

Test Form: A

Queen's University
Faculty of Arts and Science
Continuing and Distance Studies
Department of Economics

ECON 111: Introductory Microeconomics
Final Examination

Winter 2019

Instructor: Xiaoran Guo

Instructions

This examination is **THREE HOURS** in length.

There are **THREE SECTIONS** to this examination:

Part A (60%): Answer **ALL** 40 Multiple-Choice Questions (1.5% Each)

Part B (20%): Answer **FOUR** of **SIX** True/False/Uncertain Questions (5% Each)

Part C (20%): Answer **ONE** of **TWO** Problem Solving Questions

Mark your selection for Part A on the multiple-choice answer card in PENCIL. If you make changes, be sure to erase completely. Please record your name, student I.D. number and test form on the multiple choice answer card. Hand in the card inside your answer booklet.

Write your answers for Part B and Part C in the booklet provided. Put your student number on the front of all answer booklets.

Proctors are unable to respond to queries about the interpretation of exam questions. Do your best to answer exam questions as written.

The following aids are allowed: Non-programmable Calculator (Blue Stickers, Gold Stickers, Casio 991).

Name: _____ Student Number: _____

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IMPORTANT!

SCANTRON SHEET INSTRUCTIONS

1. Write your student number under "I.D. Number" on the Answer Sheet and fill in the appropriate rectangle below each number. (If your number starts with a 0, remember not to omit it.) See example below.
2. Print your last name followed by your first name in the appropriate space and fill in the appropriate rectangle under each letter. (If your name is too long to fit in the spaces provided, please enter as many letters as you can.) See example below.
3. Under "Test Form", fill in "A". See example below.
4. Print your name in "Name". See example below.

Queen's University

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Part A: MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Suppose Andrea has a job that pays her \$25 000 per year (after taxes). She is considering quitting her job and going to university full time for four years. Tuition fees and books will cost \$12 000 per year. Living expenses in either situation will cost \$10 000 per year. What is the opportunity cost of Andrea's four-year university degree?

A) \$88 000 B) \$100 000 C) \$188 000 D) \$120 000 E) \$148 000

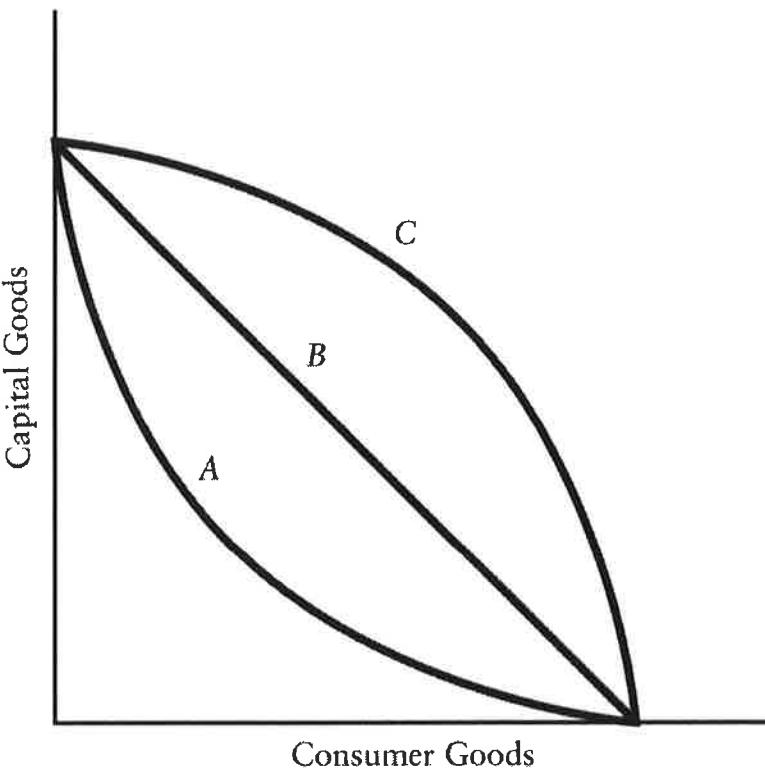


FIGURE 1-5

- 2) Refer to Figure 1-5. Which production possibilities boundaries exhibit decreasing opportunity costs?

A) boundaries A and C
B) boundary B only
C) boundary A only
D) boundary C only
E) boundaries A and B

- 3) In a modern mixed economy the government ensures that key institutions are in place to facilitate voluntary transactions between economic agents. These key institutions are

A) the House of Commons and the Senate.
B) securities regulators and the court system.
C) labour and capital markets.
D) the Department of Finance and the Bank of Canada.
E) private property and freedom of contract.

- 4) Which of the following is a normative statement? 4) _____
- A) Queen Elizabeth II is the wealthiest woman in the world.
 - B) Reducing unemployment is more important than reducing inflation.
 - C) An increase in the price of lumber is followed by a decrease in the construction of new houses.
 - D) The sun rises in the west and sets in the east.
 - E) A government deficit will reduce unemployment and cause an increase in prices.
- 5) What is the best way to display the unemployment rate in each of the world's developed economies in 2015? 5) _____
- A) a scatter diagram with two variables
 - B) a scatter diagram
 - C) a cross-sectional bar chart graph
 - D) a time series line graph
 - E) a cross-sectional graph with time-series data
- 6) Suppose that over a 12-month period, Sonali's income (Y) rises from \$27 000 to \$35 000 per year and, as a result, her spending on travel (T) increases from \$1500 to \$2500 per year. Assume there is a linear relation between the two variables, Y and T. What is the *marginal response* in T to a change in Y? 6) _____
- A) 0
 - B) 0.125
 - C) 4
 - D) 8
 - E) 0.25

Consider the following information about the production of two goods, X and Y, in two countries, A and B:

- In Country A it takes X_A units of resources to produce one unit of X and Y_A units of resources to produce one unit of Y.
- In Country B it takes X_B units of resources to produce one unit of X and Y_B units of resources to produce one unit of Y.
- Assume the amount of resources used to produce the goods in the two countries can be compared unambiguously.

TABLE 32-1

- 7) Refer to Table 32-1. If the ratio X_A/Y_A is less than the ratio X_B/Y_B , then we can say with certainty 7) _____ that
- A) The opportunity cost of producing good X in Country A is less than in Country B.
 - B) Country A has a comparative advantage in the production of good X.
 - C) The opportunity cost of producing good X in Country A is higher than in Country B.
 - D) Country A has an absolute advantage in the production of good X.
 - E) Both A and B are correct.
- 8) Suppose that the demand and supply curves in the market for apples have the following functional form: $Q_D = 250 - 4p$ and $Q_S = 10 + p$. If the prevailing price on the market is 50, then 8) _____
- A) the market is clearing.
 - B) the market exhibits an excess supply of 10 units.
 - C) the market exhibits an excess demand of 10 units.
 - D) the market exhibits an excess supply of 240 units.
 - E) the market exhibits an excess demand of 240 units.

The table below displays hypothetical demand and supply schedules for the market for overnight parcel deliveries in Canada.

	Quantity Demanded (millions)		Quantity Supplied (millions)	
Price (\$)	Year 1	Year 2	Year 1	Year 2
30	80	95	140	125
26	90	105	135	120
22	100	115	130	115
18	110	125	125	110
14	120	135	120	105
10	130	145	115	100

TABLE 3-4

9) Refer to Table 3-4. Which of the following statements describes a likely event in the market for overnight parcel delivery? From Year 1 to Year 2,

9) _____

- A) there was a rise in the price of jet fuel.
- B) there was a decrease in consumers' income.
- C) the price of regular parcel delivery decreased.
- D) the number of suppliers of overnight parcel delivery service increased.
- E) there was an improvement in technology for tracking overnight parcels.

Consider the following data for a hypothetical economy.

Year	Average Household Income (\$)	Price of Transit Passes (\$)	Quantity Demanded of Transit Passes	Price of Gasoline (\$/litre)	Quantity Demanded of Gasoline (millions of litres)
2012	80 000	60	99 000	0.95	1940
2013	80 000	60	101 000	1.05	2060

TABLE 4-5

10) Refer to Table 4-5. The cross-price elasticity of demand for transit passes in terms of the price of gasoline is _____. We can therefore conclude that these two goods are _____. 10) _____

10) _____

- A) 0.5; complements
- B) 0.33; substitutes
- C) 0.2; substitutes
- D) 0.33; complements
- E) 0.2; complements

11) Consider the Canadian market for barley. Suppose a marketing board sets a production quota which is below the equilibrium quantity. The quota will cause the price of barley to _____ and the total revenue earned by Canadian barley farmers to _____.

11) _____

- A) remain unchanged; remain unchanged
- B) fall; fall if demand is inelastic
- C) fall; fall if demand is elastic
- D) rise; rise if demand is inelastic
- E) rise; rise if demand is elastic

Demand and Supply Schedules for Chocolate Bars

Price (\$)	Quantity Demanded (thousands per week)	Quantity Supplied (thousands per week)
2.00	1500	2100
1.80	1600	2050
1.60	1700	2000
1.40	1800	1950
1.20	1900	1900
1.00	2000	1850
0.80	2100	1800
0.60	2200	1750
0.40	2300	1700

TABLE 5-1

- 12) Refer to Table 5-1. Suppose the government *imposed* a price of \$0.60 per chocolate bar. The result _____ would be _____
- A) excess supply of 1750 chocolate bars per week.
 - B) excess supply of 450 chocolate bars per week.
 - C) stockpiling of unsold chocolate bars.
 - D) excess demand of 450 chocolate bars per week.
 - E) excess demand of 2200 chocolate bars per week.
- 13) The long-run elasticity of supply of rental housing is greater than the short-run elasticity of supply because _____
- A) changes in supply occur only after investment decisions are made regarding, for example, new construction or conversion of rental housing to other uses.
 - B) the demand for rental housing is changing continuously.
 - C) investment in new rental housing has such a short payback period.
 - D) changes in supply can occur very quickly, especially when rent controls are in place.
 - E) in the long run, landlords have no incentive to alter the supply of rental housing.
- 14) Consider the market for any agricultural commodity for which there exists a binding output quota and demand is inelastic. Any individual producer has a clear financial incentive to _____
- A) limit production of the commodity.
 - B) produce a small amount beyond their individual quota amount.
 - C) leave the market.
 - D) stop producing.
 - E) give away their quota.

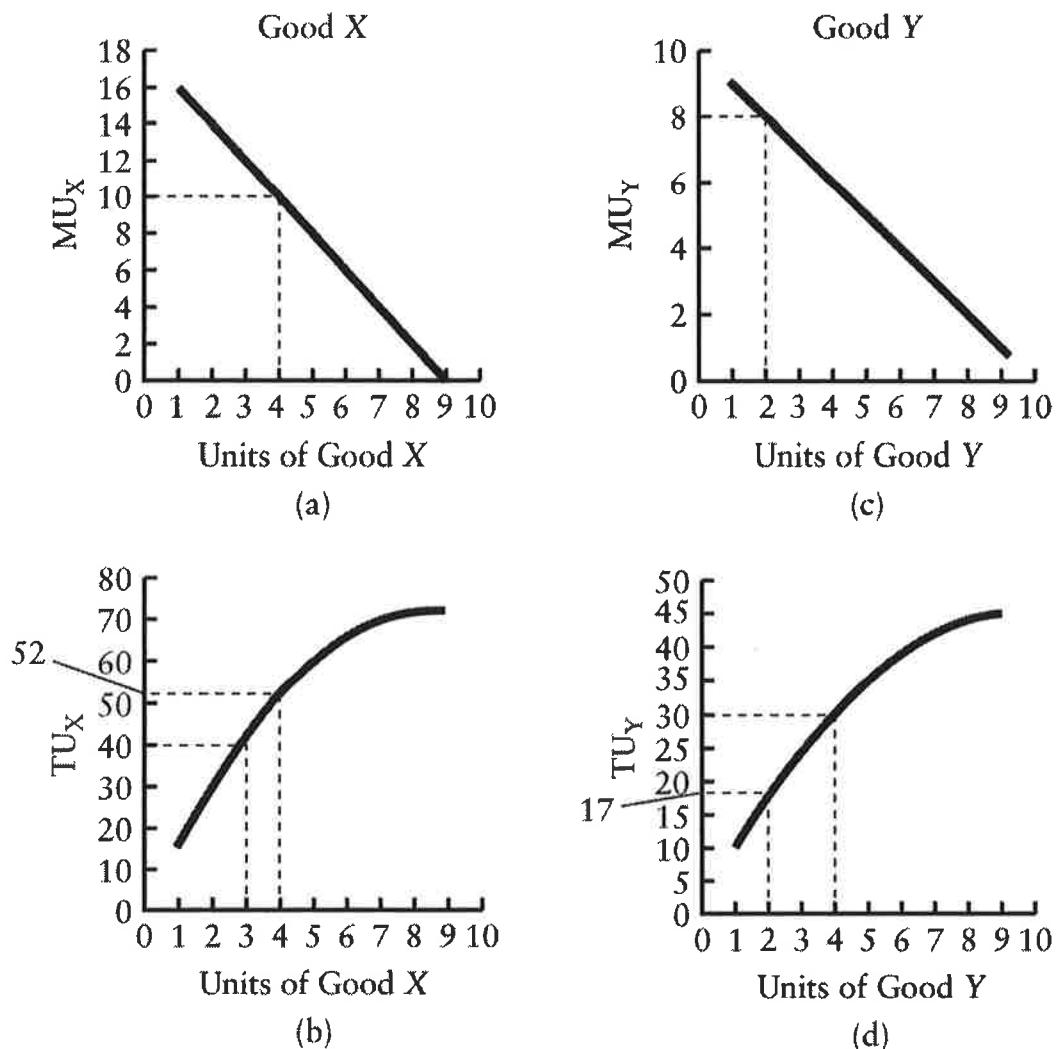


FIGURE 6-2

- 15) Refer to Figure 6-2. Suppose the price of Y is \$1, the consumer's income is \$10, and the consumer is currently buying 3 units of good X and 4 units of good Y. If this consumer is maximizing her utility, then the price of X must be 15) _____
- \$1.
 - \$2.
 - \$3.
 - \$4.
 - Impossible to tell with the given information.

16) Assume you are consuming two goods, X and Y. X and Y are both normal goods but they are not close complements. The price of good X increases but the price of Y remains unchanged. However, you are given enough additional income to ensure that your utility remains unchanged. What happens to your consumption of good X? 16) _____

- A) it increases
- B) it stays the same
- C) it decreases
- D) it increases over the long run
- E) it increases or decreases

The table below shows the total value (in dollars) that Andrew gets from playing 9-hole rounds of golf.

Rounds of Golf per Month	Total Value (\$)
0	0
1	40
2	70
3	92
4	108
5	120
6	130
7	130

TABLE 6-3

17) Refer to Table 6-3. If the price of a 9-hole round of golf is \$22, and Andrew is maximizing his utility, then his consumer surplus will be 17) _____

- A) \$26.
- B) \$22.
- C) \$108.
- D) \$92.
- E) \$202.

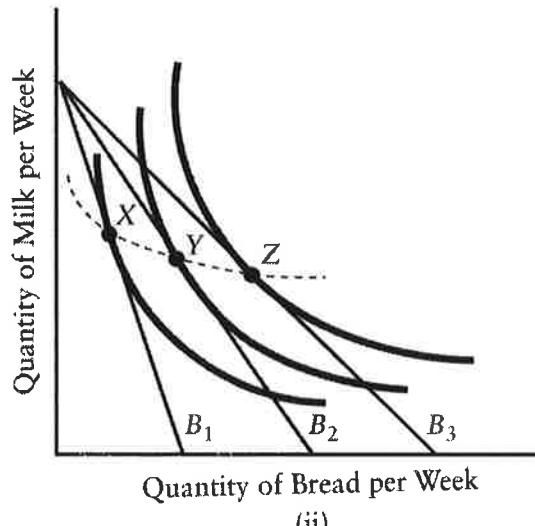
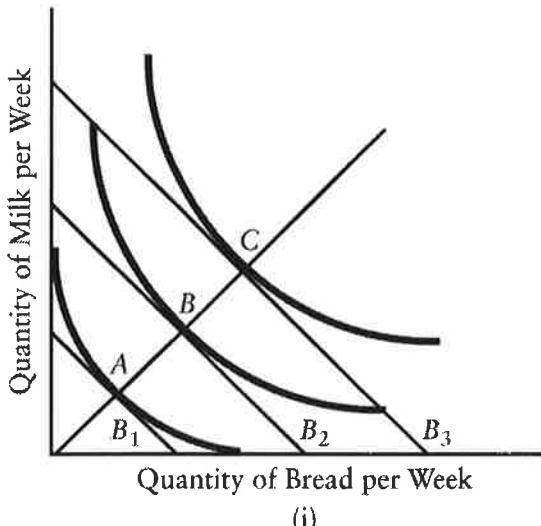


FIGURE 6-9

- 18) Refer to Figure 6-9. In part (ii), the consumer's move from point Z to point Y is caused by
- 18) _____
- a decrease in money income.
 - an increase in the price of bread.
 - a change in the consumer's preferences towards milk.
 - a decrease in the price of bread.
 - an increase in the price of milk.

Sophie consumes two goods — paperback novels and visits to the movies.

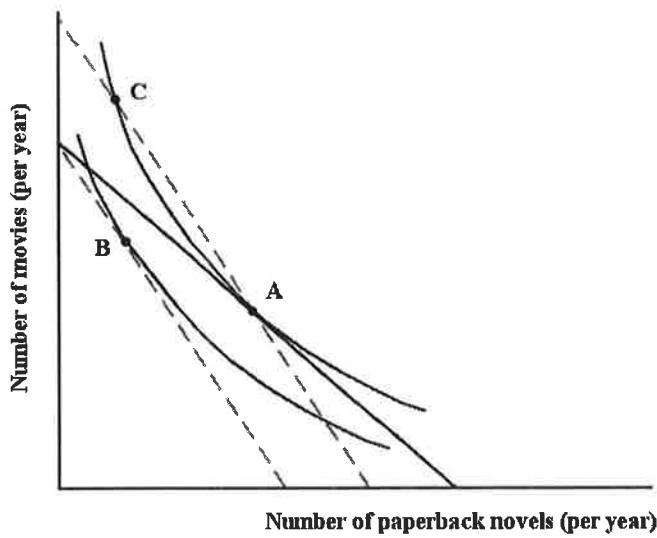


FIGURE 6-12

- 19) Refer to Figure 6-12. Sophie's movement from point A to point C is
- A) the substitution effect of an increase in the price of paperback novels.
 - B) the total effect of a decrease in the price of paperback novels.
 - C) the income effect of a decrease in the price of paperback novels.
 - D) the income effect of an increase in the price of paperback novels.
 - E) the total effect of a change in money income.

19) _____

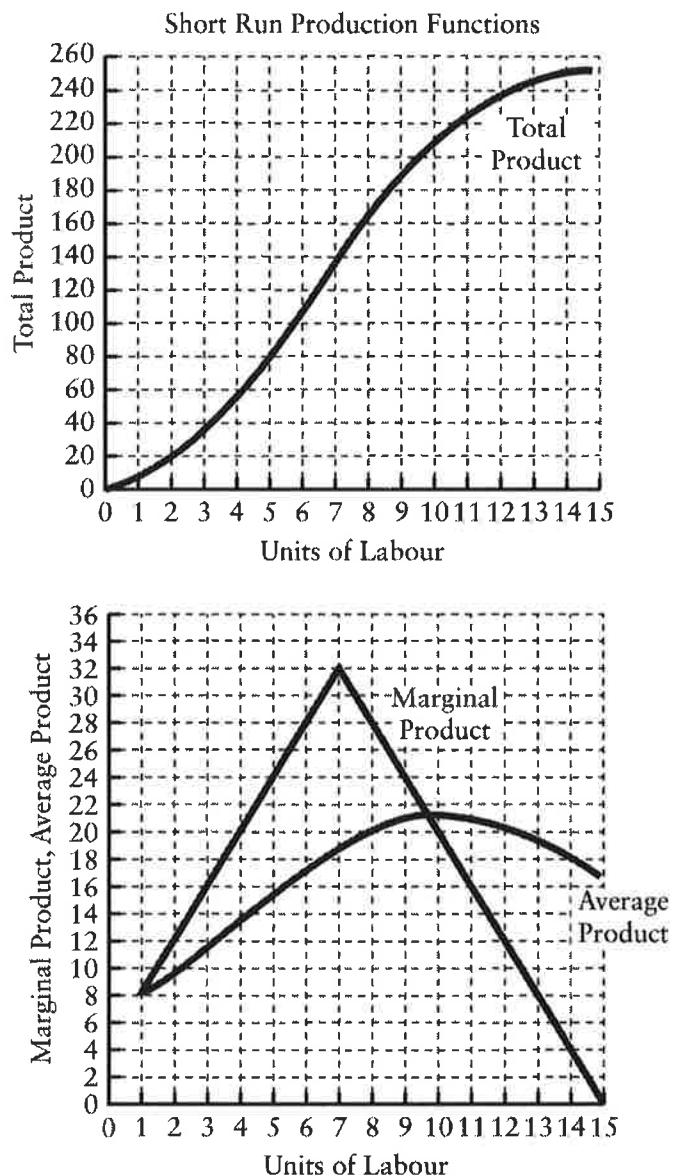


FIGURE 7-1

- 20) Refer to Figure 7-1. Total product is increasing at a decreasing rate
- from 0 to 20 units of output.
 - from 0 to 32 units of output.
 - between 140 to 200 units of output.
 - between 140 to 250 units of output.
 - over the whole production range.

20)

The diagram below shows some short-run cost curves for a firm.

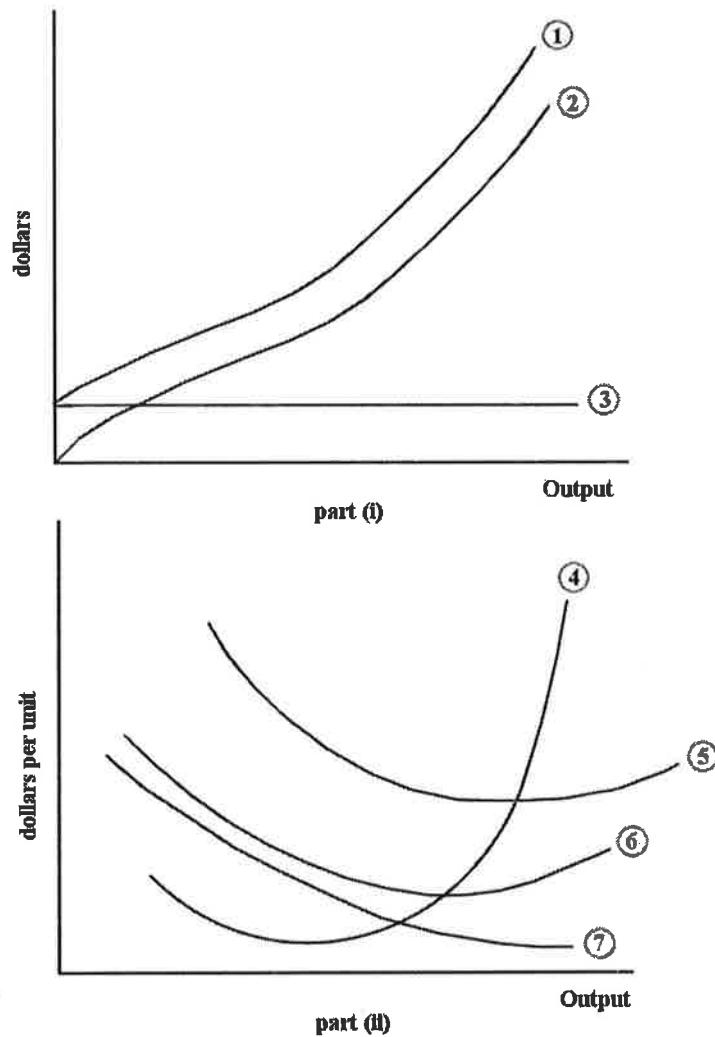


FIGURE 7-2

21) Refer to Figure 7-2. Which of the following choices correctly identifies the cost curves in part (ii) of the figure? 21) _____

- A) Curve 4 is the average fixed cost curve.
Curve 5 is the average total cost curve.
Curve 6 is the marginal cost curve.
Curve 7 is the average variable cost curve.
- B) Curve 4 is the marginal cost curve.
Curve 5 is the average variable cost curve.
Curve 6 is the average fixed cost curve.
Curve 7 is the average total cost curve.
- C) Curve 4 is the marginal cost curve.
Curve 5 is the average fixed cost curve.
Curve 6 is the average variable cost curve.
Curve 7 is the average total cost curve.
- D) Curve 4 is the average total cost curve.
Curve 5 is the marginal cost curve.
Curve 6 is the average variable cost curve.
Curve 7 is the average fixed cost curve.
- E) Curve 4 is the marginal cost curve.
Curve 5 is the average total cost curve.
Curve 6 is the average variable cost curve.
Curve 7 is the average fixed cost curve.

22) Suppose Farmer Smith hires 4 workers and leases 2 tractors and 15 hectares of farmland for one growing season, and produces 120 000 bushels of crop. The next year he hires 8 workers and leases 4 tractors and 30 hectares of farmland, and produces 260 000 bushels of crop. This firm (the farmer) is exhibiting _____ returns to scale. 22) _____

- A) decreasing
- B) increasing
- C) constant
- D) marginal
- E) variable

23) Which of the following statements most accurately makes the distinction between the *long run* and the *very-long run* with respect to the long-run average cost (LRAC) curve? 23) _____

- A) In the long run, the LRAC curve is shifting down, whereas in the very-long run the firm is moving along the existing LRAC curve.
- B) In the long run, the firm is moving along the existing LRAC curve, whereas in the very-long run, the LRAC curve is shifting up.
- C) In the long run, the firm is moving along the existing LRAC curve, whereas in the very-long run, the LRAC curve is shifting down.
- D) In the long run, the LRAC curve is shifting up, whereas in the very-long run the firm is moving along the existing LRAC curve.
- E) There is no distinction between the long run and the very-long run with respect to the LRAC curve.

- 24) Suppose XYZ Corp. is producing and selling disposable wooden chopsticks in a perfectly competitive market. The market price is \$0.04 per unit and the firm is selling 1 million units per month. Now suppose the firm increases its stated price to \$0.05 per unit. According to the theory of perfect competition, the result will be

24)

- A) total revenue will decrease from \$50 000 to \$40 000 per month.
- B) total revenue will increase from \$40 000 to \$50 000 per month.
- C) total revenue for this firm will fall dramatically, perhaps to zero.
- D) total revenue for this firm will increase, but by less than \$10 000 per month.
- E) no change in the firm's total revenue.

Consider the total cost and revenue curves shown below, for two perfectly competitive firms, Firm A and Firm B.

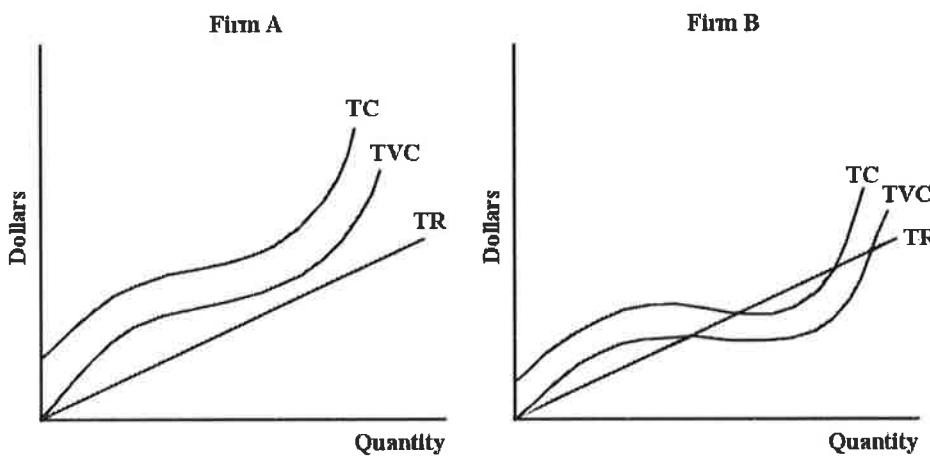


FIGURE 9-4

- 25) Refer to Figure 9-4. If both Firms A and B are producing a level of output such that the slope of the TC curve is equal to the slope of the TR curve,

25)

- A) then both firms are suffering losses because the distance between TR and TC is the smallest.
- B) then $MC = MR$ but the firm may not be maximizing its profits.
- C) then the ATC is at a minimum and the firm is maximizing profits.
- D) then $MC = MR$ and the firm is maximizing profit (or minimizing losses).
- E) then both firms are earning positive economic profits because the distance between TR and TC is the greatest.

- 26) Consider the textile industry, which we assume to be a competitive industry, and which experiences continuous cost-reducing technological change. Which of the following statements best describes this industry?

26)

- A) High-cost textile mills will co-exist with low-cost mills as long as the revenue for the high-cost mills is covering their variable costs.
- B) The price of the product is determined by the minimum ATC of the lowest-cost plants.
- C) All textile mills in the industry will be earning zero economic profits or losses.
- D) Both A and B
- E) Both B and C

27) The main argument of Joseph Schumpeter's idea of "creative destruction" is that

27) _____

- A) monopoly profits lead to innovation in an effort to sustain those profits.
- B) short-run profits created by the existence of monopolies will lead to antitrust legislation, which will force the fragmentation of monopolies into competitive industries.
- C) monopolies create profits for themselves at the expense of the destruction of consumer surplus.
- D) perfectly competitive industries are characterized by more productive innovation and productivity growth than monopolistic industries, which Schumpeter regarded as destructive.
- E) the existence of monopolies leads to destruction of the environment.

28) In November 2012, there was some discussion of several south-Asian countries joining together to restrict the supply of rice to the world market. Between them, these countries' exports of rice account for 40% of the total global trade. What would they be trying to accomplish?

28) _____

- A) They are attempting to act as a bloc to restrict entry of new producers to the world market, and thereby protect their joint profits.
- B) They are attempting to form a cartel, jointly restrict output, and increase the world price of rice.
- C) They are attempting to form a cartel, increase their joint output, and control a larger percentage of the total global trade.
- D) They are attempting to form a cartel, drive other producers out of the world market and then increase their output of rice.
- E) They are attempting to price discriminate between consumers of their exported rice, thereby increasing their share of the global trade and increasing their joint profits.

The diagram below shows the demand curve and marginal cost and marginal revenue curves for a new heart medication for which the pharmaceutical firm holds a 20-year patent on its production and sales. This protection gives the firm monopoly power for the 20 years of the patent.

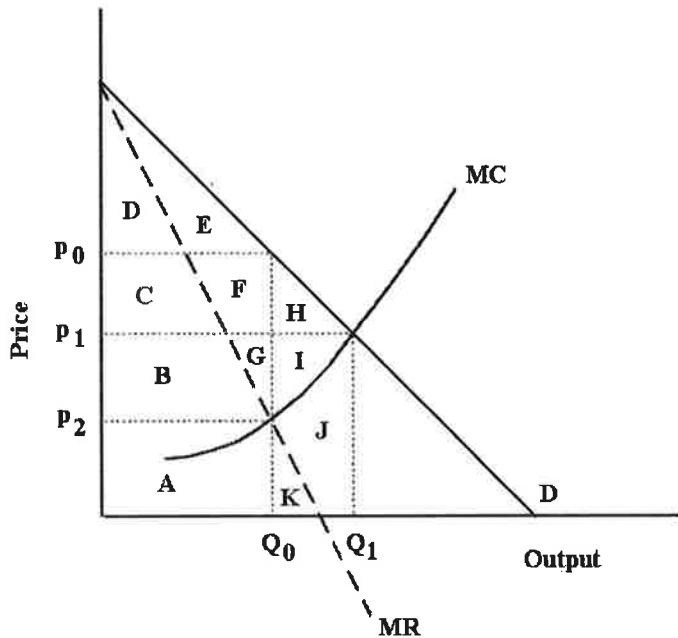


FIGURE 10–6

- 29) Refer to Figure 10–6. Assume this pharmaceutical firm is practicing perfect price discrimination among its buyers. At its profit-maximizing level of output, it will generate a deadweight loss to society represented by

29) _____

- A) areas I + J + K.
- B) areas H + I + J + K.
- C) areas H + I.
- D) There is no deadweight loss generated.
- E) It is not possible to determine with the information provided.

The diagram below shows selected cost and revenue curves for a firm in a monopolistically competitive industry.

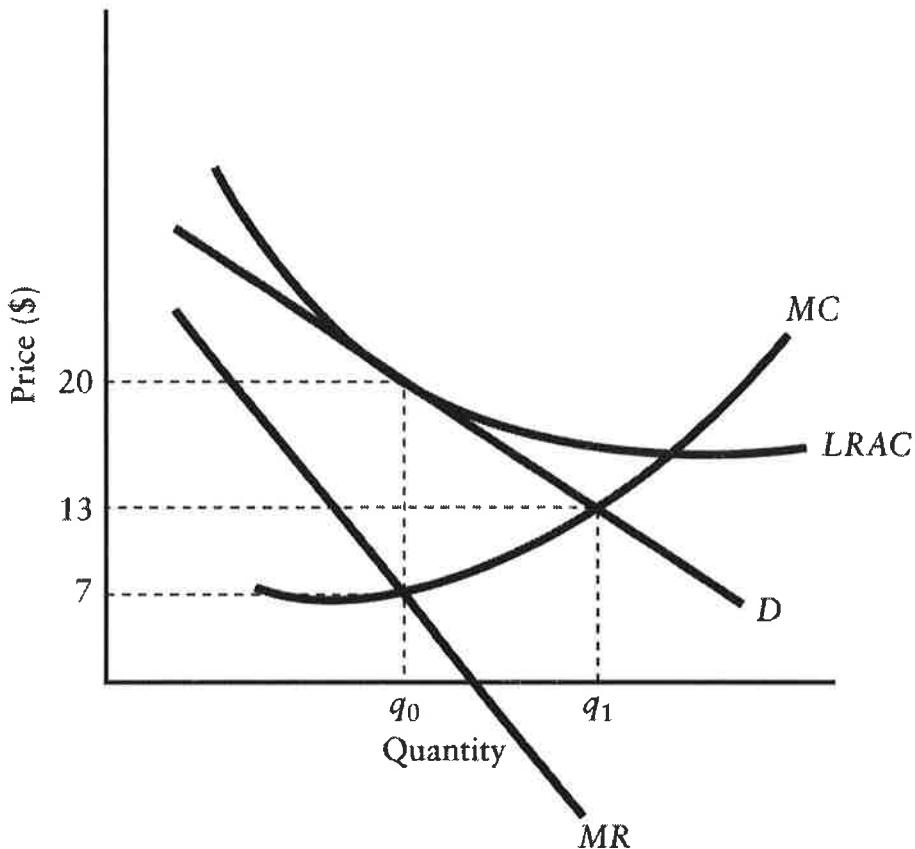


FIGURE 11-4

30) Refer to Figure 11-4. How is the excess-capacity theorem demonstrated in this diagram?

30)

- A) The short-run equilibrium occurs where the firm is producing output at q_0 , which is less than that corresponding to the lowest point on its LRAC curve.
- B) The long-run equilibrium occurs where the firm is producing output at q_1 , which is the same as for a perfectly competitive industry.
- C) The long-run equilibrium occurs where the firm is producing output at q_0 , which is less than that corresponding to the lowest point on its LRAC curve.
- D) In long-run equilibrium, this firm has excess capacity because they are selling output at a price below their LRAC.
- E) In long-run equilibrium the firm is earning positive profits, but has unexploited economies of scale.

Suppose two firms, Allstom from France, and Bombardier from Canada, are bidding on a contract to replace train cars for the subway system in Mexico City. If they bid the same amount, they share the contract—otherwise, the low bid wins. The figure below shows the payoff matrix for this contest.

		Allstom (A)	
		A bids \$50 million	A bids \$35 million
Bombardier (B)	B bids \$50 million	Profit to A: \$10 m Profit to B: \$10 m	Profit to A: \$5 m Profit to B: \$0 m
	B bids \$35 million	Profit to A: \$0 Profit to B: \$5 m	Profit to A: \$2.5 m Profit to B: \$2.5 m

FIGURE 11–5

- 31) Refer to Figure 11–5. What is the Nash equilibrium in this bidding contest between Allstom and Bombardier?

31) _____

- A) The two firms will co-operate and maximize their joint profits at \$10 million each.
- B) Each firm will bid the high price, expecting a larger total profit.
- C) Each firm will bid the low price, and each will earn a profit of \$2.5 million.
- D) There is no Nash equilibrium in this bidding contest, because each firm can expect to earn at least \$5 million.
- E) both A and C are Nash equilibria.

- 32) Suppose there are only five construction companies in a particular region that are each large enough to take on large public infrastructure projects (roads, bridges, sewers, etc.). Representatives of these companies meet regularly for coffee or on the golf course and agree on which company will submit the lowest bid for a particular project. This type of firm behaviour is an example of

32) _____

- A) tacit collusion, and is legal as long as output is not restricted.
- B) cooperative behaviour that results in increased consumer welfare.
- C) predatory pricing, and is meant to prevent new entrance to the industry.
- D) explicit collusion and is illegal.
- E) cooperative behaviour that results in higher output and lower prices.

The diagram below shows the demand and supply curves in a perfectly competitive market.

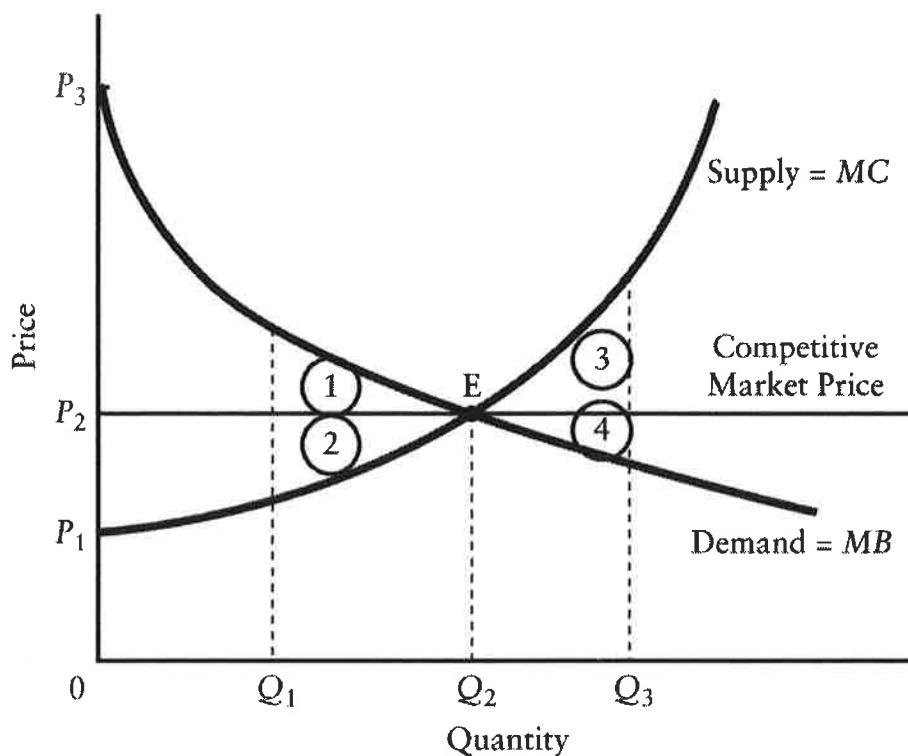


FIGURE 12-5

- 33) Refer to Figure 12-5. If output in this market were Q_3 , and the price were still P_2 , the loss in consumer surplus relative to the competitive equilibrium would be illustrated by area

33) _____

- A) 1. B) 2. C) 3. D) 4. E) 3 + 4.

- 34) In many cases throughout Canadian history, governments have sought to control the behaviour of oligopolistic firms through either ownership or regulation. Policymakers are now skeptical of such practices because

34) _____

- 1) many innovations in products and production methods that have led to increases in living standards are attributable to firms in oligopolistic industries;
- 2) it became clear that oligopolistic industries can achieve both productive and allocative efficiency through government intervention;
- 3) the regulatory body often ends up protecting the firms from competition.

- A) 1 only B) 2 only C) 3 only D) 1 and 2 E) 1 and 3

35) Canadian governments (federal, provincial and municipal) employ public ownership or regulation of industries in an effort to 35) _____

- A) ensure that the goal of profit maximization is being pursued because this ensures allocative efficiency.
- B) protect consumers from the high prices and restricted output associated with monopoly power.
- C) produce a more equitable distribution of income between consumers and producers with monopoly power.
- D) transfer monopoly profits from private firm owners to the government.
- E) promote productive efficiency in all industries.

36) Other things being equal, if it becomes more difficult to substitute capital for labour in the production of cell phones, the demand curve for labour in that industry 36) _____

- A) will shift parallel to the left.
- B) will become more elastic.
- C) will shift parallel to the right.
- D) will become more inelastic.
- E) will remain unchanged.

The three diagrams below each show a supply curve for oil tankers over a relatively short period of time.

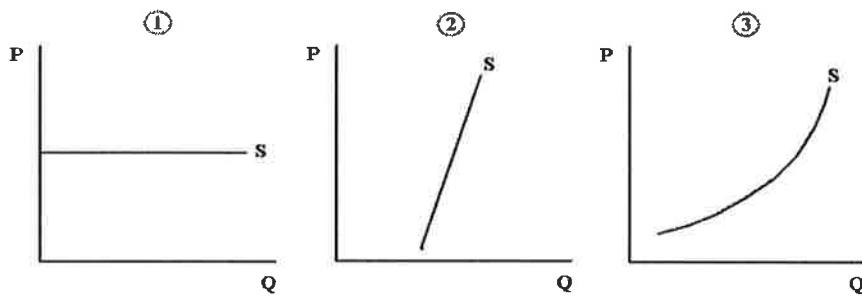


FIGURE 13-3

37) Refer to Figure 13-3. Consider oil tankers as a factor of production (for example, for the production of gasoline). Which diagram shows the most mobility of this factor of production? 37) _____

- A) diagram 1
- B) diagram 2
- C) diagram 3
- D) none of the diagrams
- E) each diagram shows mobility

The demand and supply curves shown below apply to a competitive market for a factor used in the production of widgets.

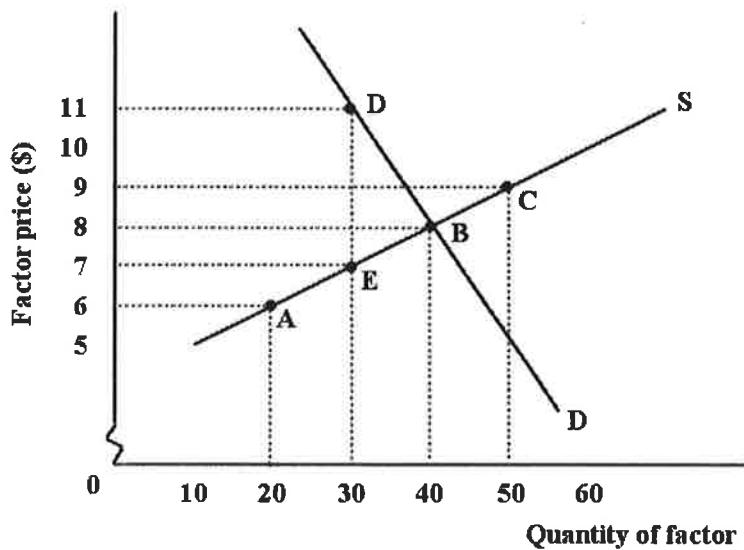


FIGURE 13-2

- 38) Refer to Figure 13-2. This factor market is in equilibrium at point B. If a technological change occurs in the production of widgets that allows for increased production from each factor, then
- A) economic rents to the initial 40 units of the factor will decrease.
 - B) total factor earnings will decrease and economic rent to the initial 40 units will increase.
 - C) equilibrium will move toward point D and the factor price will rise.
 - D) total factor earnings will rise and economic rent to the 40th unit will be zero.
 - E) equilibrium will move toward point C and economic rent to the initial 40 units will increase.

38) _____

The diagram below shows the domestic demand and supply curves for cotton towels in Canada. The prevailing world price of cotton towels is P_W . Assume that all cotton towels are identical.

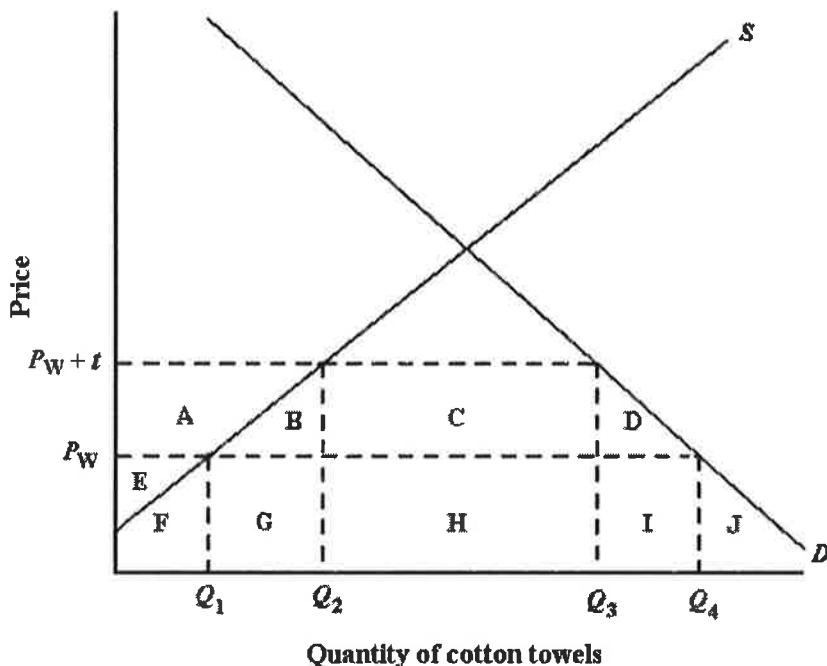


FIGURE 33-3

- 39) Refer to Figure 33-3. If Canada has free trade in cotton towels, foreign producers' revenues from their Canadian sales will be equal to the amount

39)

- A) E + F.
- B) E + F + G + H + I + J.
- C) A + B + E + F + G.
- D) G + H + I.
- E) E + F + G + H + I.

- 40) Suppose Canada has a 20% tariff on the import of carpets, and Canada currently imports this product from India at a with-tariff price of \$22. The with-tariff price of identical carpets from the United States is \$24. Now suppose a free-trade agreement with the U.S. eliminates the tariff and so the no-tariff price from the U.S. is \$20. Canada now purchases carpets from the U.S. Is Canada made better off from this trade diversion?

40)

- A) Yes, because Canada has diverted trade toward the United States.
- B) No, because it would still be cheaper for individual consumers to buy carpets from India.
- C) No, because before the agreement Canada was buying from India at a lower (pre-tariff) price and collecting tariff revenue.
- D) Yes, because Canadian consumers are paying less for carpets and consumer surplus has increased.
- E) Canada is not better or worse off. The gain in consumer surplus in Canada is identical to the loss in tariff revenue to the Canadian government.

Part B: TRUE/FALSE/UNCERTAIN QUESTIONS

*Choose **FOUR** of the following **SIX** statements. For each chosen statement, explain why the statement is True, False or Uncertain. A diagram and(or) a few lines of explanation should be sufficient.*

Unsupported answers will receive no marks.

- B1.** Perfect price discrimination will cause allocative inefficiency.
- B2.** Consumers will bear a larger burden of a sales tax if demand is relatively elastic and supply is relatively inelastic.
- B3.** Suppose there are only two firms in a special industry. If they each set a high price, they each earn \$5000. If they each set a low price, they each earn \$800. If one firm sets a low price while the other sets a high price, the low-price firm earns \$4000 while the high-price firm earns \$1000. A prisoners' dilemma exists in the game.
- B4.** Suppose the government decides, in the interest of "fairness", to impose a policy prohibiting factor-price differentials. The likely result would be an excess of factors in uses with low net advantage.
- B5.** The excess-capacity theorem predicts that long-run equilibrium in a monopolistically competitive industry occurs with all firms producing at a higher output level than that which minimizes average total costs.
- B6.** For a perfectly competitive firm, price should equal average cost in the short run, but not necessarily in the long run.

Part C: PROBLEM SOLVING QUESTIONS

Choose **ONE** of the following **TWO** questions.

Answer all parts and show all your reasoning and calculation.

C1.

Suppose the demand and supply curves for beef in Canada are given by

$$Q^D = 155 - P$$

$$Q^S = \frac{1}{2}P - 10$$

- a) Calculate the equilibrium price (P^*) and the equilibrium quantity (Q^*). Graph the supply and demand curves and identify the equilibrium values in a diagram (label all axes and curves, identify the P and Q intercepts).
- b) Calculate the elasticity of demand at the equilibrium point in part a). If the supply of beef increased, would total expenditure on beef rise or fall? Explain.
- c) Suppose the government imposes a price ceiling of $\bar{P} = 95$. What is the new price and quantity? What is the excess supply or excess demand with this policy? Show the change in economic surplus from this policy (relative to the free market equilibrium in part a)) in your diagram.
- d) Now, suppose the world price for beef is $P^W = 120$. If the economy (as described in part a)) opens to trade, does Canada import or export beef? What quantity of beef is traded? Sketch a diagram and identify the consumer surplus (CS) and producer surplus (PS) with free trade.
- e) Now, suppose the world price for beef is $P^W = 80$ and the government imposes a tariff of $t = 5$ on each unit of beef imported. Sketch a diagram and identify i) the deadweight loss (DWL) from the tariff relative to free trade, ii) the tariff revenue and iii) the total value of imports.

C2.

Suppose a natural monopoly's total cost and marginal cost are given by

$$C = 10 + 15Q$$

$$MC = 15$$

and it faces (inverse) demand and marginal revenue given by

$$P = 25 - Q$$

$$MR = 25 - 2Q$$

- a) Calculate the monopoly price, the monopoly output, and the monopoly profits.
- b) Calculate the average total cost at the monopoly output. Graph the demand, marginal revenue (MR), average total cost (ATC), and marginal cost (MC) curves (label all axes and curves). Add the monopoly price and monopoly output from part a) to the graph.
- c) Calculate the dead weight loss (DWL) from the monopoly. Identify the area of the deadweight loss on your graph.
- d) If the government regulates the monopoly with average-cost pricing, what is the price and output? Compare this output to the monopoly output without regulation. Does this policy result in allocative efficiency?
- e) Suppose demand falls so that the monopoly output is 2.5 and the monopoly price is 17.5. Will the monopoly produce any output in the short run? Will the monopoly produce in the long-run? Explain.