent of the level of inputs used.

(D) Diminishing marginal returns is only applicable in the short-run.

Correct Answer: **A**

Explanation:

If MRTS is constant, labour and capital are perfect substitutes in production.

Topic 4 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=25#h5p-44

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=25#h5p-43

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=25#h5p-45

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=25#h5p-46

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=25#h5p-47

Topic 4 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=25#h5p-48

Topic 5: Cost Curves and Cost Minimization

Topic 5 Practice Questions

(Credit: Einboeck.official/[Wikimedia Commons](#)/ CC BY-SA 4.0)

1. Nick owns an ice cream parlour. He spends $650 on two inputs, capital and labour. He pays $14 an hour to his labourers and the rental cost of capital is $24 per hour. Assuming capital is plotted on the vertical axis and labour is plotted on the horizontal axis, determine the slope of the isocost line.

        (A) 12/7
        (B) -7/12
        (C) 7/12
        (D) 12/5

Correct Answer: **B**
Steps:
The slope of the isocost line
$= \Delta K / \Delta L = -(w/r)$
$= -14/24$
$= -7/12$

2. Bob runs a small firm. The total cost function is:

TC = $1000 + 10q + 10q^2$

If Bob wanted to minimize the average total cost, which of the following output levels would he choose?

        (A) 1/10
        (B) 11
        (C) 20
        (D) 10

Correct Answer: D

Steps:

The average total cost reaches its minimum when ATC = MC.

Step 1: Find MC

        MC = $\Delta TC / \Delta q = 10 + 20q$

Step 2: Find ATC

        ATC = TC / q = $(1000 + 10q + 10q^2) / q = 1000 / q + 10 + 10q$

Step 3: Set MC = ATC

        $1000 / q + 10 + 10q = 10 + 20q$

Multiply both sides of the equation by q:

        $1000 + 10q + 10q^2 = 10q + 20q^2$

        $1000 = 10q^2$

        $100 = q^2$

        $q = 10$

The average total cost is minimized at q = 10.

3. Assume the price of labour is $12 and the price of capital is $25. For a total cost of $150, what is the isocost equation?

        (A) 150 = 12L * 25K
        (B) 150 = 25L + 12K
        (C) 150 = 12L + 25K
        (D) 25 = 150L − 12
        (E) None of the above

Correct Answer: C

4. Consider two firms: Firm A and Firm B. Each produces a single product. Assume these two firms merge, which increases the cost associated with producing both goods. _____ are present in production.

        (A) Economies of scale
        (B) Diseconomies of scale
        (C) Economies of scope
        (D) Diseconomies of scope

Correct Answer: D

5. Mr. Brown is a famous investor on Wall Street. He becomes tired of trading stocks and wants new challenges. He quits his job and starts his own business. Mr. Brown used to earn $200,000 a year as an investor. Now, he pays himself $105,000 a year. In addition, he pays $10,000 a year for the factory building he rents and $20,000 a year for the equipment that he rents to run his business. What is the economic cost of the time that Mr. Brown contributes to his start-up business?

        (A) $220,000 a year
        (B) $95,000 a year

(C) $200,000 a year

(D) $230,000 a year

Correct Answer: **B**

Explanation:

The economic cost of the time that Mr. Brown contributes to his start-up business is: $200,000 – $105,000 = $95,000 a year.

6. Suppose Firm A is paying its workers $15/hr and rents capital at a rate of $10/hr. Assume the cost of labour increases by $5/hr. What would happen to the isocost line? Calculate the slope of the new isocost line and predict what will happen to the input combination used in production.

(A) The isocost line will shift to the left; the new slope will equal -0.5; both labour input and capital input will decrease.

(B) The isocost line will shift to the right; the new slope will equal -1.5; both labour input and capital input will increase.

(C) The isocost line will rotate inward; the new slope will equal -2; labour input will decrease and capital input will increase.

(D) The isocost line will rotate outward; the new slope will equal -0.5; labour input will increase and capital input will decrease.

Correct Answer: **C**

Steps:

The slope of the new isocost line = -20/10 = -2. The horizontal intercept decreases and the isocost line rotates inward. Because the cost of labour increases, Firm A will use fewer units of labour and more units of capital.

7. As total output increases, which of the following statements regarding short-run cost functions is correct?

(A) Average variable cost increases.

(B) Total cost and variable cost increase by the same amount.

(C) Average fixed cost remains unchanged.

(D) Average fixed cost decreases.

(E) Both B and D.

Correct Answer: **E**

Steps:

As output increases in the short-run, the total variable cost increases. Nevertheless, the average variable cost could increase or decrease. The fixed cost is independent of the output level. Average fixed cost decreases as the output level increases.

8. You are the manager of a Nike factory and you oversee the production of Nike Tech tracksuits. You employ 50 workers and the wage rate is $20 an hour. Moreover, you use 10 machines at an hourly rental rate of $400. Assume the production function is: $q = 2L + 10K$. Currently, you are producing 200 units of suits an hour. The CEO has decided to reward managers and the only criterion is whether or not the factory minimizes its production costs. Do you think that you will receive an award? If the answer is no, before the end of the fiscal year, how would you change the input combination?

Answer:

In this production process, labour and capital are perfect substitutes.

$MP_L / W = 2/20 = 0.1$

$MP_K / r = 10/400 = 0.025$

$MP_L / W > MP_K / r$

Therefore, to minimize the total cost, you would have to use a corner solution. You should only use labour in production.

Currently, your total cost = 20 * 50 + 400 * 10 = 5000

Given $5000, the optimal labour input = 5000 / 20 = 250

The output level = 2L+10K = 2 * 250 + 10 * 0 = 500.

9. True or false:

If a firm achieves economies of scale, it automatically achieves economies of scope.

Answer: False

Explanation:

No direct relationship exists between economies of scale and economies of scope. Economies of scale refer to the production of one good, whereas economies of scope refer to the production of two or more goods.

10. Suppose the long-run total cost function is $C(q) = 4q^2$. What is the cost-output elasticity?

      (A) 2

      (B) 4

      (C) ¼

      (D) 1

      (E) ½

Correct Answer: A

Steps:

The cost-output elasticity $E_c = MC/AC$

Given $C(q) = 4q^2$

$MC = \Delta C/\Delta q = 8q$

$AC = C/q = 4q$

Therefore, $E_c = 8q/4q = 2$

11. Are the following statements regarding short-run cost functions true or false:

      (i) When marginal product decreases, the marginal cost rises.

      (ii) Fixed cost increases with the level of output.

      (iii) If the marginal cost is greater than the average total cost, the average total cost must be decreasing.

Answer:

(i) True

(ii) False

(iii) False

Explanation:

Both (ii) and (iii) are false. Fixed cost does not vary with the level of output. When the marginal cost is greater than the average total cost, the average total cost is increasing.

12. Which of the following statements is false?

      (A) Accounting cost is also known as the sunk cost.

      (B) Economic cost includes both explicit cost and implicit cost.

      (C) Accounting cost only considers the actual monetary cost.

(D) A firm's expenses for office supplies and utilities are included in the accounting costs.

Correct Answer: A

13. A restaurant owner rents kitchen equipment for \$32 an hour and pays his employees \$20 an hour. If the owner's $MP_K = 4$ and $MP_L = 2.5$, which of the following is true?

    (A) The owner can reduce the cost of production at his current output by increasing labour inputs and lowering capital inputs.

    (B) The owner can reduce the cost of production at his current output by increasing capital inputs and lowering labour inputs.

    (C) The owner is currently minimizing cost at his current output.

    (D) The owner can reduce the cost of production at his current output by lowering both labour and capital inputs.

    (E) The owner can reduce the cost of production at his current output by increasing both labour and capital units.

Correct Answer: C

Steps:

$MP_L/w = 2.5/20 = 0.125$

$MP_K/r = 4/32 = 0.125$

$MP_L/w = MP_K/r$. Therefore, the current input combination is optimal, and the owner is minimizing the total cost of production.

14. A pizza parlour has recently expanded to accommodate more customers due to its growing popularity. The kitchen and restaurant space doubles. In addition, the parlour doubles its orders of pizza ingredients to keep up with the rising demand. Before the expansion, the parlour incurred a total cost of \$800 a week for 1,000 pizzas. After expansion, the cost became \$1,500 a week for 2,000 pizzas. This is an example of:

    (A) diseconomies of scale.

    (B) diseconomies of scope.

    (C) increasing returns to scale.

    (D) economies of scope.

    (E) economies of scale.

Correct Answer: E

Steps:

Economies of scale occur when a doubling of output requires less than a doubling of cost. Another way to think of this concept is that the average cost decreases as the output level increases. In this case, initially, AC = \$800 / 1,000 = 0.8. After expansion, AC = \$1,500 / 2,000 = 0.75. AC decreases with the output level, which indicates that the pizza parlour achieves economies of scale.

15. Consider isoquants that slope downward and are convex. Are the following statements true or false:

    I. As we move downward along an isoquant, it becomes more and more difficult to substitute one input for another while keeping the output unchanged.

    II. Assume increasing returns to scale. The isoquants will move further apart from each other as inputs are increased proportionately.

    (A) Both I and II are true.

    (B) I is true and II is false.

    (C) I is false and II is true.

(D) Both I and II are false.

Correct Answer: B

Steps:

With increasing returns to scale, the isoquants become closer and closer together as the inputs increase proportionately.

16. Jennifer started a small business in 2010. Today, the business is worth $450,000. Assume that the market interest rate is 5%. Corporation A would like to buy Jennifer's business next year for $462,500, and Corporation B would like to buy the business today for $450,000. If Jennifer keeps the business for another year, she can make a profit of $10,000. What should she do?

        (A) Get more information to answer the question.

        (B) Sell to Corporation A.

        (C) Sell to Corporation B.

        (D) Jennifer is indifferent to selling to either corporation.

Correct Answer: D

Steps:

If Jennifer sells to Corporation B this year, the present value = $450,000.

If she operates for one more year and then sells to Corporation A next year, the present value = ($462,500 + $10,000) / 1.05 = $450,000.

Both options would generate the same present value. So, Jennifer is indifferent between the two options.

17. A firm's total cost function is: TC = $2000 + 2Q + 5Q^2$. Which of the following statements is false?

        (A) ATC = 2000/Q + 2 + 5Q

        (B) AFC = 2000/Q

        (C) TVC = $5Q^2$

        (D) MC = 2 + 10Q

Correct Answer: C

Steps:

TVC = TC − TFC

    = $2000 + 2Q + 5Q^2 − 2000$

    = $2Q + 5Q^2$

18. A car wash company hires workers and rents equipment to provide its services. The company wants to wash 240 cars an hour. Currently, it pays its workers $12 an hour and has a rental cost of $3 an hour. The production function is given as: Q = 15KL. Find the optimal input combination that minimizes the firm's total cost.

Answer: The optimal bundle of inputs is L = 2, K = 8.

Steps:

Q = 240 units

r = $3

w = $12

Q = 15KL

$MP_K = \Delta Q / \Delta K = 15L$

$MP_L = \Delta Q / \Delta L = 15K$

At the optimal input combination,

$MRTS_{L,K} = w/r$

$15K/15L = 12/3$

$K = 4L$

$Q = 240$ units

$15KL = 240$

Sub $K = 4L$ into $15KL = 240$

$15*(4L)*L = 240$

$L^2 = 4$

$L = 2$

$K = 4L = 8$

Thus, the optimal bundle of inputs is $L = 2$, $K = 8$

19. Which of the following statements is false:

        (A) When marginal cost equals average cost, the average cost is minimized.

        (B) When marginal cost > average cost, the average cost is increasing.

        (C) When marginal cost > average cost, the average cost is decreasing.

        (D) When marginal cost < average cost, the average cost is decreasing.

Correct Answer: C

20. A firm has $1,000 to spend on two inputs: labour, graphed on the horizontal axis, and capital, graphed on the vertical axis. If the hourly wage for workers is $30 and the hourly cost of capital is $60, what is the slope of the isocost curve?

        (A) –1/2

        (B) -2

        (C) 30/60

        (D) 2

Correct Answer: A

Steps:

The isocost equation is: $30L + 60K = 1,000$

Rewrite this equation:

$K = 50/3 – 1/2L$

The slope = $–1/2$

21. Steven is a stock trader. At the beginning of last year, he invested $10,000 in stocks after saving, which he could have put into the bank and earned interest at a rate of 5% per year. Moreover, it turned out that the stocks he invested in performed poorly last year, and he only received 70% of his principal back at the end of the year. What is the opportunity cost for Steven, having invested the money instead of earning interest in a bank?

        (A) $3,000

        (B) $500

        (C) $3,500

        (D) $4,000

Correct Answer: C

Steps:

Steven has two options:

- Option 1: Invest money in the stock market. The value of Option 1 at year-end = 10,000 * 70% = $7,000

- Option 2: Put money into a bank and earn an annual interest of 5%. The value of Option 2 at year-end = 10,000 * (1+5%) = $10,500

The opportunity cost = $10,500-$7000 = -$3,500

22. Consider the validity of the following statements:

       I. Economic cost may be lower than accounting cost.

       II. Sunk cost should not influence decision making.

       A) I is true and II is false.

       B) I is false and II is true.

       C) Both I and II are true.

       D) Both I and II are false.

Correct Answer: B

Explanation:

Statement I is false. Accounting cost only includes explicit costs, while economic cost includes both explicit and implicit costs. Thus, economic cost is never lower than accounting cost.

23. Suppose Andy's firm uses both capital input (K) and labour input (L) in production. The production function is given as:

$$Q = K^{0.75}L^{0.25}$$

The cost of labour is $3 a unit, and the cost of capital is $5 a unit. The cost-minimizing capital-labour ratio (K/L) is ————.

       (A) 9/5

       (B) 3/1

       (C) 5/9

       (D) 1/3

Correct Answer: A

Steps:

$MP_L = 0.25 * K^{0.75}L^{-0.75}$

$MP_K = 0.75 * K^{-0.25}L^{0.25}$

$MRTS_{L,K} = MP_L/ MP_K = (0.25 * K^{0.75}L^{-0.75}) / (0.75 * K^{-0.25}L^{0.25}) = K/3L$

Set $MRTS_{L,K} = w / r$

$K/3L = 3/5$

$K/L = 9/5$

The cost-minimizing capital-labour ratio $K/L = 9/5$.

Topic 5 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-49

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-50

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-51

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-52

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-53

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-54

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-55

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-56

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-57

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-58

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-59

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-60

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-99

Topic 5 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=27#h5p-61

Topic 6: Profit Maximization and Supply

Topic 6 Practice Questions

(Credit: Fred Miller/[Flickr](#)/CC BY 2.0)

1. Zach owns a small, perfectly competitive, fast-food restaurant in downtown Toronto. The market price of the combo meal is $20.

Zach's total cost is as follows:

$$TC = 1500 + 0.0025Q^2$$

Assume that the local government decides to impose a per-unit tax of $2.50 ONLY on Zach's restaurant. Find Zach's after-tax output and profit.

Answer:

The total cost function:

$TC = 1500 + 0.0025Q^2$

The marginal cost function:

$MC = 0.005Q$

The after-tax total cost function:

$TC = 1500 + 0.0025Q^2 + 2.5Q$

The after-tax marginal cost function:

$MC = 0.005Q + 2.5$

Set P = MC

$20 = 0.005Q + 2.5$

20 − 2.5 = 0.005Q

17.5 = 0.005Q

Q = 3,500

Profit = TR − TC

TR = P × Q = 20 × 3,500 = $70,000

TC = 1500 + 0.0025(3500)^2 + 2.5(3500) = 1500 + 30625 + 8750 = 40,875

Profit = TR − TC = 70,000 − 40,875 = $29,125

2. Firm A operates in a perfectly competitive market. Its short-run total cost function is given as:

TC = 50 + 0.2Q^2

Firm A's product is sold at a market price of $20 a unit. What is Firm A's profit-maximizing output decision for the short-run?

    (A) Q* = 40; Firm A should shut down.
    (B) Q* = 20; Firm A should continue to produce.
    (C) Q* = 50; Firm A is indifferent about shutting down or producing.
    (D) Q* = 50; Firm A should shut down.
    (E) Q* = 50; Firm A should continue to produce.

Correct Answer: **E**

Steps:

MC = ΔTC / ΔQ = 0.4Q

Set P = MC

20 = 0.4Q

so Q = 50

TC = 50 + 0.2Q^2

VC = 0.2Q^2

AVC = VC / Q = 0.2Q

At Q = 50, AVC = 0.2 * 50 = 10

Since P = 20 > 10, Firm A will continue to operate and will produce 50 units of product.

3. A firm in a perfectly competitive market will have a marginal revenue curve that is _____.

    (A) upward sloping
    (B) vertical
    (C) downward sloping
    (D) horizontal
    (E) below the AR curve

Correct Answer: **D**

Steps:

In a competitive market, an individual firm is a price taker, and it faces a demand that is perfectly elastic (i.e., horizontal).

4. Which of the following is not a basic assumption of a perfectly competitive market?

    (A) Free entry and exit
    (B) Price taking
    (C) Price setting
    (D) Product homogeneity

Correct Answer: C

5. The demand curve facing an individual competitive firm is:
>   (A) perfectly inelastic and equal to the marginal revenue curve.
>   (B) perfectly elastic and equal to the marginal revenue curve.
>   (C) perfectly elastic and equal to the marginal cost curve.
>   (D) perfectly inelastic and equal to the marginal cost curve.
>   (E) elastic and equal to the marginal cost curve.

Correct Answer: B

6. James owns a competitive hot dog stand in downtown Toronto. He sells hot dogs for $4 each. James' cost for ingredients is $2.5 a hot dog, while the cost of his city permit to operate on the street averages $1.5 a hot dog. What should James do?
>   (A) Shut down his hot dog stand.
>   (B) Increase the price to $5 per hot dog.
>   (C) Continue to operate in the short-run.
>   (D) Need more information to answer this question.

Correct Answer: C
Steps:
P = $4, AVC = $2.5, AFC = 1.5
P > AVC, so James should continue to operate.
AC = AVC + AFC = $2.5 + $1.5 = $4
P = AC, so James breaks even and has zero economic profit.

7. Which of the following is NOT true at the long-run competitive equilibrium?
>   (A) No firm has an incentive to enter or exit the industry because every incumbent firm is earning zero economic profit.
>   (B) At the profit-maximizing output level, the price of the product is less than the average variable cost of production.
>   (C) All firms in the industry are maximizing their profits.
>   (D) The market price is determined where the market supply curve intersects the market demand curve.

Correct Answer: B
Steps:
At the long-run competitive equilibrium, every firm breaks even. P = LMC = LAC

8. When a competitive firm produces the profit-maximizing output in the short-run, which of the following statements must be true?
>   (A) MC = MR and MC is falling.
>   (B) MC = AVC and MC is rising.
>   (C) MC = ATC and MC is rising.
>   (D) MC = AR and MC is rising.

Correct Answer: D
Steps:
The profit-maximizing condition in the short-run is: MR = MC and the MC curve is rising. MR = AR.

9. Assume that firms are earning positive economic profit in a competitive market. Are the following statements true or false?

        (A) The market price will soon fall, so firms should exit the industry immediately to avoid losing money.

        (B) Long-run competitive equilibrium is achieved as all firms are maximizing profit.

        (C) New entrants will enter the market until firms are earning negative economic profit.

        (D) Positive economic profit implies that firms in this industry enjoy an above-normal return.

Correct Answer:
(A) False
(B) False
(C) False
(D) True

Explanation:
In a competitive market, a firm could have a profit, a loss, or break even in the short-run. In the long-run, every firm breaks even.

10. In a perfectly competitive market, the long-run market supply and demand are: $P = 50 + 0.25Q_S$ and $P = 80 - 0.05Q_D$. The long-run marginal cost function for an individual firm in this market is: $MC = 5 + 20q$. How many firms are in this market?

Answer: Approximately 29 firms are in this market.
Steps:
Step 1: Find the equilibrium market price and quantity.
$50 + 0.25Q = 80 - 0.05Q$
$P = 75$, and $Q = 100$
Step 2: Determine the output level of individual firms.
Set $P = MC$
$75 = 5 + 20q$, $q = 3.5$
The number of firms $= Q/q = 100/3.5 = 28.57$
Approximately 29 firms are in this market.

11. Westdale Diner, a highly competitive eatery, sells donuts for $1.50. Its total and marginal cost functions are: $TC = 1000 + 0.0005Q^2$ and $MC = 0.001Q$, where Q refers to donuts sold per day. What is the total economic profit for the business?

        (A) 275

        (B) 125

        (C) 150

        (D) 225

Correct Answer: B
Steps:
Equate $P = MC$ to find the profit-maximizing quantity.
$1.5 = 0.001Q$
$Q = 1500$
$TC = 1000 + 0.0005(1500)^2 = \$2,125$

Economic profit = TR − TC = (1.5)(1500) − 2,125 = 2,250 − 2,125 = $125

12. A perfectly competitive firm has a cost function: TC = 200 + 0.5Q + 0.2Q^2. Assume the market price is $16.50 per unit. The firm should produce _____ units in the short-run to maximize its profit.
        (A) 40
        (B) 39
        (C) 41
        (D) 43

Correct Answer: **A**
Steps:
MC = ΔTC/ΔQ = 0.5 + 0.4Q
Equate P = MC to find the profit-maximizing output.
$16.5 = 0.5 + 0.4Q
Q = 40
Check the shut down condition.
Given TC = 200 + 0.5Q + 0.2Q^2
VC = 0.5Q + 0.2Q^2
AVC = 0.5 + 0.2Q
At Q = 40, AVC = 8.5
P > AVC
So, the firm should operate in the short-run.

13. In a perfectly competitive market, assume firms are making a profit in the short-run. Predict the impact on the market demand and supply curves in the long-run.
        (A) Both curves will remain the same.
        (B) The market supply curve will shift to the right.
        (C) The market demand curve will shift to the right.
        (D) The market supply curve will shift to the left.

Correct Answer: **B**
Steps:
No entry barrier is present in a competitive market. Thus, profit will attract new entrants. In addition, existing firms will have an incentive to expand production. The market supply will shift to the right.

14. The demand curve for a perfectly competitive firm is:
        (A) perfectly elastic because a competitive firm is a price taker.
        (B) the same as the average revenue curve but not the marginal revenue curve.
        (C) the same as the marginal revenue curve but not the average revenue curve.
        (D) the same as the market demand curve because the competitive firm is a price taker.

Correct Answer: A
Steps:
The demand curve for a perfectly competitive firm is horizontal (i.e., perfectly elastic). A competitive firm is a price taker. So, P = MR = AR. The demand curve faced by an individual competitive firm is the same as its average revenue curve and its marginal revenue curve.

15. A competitive light bulb store has a total cost of:

$TC = 5Q^2 + 20Q$

The light bulbs sold by this store have mercury in them, which is highly toxic and can be fatal. Assume a "health" tax of $1 per light bulb is imposed ONLY on this store. What is the store's supply curve?

(A) 0.1P − 2.1
(B) 10P − 21
(C) 5P − 1
(D) 0.1P + 2

Correct Answer: A

Steps:

$MC = 10Q + 20$

With the addition of the tax, $MC = 10Q + 20 + 1 = 10Q + 21$

Equate P = MC to maximize profit.

$P = 10Q + 21$

$10Q = P − 21$

$Q = 0.1P − 2.1$

The store's supply curve is: $Q = 0.1P − 2.1$

16. Assume that perfectly competitive firms in a decreasing-cost industry are earning economic profits. Determine the validity of the following statements. In the long-run:

(I) the market price will decrease.
(II) the marginal cost of production will decrease.

(A) Both I and II are false.
(B) I is true, and II is false.
(C) I is false, and II is true.
(D) Both I and II are true.

Correct Answer: D

Steps:

Profit will attract new entrants. In addition, existing firms will have an incentive to expand production. The market supply will shift to the right. In a decreasing-cost industry, input prices decrease when the industry output increases. Therefore, both MC and P will decrease in the long-run.

17. Answer the following questions:

(I) What is a competitive firm's short-run supply curve?

(II) Suppose the Ontario government recently increased the minimum wage. What is the impact on a competitive firm's profit if this firm continues to produce the same level of output?

Answer:

(I) A competitive firm's short-run supply curve is the fraction of the firm's marginal cost curve that lies above the minimum of AVC.

(II) This competitive firm's profit will decrease if it produces the same output level after the minimum wage increases.

Topic 6 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-64

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-102

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-103

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-104

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-62

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-100

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-63

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-65

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-67

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-68

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-69

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-101

Topic 6 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=29#h5p-82

Topic 7: Competitive Markets: Analysis

Topic 7 Practice Questions

(Credit: Paul Sableman/ Flickr/ CC BY 2.0)

1. Consider the market for paper. The market supply and demand functions are given as:

$$Q_S = 15P$$
$$Q_D = -10P + 500$$

Assume the government imposes a production quota of 150 units of paper. What is the deadweight loss as a result of this production quota?

       (A) 1,875
       (B) 3,000
       (C) 1,125
       (D) 750

Correct Answer: A
Steps:

Set $Q_s = Q_d$

15P = -10P + 500

P = 20, Q = 300

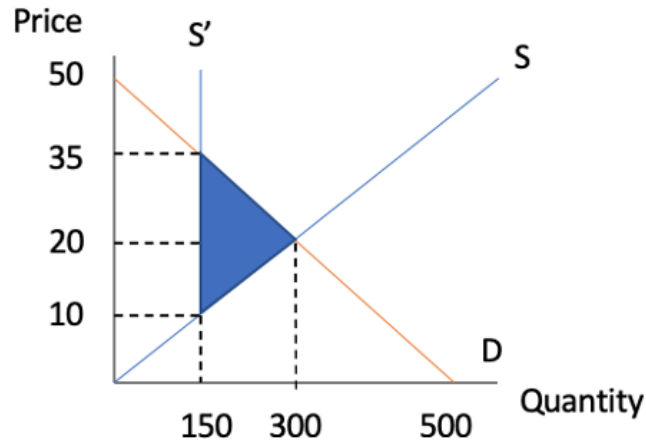The free-market equilibrium price is $20 and the market quantity is 300.

With the quota, Q_d = -10P + 500 = 150

Solve for P, P = 35

The market price is $35 with the production quota.

Substituting Q = 150 into Q_s = 15P. P = 10

The deadweight loss = 0.5*(35-10)(300-150) = 1,875

2. The market demand and supply function for Good A are given by:

$$Q_D = 200 - 5P$$
$$Q_S = 100 + 3P$$

The federal government plans to levy a flat tax on each unit of Good A produced. How much tax should the federal government levy if they want to stabilize the price that sellers receive at $10?

　　　　(A) $2

　　　　(B) $4

　　　　(C) $6

　　　　(D) $10

Correct Answer: B

Steps:

$P_b - P_s = t$

Set P_s = $10, P_b = 10 + t

Equate Q_d and Q_s

200 - 5P_b = 100 + 3P_s

200 - 5(10 + t) = 100 + 3*10

200 - 50 - 5t = 100 + 30

20 = 5t

Solve for t

t = 4

3. Which of the following statements are true and which are false?

i) The government buys the excess supply to maintain price support.

ii) If demand is more elastic relative to supply, the tax burden falls mostly on buyers.

iii) Deadweight loss is the net loss of total surplus.

iv) A price ceiling is the maximum amount a seller is allowed to charge for a product or service.

Correct Answer:

(i) True

(ii) False

(iii) True

(iv) True

4. The market for iPhone cases is given by the following:

$$Q_S = 2P - 35$$
$$Q_D = 100 - 2.5P$$

Calculate the consumer surplus and total surplus at the market-clearing price.

(A) Total surplus is 281.25 while consumer surplus is 125.

(B) Total surplus is 125 while consumer surplus is 281.25.

(C) Total surplus is 281.25 while consumer surplus is 156.25.

(D) Total surplus is 156.25 while consumer surplus is 125.

(E) More information is needed to calculate the total and consumer surplus.

Correct Answer: A

Steps:

Find the market-clearing price and quantity.

$2P - 35 = 100 - 2.5P$

$P = \$30$

Substitute P = \$30 into the supply equation $Q_S = 2P - 35$.

$Q = 2P - 35$

$Q = 2(30) - 35$

$Q = 25$

Next, find the vertical intercept of the demand curve and supply curve.

Set Q = 0

$Q_D = 100 - 2.5P$

$0 = 100 - 2.5P$

$P = 40$ (vertical intercept of the demand curve)

$Q_S = 2P - 35$

$0 = 2P - 35$

$P = 17.5$ (vertical intercept of the supply curve)

Find the total surplus.

$TS = 0.5*(40 - 17.5) * 25$

$TS = 281.25$

Find the consumer surplus.

$CS = 0.5*(40 - 30) *25$

$CS = 125$

5. Suppose the clothing market is competitive, and is characterized by the following demand and supply functions:

$$Q_d = 520 - 40P$$
$$Q_s = -80 + 160P$$

The government imposes a unit tax of $2.50 on clothing. Find the deadweight loss caused by the tax.

(A) 100
(B) 200
(C) 300
(D) 400
(E) 500

Correct Answer: **A**

Steps:

Equate $Q_d = Q_s$

$P_b − P_s = 2.50$

$520 − 40P_b = −80 + 160P_s$

Replace P_b using $P_s + 2.50$:

$520 − 40(P_s + 2.50) = −80 + 160P_s$

$520 − 40P_s − 100 = −80 + 160P_s$

Solve for P_s

$P_s = 2.5$

$P_b = P_s + 2.50 = 5$

Substituting $P_s = 2.5$ into $Q_s = −80 + 160P_s$

$Q_s = −80 + 160(2.5) = 320$

Find the free-market equilibrium price and quantity.

Set $Q_d = Q_s$

$520 − 40P = −80 + 160P$

$P = 3, Q = 400$

Deadweight loss = $(1/2)$ x (2.50) x $(400 − 320) = 100$

6. Suppose that the demand and supply curve of wheat is given as:

$$Q_D = 750 − 145P$$
$$Q_S = 184 + 138P$$

where Q is measured in millions of bushels and P is the price per bushel. Due to COVID-19, the government maintains the price of wheat at $3.50 per bushel by purchasing any excess supply. Find the cost to the government and the change in consumer surplus caused by this price support program.

(A) $1456.62; −$526.61
(B) $1449.51; −$486.29
(C) $1485.75; −$486.29
(D) $1485.75; −$526.61

Correct Answer: **D**

Steps:

At P = $3.5, excess supply = $Q_S − Q_D = 184 + 138P − (750 − 145P) = 424.5$

The government's cost = $3.5 * 424.5 = $1485.75

Next, find the change in consumer surplus.

Set $Q_D = Q_S$

$750 − 145P = 184 + 138P$

$P = $2, Q = 460$

The free-market equilibrium price and quantity: P = $2, Q = 460

Now, find the vertical intercept of the demand curve.

$Q_D = 750 − 145P$

Set Q_D = 0 and solve for P.

P = 750 / 145 = 5.17

The vertical intercept of the demand curve is $5.17.

Find the consumer surplus at free-market equilibrium price.

CS = 0.5 * (5.17 − 2) * 460 ≈ 729.1

Find the consumer surplus with price support.

Substituting P = 3.5 into Q_D = 750 − 145P, Q_D = 750 − 145 * 3.5 = 242.5

CS = 0.5 * (5.17 − 3.5) * 242.5 ≈ 202.49

The change in consumer surplus = 202.49 − 729.1 ≈ -526.61

7. Which of the following statements are true and which are false?

  I: Externalities are the only reason for market failure.

  II: The impact of a negative externality is accounted for by the market price.

Correct Answer:

  (I) False. Asymmetric information and public good are also reasons for market failure.

  (II) False. The impact of a negative externality is not transmitted via price.

8. Assume the following equations model the supply and demand curves for Netflix:

$$Q_d = 35 − 3P$$
$$Q_s = 15 + 2P$$

The Canadian government has decided to implement a per-unit tax of $4 on the service. How much more does the buyer pay after the tax is imposed compared to what they were paying before?

  (A) $1.60

  (B) $5.60

  (C) $4

  (D) $4.80

  (E) The seller would assume the burden of the tax and the buyer would not notice a price change.

Correct Answer: A

Steps:

First, find the market equilibrium price before the tax is imposed.

Set $Q_d = Q_s$, and solve for P. P = $4, and Q = 23.

With the unit tax, $P_b = P_s + 4$

Set $Q_d = Q_s$

35 − 3P_b = 15 + 2P_s

Substitute $P_b = P_s + 4$ into the above equation.

35 − 3(P_s + 4) = 15 + 2P_s

5P_s = 8

P_s = 8/5 = 1.6 ⟹ P_b = 1.6 + 4 = 5.6

Then, the change in consumer price = 5.6 − 4 = 1.6

Buyers now pay $1.60 more than they used to.

9. The market demand and supply functions for fabric are:

$$Q_d = 20 − 0.25P$$
$$Q_s = P − 20$$

Assume the government sets a price floor at $40. What is the change in consumer surplus after this price floor is implemented?

(A) -$100

(B) -$88

(C) -$66

(D) 0

Correct Answer: B

Steps:

First, find the free-market equilibrium price and quantity.

Set $Q_d = Q_s$

$20 - 0.25P = P - 20$

$40 = 1.25P$

$P = 32$, $Q = 12$

Find the vertical intercept of the demand curve.

Set $Q_d = 0$, $20 - 0.25P = 0$

$P = 80$

$CS = 0.5 * (80 - 32) * 12 = 288$

After the price floor is implemented, $Q_d = 20 - 0.25(40) = 10$

$CS = 0.5 * (80 - 40) * 10 = 0.5(10 * 40) = 200$

$\Delta CS = 200 - 288 = -88$

After the price floor is implemented, the consumer surplus decreases by $88.

10. The market for corn is perfectly competitive with the market demand and supply functions given as:

$$Q_d = 200 - 20P$$
$$Q_s = 80 + 10P$$

Where Q_d and Q_s are measured in millions of bushels, and P is measured in dollars per bushel. Suppose the government implements a unit tax of $2.50 on corn. Answer the following:

(A) Find the free-market equilibrium price and quantity.

(B) Find the equilibrium price and quantity after the imposition of the unit tax.

(C) Calculate the government tax revenue.

(D) What is the deadweight loss caused by the unit-tax?

Answer:

(A) Find the free-market equilibrium price and quantity.

Set $Q_d = Q_s$

$200 - 20P = 80 + 10P$

$P_0 = 4$, $Q_0 = 120$

At the free-market equilibrium, the price of wheat is $4 per bushel, and the quantity is 120 million bushels.

(B) Find the market price and quantity after the imposition of the tax.

Set $Q_d = Q_s$

Substituting $P_b = P_s + 2.5$ into the demand function.

$200 - 20(P_s + 2.5) = 80 + 10P_s$

$P_s = 2.33$

$P_b = P_s + 2.5 = 4.83$

$Q = 103.33$

After the imposition of the tax, consumers pay $4.83 per bushel, and sellers receive $2.33 per bushel. The after-tax equilibrium quantity is 103.33 million bushels.

(C) Calculate the government tax revenue.

Tax revenue = $2.50 × 103.33 = $258.33 million

(D) Calculate the deadweight loss for corn caused by the unit tax.

DWL = 0.5 × 2.50 × (120 − 103.33) = $20.84 million

11. In a competitive market, the market-clearing price is $5.30 and the quantity is 20. At P = $5.30, the consumer surplus of this market is 47. Assume the market demand function is linear. Derive the market demand function based on the above information.

Answer:

P = 10 − 0.235Q

Steps:

Assume the demand function is P = a − bQ

CS = 0.5 * (a − 5.3) * 20 = 47

Solve for a.

a = 10

Substituting P = 5.3, Q = 20, a = 10 into the demand function P = a − bQ.

5.3 = 10 − b * 20

b = 0.235

The market demand function is: P = 10 − 0.235Q

12. Market failure occurs in a situation where a/an _____ competitive market is _____ because prices _____ provide proper signals to consumers and producers.

    (A) regulated, efficient, fail to

    (B) unregulated, efficient, successfully

    (C) regulated, inefficient, successfully

    (D) unregulated, inefficient, fail to

Correct Answer: D

13. Which of the following is an example of a negative externality?

    (A) A third-party firm decides to ruin another firm's reputation by spreading false rumours about them.

    (B) An individual using winter tires creates a safer driving environment for all the other drivers around him or her.

    (C) An increase in air travel leads to air pollution, which poses a negative impact on other members of the society.

    (D) A beekeeper's bees extract nectar from a neighbour's apple tree orchard.

Correct Answer: C

14. In what circumstance does the burden of the tax fall mostly on sellers?

    (A) When demand and supply are equally elastic.

    (B) When supply is more elastic relative to demand.

    (C) When demand and supply are equally inelastic.

    (D) When demand is more elastic relative to supply.

Correct Answer: D

15. Assume the market demand and supply curves of gasoline are:

$$Q_d = 180 − 30P_b$$

$$Q_s = 70 + 25P_s$$

Assume a \$2 per litre gasoline tax is imposed. The after-tax market quantity is:

   (A) 87.3

   (B) 92.7

   (C) 82.7

   (D) 103.3

Correct Answer: **B**

Steps:

Set $Q_d = Q_s$

$180 - 30P_b = 70 + 25P_s$

Substituting $P_b = P_s + 2$ into the above equation

$180 - 30(P_s + 2) = 70 + 25P_s$

$25P_s + 30P_s = 180 - 70 - 60$

$55P_s = 50$

$P_s = 0.91$

$P_b = 0.91 + 2 = 2.91$

$Q = 180 - (30)(2.91) = 180 - 87.3 = 92.7$

Topic 7 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-70

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-105

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-72

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-106

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-112

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-107

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-74

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-75

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-71

An interactive H5P element has been excluded from this version of the text. You can view it online here:

https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-108

Topic 7 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=31#h5p-83

Topic 8: Monopoly

Topic 8 Practice Questions

(Credit: Coolcaesar/ Wikimedia Commons/ CC BY-SA 4.0)

1. Fred Co. is the only producer in the market. The market demand curve and total cost curve are given as: Q = 240 − 0.25P, and TC = $50Q − 0.5Q^2$. How many units should Fred Co. produce to maximize profit?

      (A) 303
      (B) 60
      (C) 130
      (D) 32

Correct Answer: C

Steps:

Rewrite the demand function Q = 240 − 0.25P

P = 960 − 4Q

MR = 960 − 8Q

TC = $50Q − 0.5Q^2$

MC = ΔTC/ΔQ = 50 − Q

The company maximizes its profit at MR = MC

960 − 8Q = 50 − Q

Solve for Q

Q = 130 units

2. Apple Inc. sells AirPods and enjoys monopoly power because no close substitutes are available to consumers. As more brands of wireless earbuds are introduced into the market, the demand for AirPods becomes _____ elastic and the value of the Lerner index _____.

        (A) less; decreases

        (B) more; decreases

        (C) less; increases

        (D) more; increases

Correct Answer: B

Steps:

As more brands of wireless earbuds are available to consumers, the demand for AirPods becomes more elastic.

The Lerner index of monopoly power = $(P − MC)/P = -1/E_d$. As Ed increases, the Lerner index decreases.

3. Suppose a CD shop is the only seller of music CDs in Hamilton. The demand curve for CDs is given as Q = 300 − 2P. The marginal cost is given as: MC = 10. Find the value of the Lerner index.

Answer: L = 0.875

Steps:

Rewrite Q = 300 − 2P

P = 150 − 1/2Q

MR = 150 − Q

The CD shop maximizes its profit at MR = MC

150 − Q = 10

Q = 140

Substituting Q = 140 into P = 150 − 1/2Q

P = 150 − 1/2 * 140 = 80

The Lerner index = (P − MC)/P = (80 − 10)/80 = 0.875

4. Sam's Oil Shop is the only supplier in the local market. The demand curve is given as: Q = 100 − 5p. Sam has two plants: Plant 1 and Plant 2. The marginal cost of each plant is given as:

$$MC_1 = 10 + 5Q_1$$
$$MC_2 = 15 + 5Q_2$$

Determine the profit-maximizing output level of each plant.

Answer: $Q_1 = 1.8$, $Q_2 = 0.8$

Steps:

Rearrange MC_1 and MC_2:

$Q_1 = MC_1/5 − 2$

$Q_2 = MC_2/5 − 3$

Sum Q1 and Q2 horizontally

$Q = MC_1/5 + MC_2/5 − 5$

Replace MC_1 and MC_2 using a common MC

Q = 2MC/5 − 5

$MC = (5Q + 25)/2$

Rearrange the market demand function

$P = 20 - Q/5$

$MR = \Delta TR/\Delta Q = 20 - 2Q/5$

Set MR = MC

$20 - 2Q/5 = (5Q + 25)/2$

$29Q = 75$

$Q \approx 2.59$

Substitute Q = 2.59 into MC

We get MC ≈ 18.98

When maximizing profit, $MC = MC_1 = MC_2$

Substitute MC = 18.98 into Q_1 and Q_2

$Q_1 = MC_1/5 - 2 = 18.98/5 - 2 = 1.796 \approx 1.80$

$Q_2 = MC_2/5 - 3 = 18.98/5 - 3 = 0.796 \approx 0.80$

5. Suppose SolarCar Inc. is the only firm that produces solar-powered cars. Its demand curve, marginal revenue, and marginal cost curve are as follows:
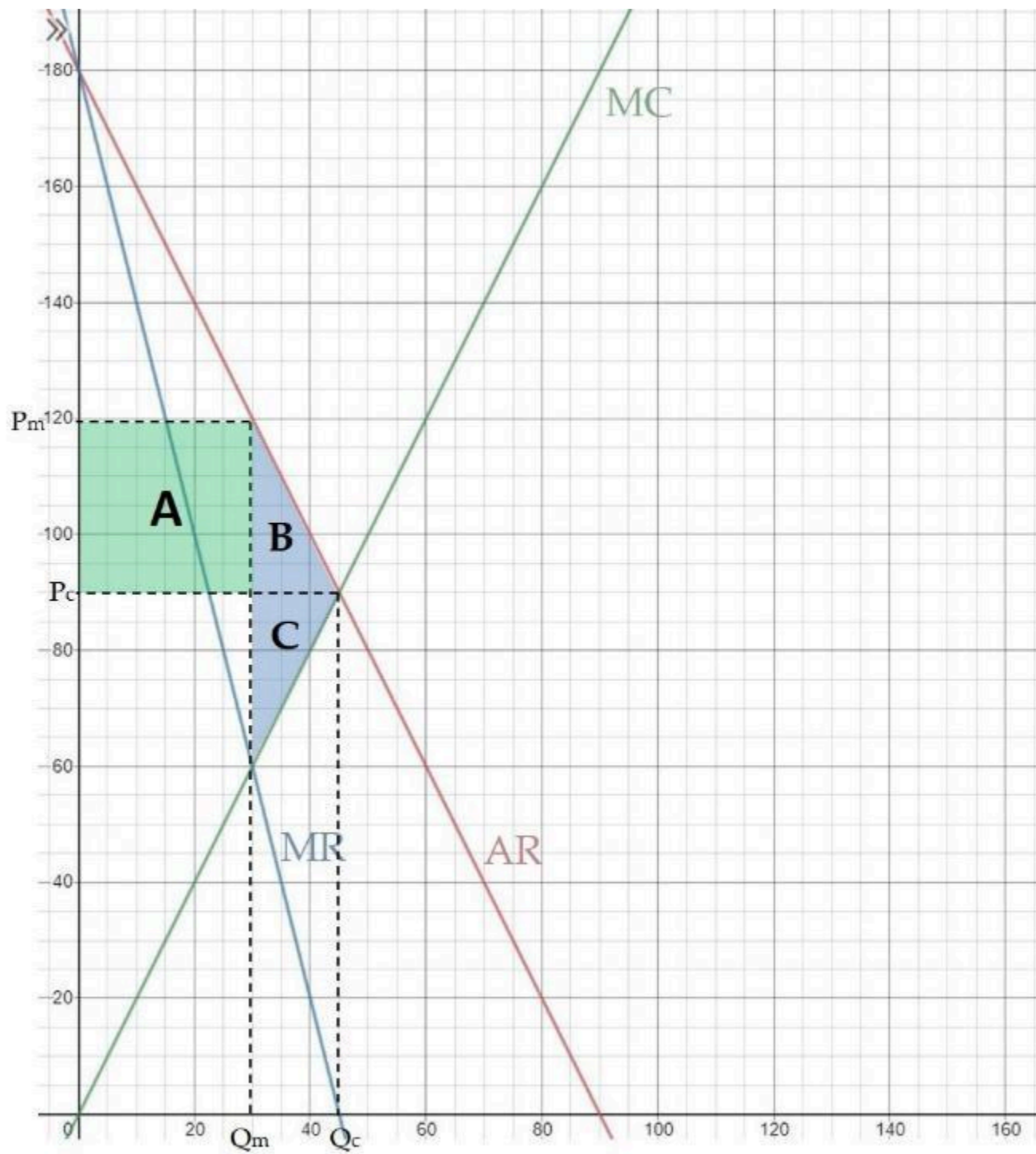
$$P = 180 - 2Q$$
$$MR = 180 - 4Q$$
$$MC = 2Q$$

Assume the market structure was initially perfectly competitive. Changing from perfect competition to monopoly, the change in consumer surplus is _____, and the change in producer surplus is _____. The deadweight loss caused by monopoly power is _____.

      (A) -1,125; 675; and 450

      (B) 900; 2,700; and -225

      (C) 1125; -675; and -450

      (D) -900; 2,700; and 225

Correct Answer: A

Steps:

As shown in the graph, changing from perfect competition to monopoly,

$\Delta CS = -(A + B)$

$\Delta PS = A - C$

The deadweight loss is area B and C.

To calculate areas A, B, and C, we need to find Q_c, Q_m, P_c, and P_m.

To find Q_c and P_c,

180 − 2Q = 2Q

Q$_c$ = 45

P$_c$ = 90

To find Q$_m$ and P$_m$,

MC = MR

180 − 4Q = 2Q

Q$_m$ = 30

P$_m$ = 120

Area A = 30 * (120 − 90) = 900

Area B = 0.5 * (45 − 30) * (120 − 90) = 225

At Q$_m$ = 30, MC = 2 * 30 = 60

Area C = 0.5 * (45 − 30) * (90 − 60) = 225

△CS = −(A + B) = −(900 + 225) = −1,125

△PS = A − C = 900 − 225 = 675

DWL = B + C = 225 + 225 = 450

6. A monopolist has a constant marginal cost of $30 per unit of output, and the price elasticity of demand is -3. What is the firm's profit-maximizing price?

> (A) $20
> (B) $45
> (C) $25
> (D) $10

Correct Answer: B

Steps:

The monopolist sets MR = MC to maximize profit.

MR = MC = 30

MR = P(1 + 1/E$_d$)

30 = P(1 + 1/(-3))

Solve for P

P = 45

7. Answer the following questions:

> (i) A monopolist wants to maximize his profit. Which output option will he choose?

> (ii) Assume the monopolist's objective is to maximize the total revenue. Which output option will he choose then?

>> (A) The output option where total revenue exceeds total cost.
>> (B) The output option where marginal revenue equals total cost.
>> (C) The output option where the slope of the total revenue curve and the slope of the marginal revenue curve are equal.
>> (D) The output option where the slope of total revenue curve and the slope of the total cost curve are equal.
>> (E) The output option where marginal revenue hits the horizontal axis.

Answer:

(i) D

(ii) E

8. A monopolist increases his firm's output and lowers his firm's price. As a result, his firm discovers that its total revenue decreases. In this situation, the firm should:

(A) Decrease output as it is producing in the elastic range of its demand curve.
(B) Increase output as it is producing in the elastic range of its cost curve.
(C) Decrease output as it is producing in the inelastic range of its demand curve.
(D) Increase output as it is producing in the inelastic range of its cost curve.

Correct Answer: C

Steps:

The fact that total revenue decreases when the price falls indicates that the monopolist is producing in the inelastic range of the demand curve. In this case, marginal revenue is negative. To maximize profit, the monopolist should decrease output.

9. Which of the following statements regarding natural monopoly is correct?

(A) Several firms are in this market.
(B) If the government sets price at the level where MC = AR, the firm will incur a loss and eventually go out of business.
(C) Without government intervention, the firm will set the price at MC = MR.
(D) Both B and C.

Correct Answer: D

10. Suppose a firm is the only computer producer in the local market. The market demand function is given as: Q = 200 − 2P. The firm's total cost function is given as: TC = 10Q.

The government levies a unit-tax of $10 on computers. What is the profit-maximizing price after the imposition of tax?

(A) $45
(B) $55
(C) $60
(D) $65

Correct Answer: C

Steps:

Q = 200 − 2P

Rearrange this equation: P = 100 − 0.5Q

MR = 100 − Q

TC = 10Q

MC = 10

With a unit tax t = 10, the new marginal cost function MC_t is:

MC_t = 10 + t = 10 + 10 = 20

Equate MR and MC to maximize profit

100 − Q = 20

Q = 80

Substituting Q = 80 into the demand function Q = 200 − 2P

Solve for P

P = 60

11. Which of the following markets would be best classified as an oligopsony?
        (A) The market for apples.
        (B) The market for cars.
        (C) The market for iPhones.
        (D) The market for spaceship engines.

Correct Answer: **D**

Steps:

An oligopsony defines a market with only a few buyers. The market for a highly expensive and specialized product such as spaceship engines would only have a few buyers compared to the other more traditional consumer products listed.

12. Barrick Gold Company is the only employer of miners in a remote region of the country. Assume the price of gold decreases, the firm's employment level _____ and the equilibrium wage _____.
        (A) decreases; decreases
        (B) decreases; increases
        (C) increases; decreases
        (D) increases; increases

Correct Answer: **A**

Steps:

If the price of gold decreases, MV will shift down. The labour supply schedule and ME will not change. The company set MV = ME to maximize profit. With a lower MV, both employment level and wage will decrease.

13. Consider a monopolist producer. The demand curve and total cost curve are given below:
$$Q = 180 - 2P$$
$$TC = 5Q$$

Suppose that a tax of $5 for each unit produced is imposed by the government. What is the monopolist's profit level after the imposition of the unit tax?
        (A) $3200
        (B) $4000
        (C) $3612.5
        (D) $3000

Correct Answer: **A**

Steps:
Rearrange $Q = 180 - 2P$
$P = 90 - 1/2Q$
$TR = 90Q - 1/2Q^2$
$MR = \Delta TR/\Delta Q = 90 - Q$
With the unit tax, $TC = 5Q + 5Q = 10Q$
$MC = \Delta TC/\Delta Q = 10$
Set MR = MC to maximize profit
$90 - Q = 10$
$Q = 80$
Substituting $Q = 80$ into the demand function
$P = 90 - \frac{1}{2}(80) = 50$

Profit = TR – TC = P * Q – 10Q = 50 * 80 – 10 * 80 = 3,200

14. Assume the rice market was changed from perfect competition to monopoly. Which of the following predictions regarding the rice market is true?

        (A) The price of rice decreases.
        (B) Consumer surplus decreases.
        (C) Producer surplus decreases.
        (D) A net social gain occurs.
        (E) The consumption of rice increases.

Correct Answer: **B**

15. Consider the only coal mining firm in the market. The total cost function is: $TC = 100 – 5Q + Q^2$, and the market demand is $P = 55 – 2Q$. What is the deadweight loss from monopoly power?

Suppose the government sets a maximum price at $27 per unit.

Find the following:

        1) market price and quantity
        2) the firm's profit
        3) consumer surplus, and
        4) deadweight loss both before and after the price ceiling is imposed.

Answer:

Before the price ceiling is imposed:
$P = 55 – 2Q$, $TR = P*Q = 55Q – 2Q^2$
$MR = dTR/dQ = 55 – 4Q$
$MC = dTC/dQ = 2Q-5$
Set MR = MC
$55 – 4Q = 2Q-5$
$Q = 10$, $P = 55 – 2(10) = \$35$
Economic profit = TR – TC = $35 * 10 – (100 – 5 * 10 + 10^2) = 200$
Substituting Q = 0 into P = 55 – 2Q
The choke price = 55
CS = (0.5) * 10 * (55 – 35) = \$100
The deadweight loss is shown in the area below the demand curve, above the marginal cost curve, and between the quantities of 10 and 15.
DWL = 0.5 * (35 – 15) (15 – 10) = \$50

After the imposition of the price ceiling:
$P_{max} = \$27 < 35$, so this price ceiling is effective.
Substituting P = \$27 into the demand equation P = 55 – 2Q
$27 = 55 – 2Q$
$Q = 14$. $P = 27$
Economic profits = TR – TC = $27 * 14 – (100 – 5 * 14 + 14^2) = 152$
CS = (0.5) * (55 – 27) * (14) = 196
DWL = 0.5 * (15 – 14) (27 – 23) = 2

16. Suppose a monopolist has a market demand of P = 120 – 3Q and the firm's marginal cost curve is constant, MC = 50. The government has imposed a $1 tax on each unit of goods sold. How much has the price changed?

        (A) $1

(B) $0.51
(C) $2.30
(D) $1.10
(E) Not enough information

Correct Answer: B
Steps:
Initially:
P = 120 − 3Q
MR = 120 − 6Q
MC = 50 before tax
Set MC = MR to maximize profit
120 − 6Q = 50
Q_m = 11.67
P_m = 120 − 3 * 11.67 = $84.99
After the tax is imposed
MC_t = MC + t = 50 + 1 = 51
Set 120 − 6Q = 51
Q = 11.5
Substituting Q = 11.5 into P = 120 − 3Q
P = 120 − 3 * 11.5 = $85.5
$85.5 − $84.99 = $0.51
After the tax is imposed, the price increases by $0.51

17. Consider a monopolist with the following total cost function: TC(q) = 55 + q^2. Assume the market demand is given as: P = 60 − 2q. The profit-maximizing price and quantity are_____, and the economic profit is _____.

     (A) P = 10, Q = 40; 225
     (B) P = 20, Q = 10; 345
     (C) P = 40, Q = 10; 245
     (D) P = 10, Q = 20; 245

Answer: C
Steps:
P = 60 − 2q
MR = 60 − 4q
TC(q) = 55 + q^2
MC = ΔTC/ΔQ = 2q
Set MR = MC to maximize profit
60 − 4q = 2q
q = 10
Substituting q = 10 into P = 60 − 2q
P = 40
Economic profit = TR − TC = P * q − TC = 40 * 10 − (55 + 10^2) = 245

Topic 8 H5P Interactive Questions

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-76

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-77

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-78

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-79

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-80

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-81

Topic 8 Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/intmicrotest/?p=33#h5p-84

Contact information

Dr. Zhen He

Assistant Professor Teaching Track

Department of Economics, McMaster University

hez13@mcmaster.ca

https://socialsciences.mcmaster.ca/people/he-zhen