

Elasticity and taxes (p.63)

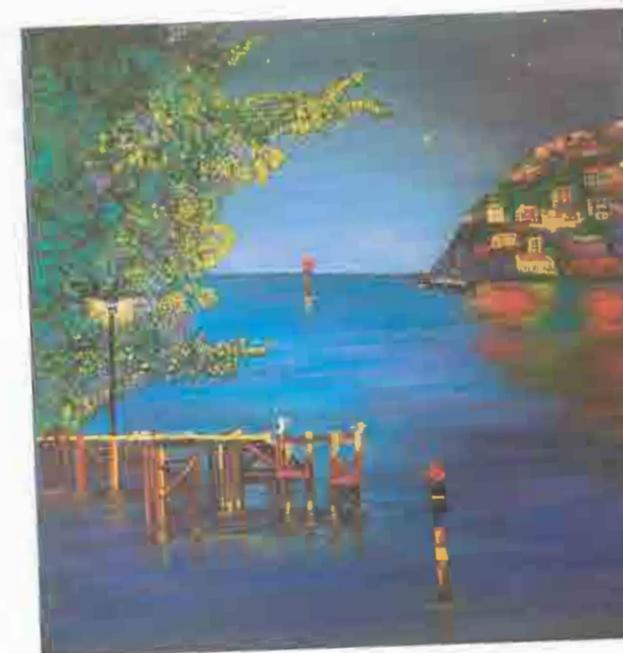
Comments / sample answer	
2	The supply curve will shift to the left
3	The incidence refers to the burden of the tax - does it fall on buyers or sellers?
4	Price elasticity of demand - if demand is elastic sellers pay more of the tax; if demand is inelastic, buyers pay more of the tax
5	Because taxing goods that are inelastic will cause quantity to fall by less than goods that are elastic and this will mean that tax revenue will be much higher.
6a	Equilibrium price = \$9; equilibrium quantity = 100,000
6b	No, because the incidence of the tax is shared between the buyer and the seller.
6c	Equilibrium price = \$11; equilibrium quantity = 80,000
6d	The incidence on buyers = \$2; the incidence on sellers = \$1
6e	Demand is inelastic because the incidence of the tax falls more on consumers.
6f	Tax revenue = \$240,000
6g	Higher; lower; greater

Multiple choice

Page 56: 1 a; 2 c; 3 b; 4 b; 5 a; 6 c; 7 b; 8 c; 9 d; 10 a; 11 a; 12 c; 13 d; 14 b; 15 b; 16 d; 17 b; 18 c; 19 a; 20 d.

Page 61: 1 c; 2 a; 3 c; 4 d; 5 d; 6 c; 7 b; 8 b; 9 d; 10 c; 11 d; 12 c; 13 d; 14 a; 15 b.

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**Market Efficiency****Key Questions**

- Explain the concept of economic efficiency
- Explain the concept of consumer surplus
- Explain the concept of producer surplus
- What is total economic surplus and why it is maximised at market equilibrium?
- Explain the meaning of deadweight loss
- How does underproduction and overproduction affect market efficiency?
- How do price controls, such as price ceilings and price floors, affect market efficiency?
- How do taxes and subsidies affect market efficiency?

Key Understandings

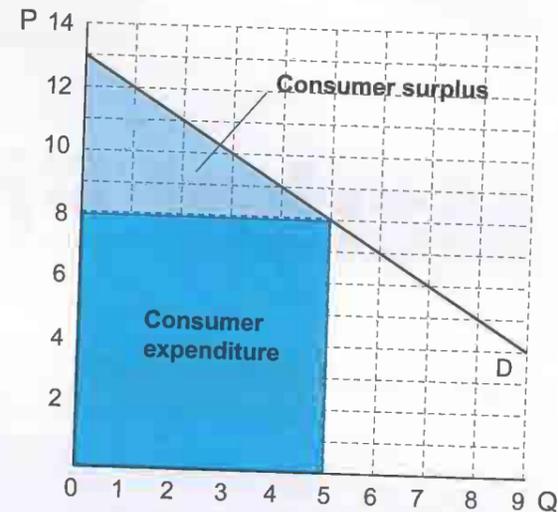
Economic efficiency

What does economic efficiency mean? It means producing the goods that society wants at the lowest possible cost. An efficient outcome means that it is not possible to make someone better off without making someone else worse off. Economists relate the term economic efficiency to making the best use of scarce resources.

Demand and consumer surplus

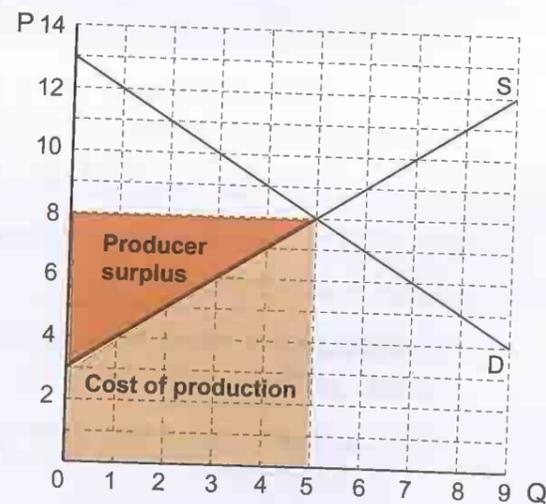
A demand curve is a willingness to pay curve. A demand curve reflects the maximum price a consumer is prepared to pay for a particular good. In the demand curve below, the consumer buys 5 goods at a price of \$8 each - total expenditure is \$40. But does this represent the total value of the 5 goods to the consumer? The demand curve shows that the consumer would be willing to pay \$12 for the first unit, \$11 for the second, \$10 for the third unit and \$9 for the fourth. If we sum the prices for the 5 units we derive the total value to the consumer which equals \$50.

Consumer surplus is the difference between what a consumer is prepared to pay and what they actually pay in the market. In this example, consumer surplus equals \$10 (\$50 - \$40). It is shown as the area below the demand curve and above the price line. Consumer surplus is a measure of the economic well-being of consumers. An increase in consumer surplus means that the consumer is better off - their economic welfare has increased. A fall in price will increase consumer surplus.



Supply and producer surplus

The supply curve reflects the minimum price that producers are willing to sell their products. The minimum price reflects the producer's costs of production. In the supply curve opposite, the producer sells 5 goods at a price of \$8 each - total revenue is \$40. But the producer would be willing to sell the first unit for \$4, the second for \$5, the third for \$6 and the fourth for \$7. The five prices sum to \$30 which equals the cost of production - shown as the area below the supply curve.



Producer surplus is the difference between what a producer is willing to receive (minimum supply price or cost of production) and what they actually receive in the market. It is like profit for the producer. In this example, producer surplus equals \$10 (\$50 - \$40). It is shown as the area above the supply curve and below the price line. Producer surplus is a measure of the economic well-being of producers. An increase in producer surplus means that the producer is better off - their economic welfare has increased because they sell more at a higher price.

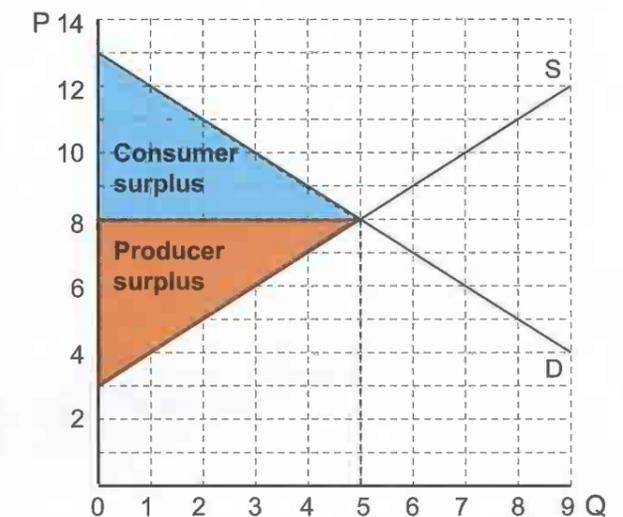
Total economic surplus

Total economic surplus is a measure of the net benefits to society from the production and consumption of the good. Total surplus is the sum of consumer and producer surplus. It is a measure of the net benefits society receives after taking into account the cost of resources:

$$\text{Total Surplus} = \text{Consumer Surplus} + \text{Producer Surplus}$$

$$\text{Total Surplus} = \text{Total Benefits} - \text{Total Costs}$$

The aim of society should be to maximise total surplus in every market. Total surplus is an extremely important concept because it provides us with a measure of economic efficiency. Total surplus reflects the net benefits society obtains from the consumption and production of a particular good or service. It provides a method to measure how well the economy is solving the economic problem. Only when total surplus is being maximised can we say that we have achieved an efficient allocation of resources.



Economic Efficiency occurs when total surplus is at a maximum

Total surplus is only maximised at equilibrium

When total surplus is reduced because of either under or overproduction, it is referred to as a deadweight loss. A deadweight loss refers to an avoidable decrease in total surplus because something has prevented the market from producing the optimal output.

Price controls and economic efficiency

Price controls are government regulated prices that set prices either above or below the equilibrium price. There are two types of price controls known as price ceilings and price floors. A price ceiling is a legislated maximum price that sellers are allowed to charge in the market. Price ceilings are designed to help consumers. A price ceiling creates a shortage which results in a deadweight loss. A price floor is a legislated minimum price that sellers are allowed to charge in the market. Price floors are designed to help producers. A price floor creates a surplus which also results in a deadweight loss.

Worksheet 1 - consumer and producer surplus

1. Explain the meaning of economic efficiency.

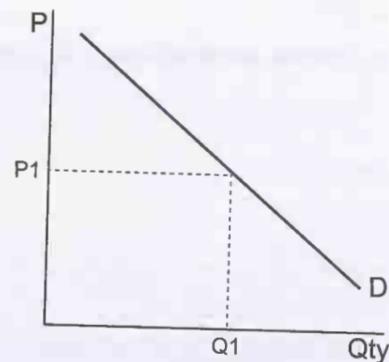
2. Why is a demand curve referred to as a 'willingness to pay' curve?

3. Define consumer surplus.

4. If you are willing to pay \$12 for a pizza but actually pay \$8, what is your consumer surplus?

5. If you purchase a new puppy for \$1500 and your consumer surplus was \$2500, how much do you value the puppy?

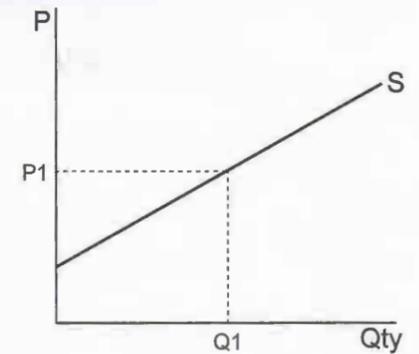
6. On the diagram below, shade the areas of consumer expenditure and consumer surplus at P1. Illustrate and explain what happens to consumer surplus if price falls.



7. Define producer surplus.

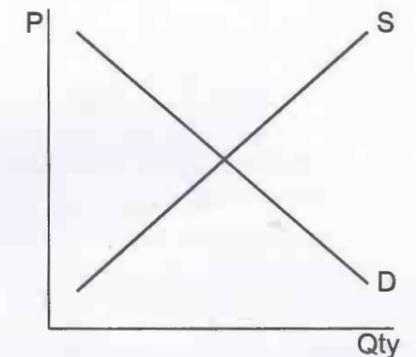
8. If you sell a good for \$100 and your cost of production was \$60, what is your producer surplus?

9. On the diagram below, shade the areas of producer surplus and cost of production at P1. Illustrate and explain what happens to producer surplus if price rises.



10. Which is more important - consumer surplus or producer surplus?

11. Define total economic surplus. On the diagram below shade the areas of consumer and producer surplus.

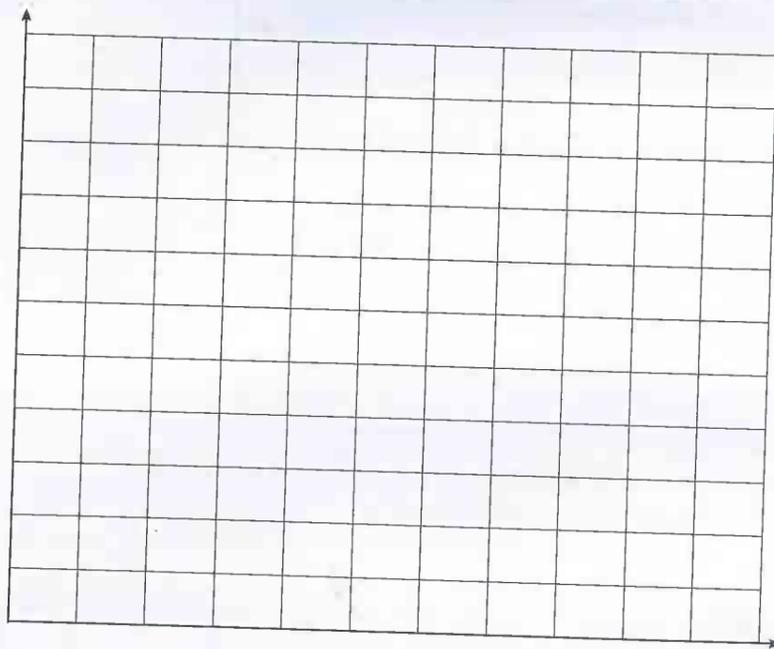


12. At what price and quantity is total surplus maximised?

Problem solving

1. Graph the demand schedule in the table below on the graph provided:

Price	Qty	Consumer Surplus Price = \$12	Consumer Surplus Price = \$8	New Quantity
20	1			
18	2			
16	3			
14	4			
12	5			
10	6			
8	7			
6	8			
4	9			
2	10			



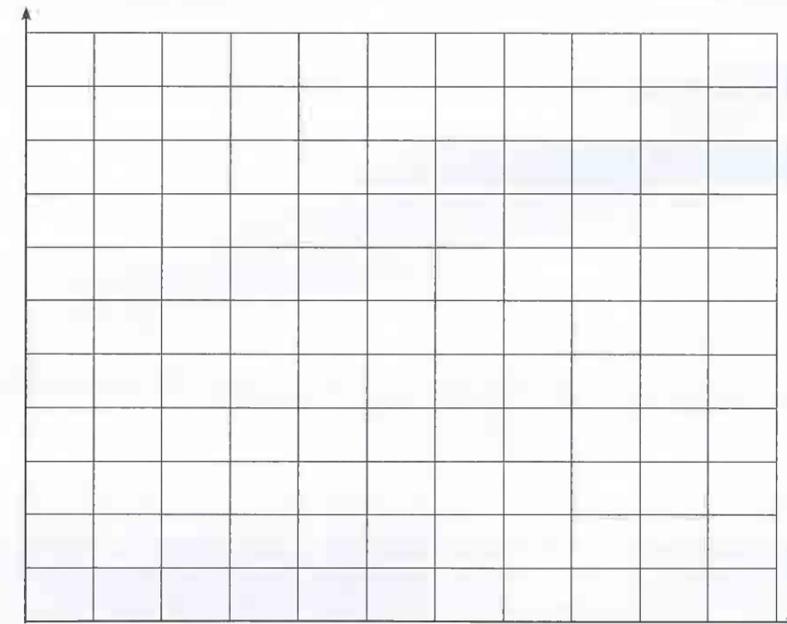
- Assume that the equilibrium price is \$12, complete column 3.
At this price, the consumer would buy _____ units and total consumer surplus would equal _____
- The total value of 5 units is _____
- Assume that the equilibrium price is \$8, complete column 4.
At this price, the consumer would buy _____ units and total consumer surplus would equal \$ _____

d. If demand increased by 2 units for each price, complete column 5 and graph the new demand curve.

At a price of \$12 the consumer would buy _____ units and total consumer surplus would equal \$ _____

2. Graph the supply schedule in the table below on the graph provided:

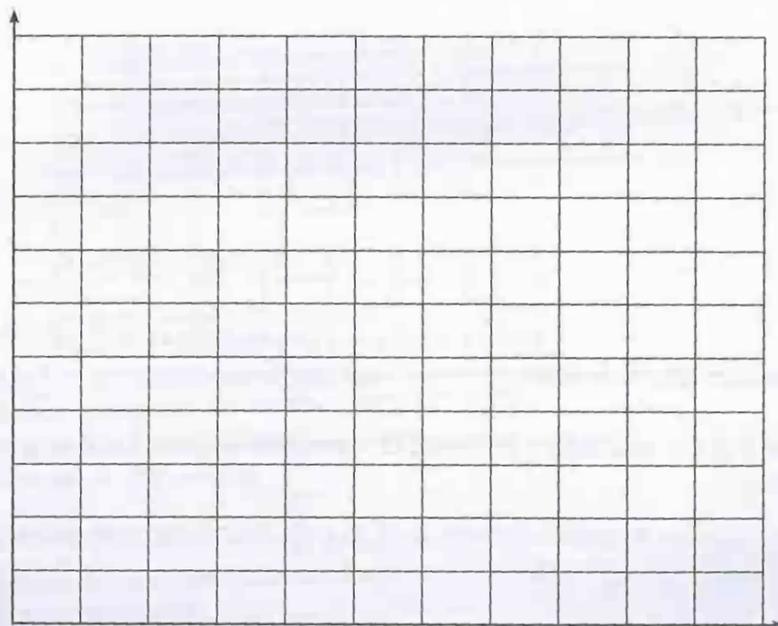
Price	Qty	Producer Surplus Price = \$12	Producer Surplus Price = \$8	New Quantity
20	9			
18	8			
16	7			
14	6			
12	5			
10	4			
8	3			
6	2			
4	1			
2	0			



- Assume that the equilibrium price is \$12, complete column 3 showing producer surplus.
The producer would sell _____ units and total producer surplus would equal \$ _____

- b. The total cost of 5 units is \$ _____
 - c. Assume that the equilibrium price is \$8, complete column 4 showing producer surplus.
At this price, the producer would sell _____ units and total producer surplus would equal \$ _____
 - d. If supply increased by 2 for each price, complete column 5 and graph the new supply curve.
At a price of \$12 the producer would sell _____ units and total producer surplus would equal \$ _____
3. Graph the following demand and supply curves for monthly premium wine sales.

Price \$	Quantity Demanded (D)	Quantity Supplied (S)	Increase in demand (D1)	Qty S after tax (S1)
100	100	900	300	700
90	200	800	400	600
80	300	700		
70	400	600		
60	500	500		
50	600	400		
40	700	300		
30	800	200		
20	900	100		-
10	1000	0		-



- a. What is the equilibrium price and quantity? _____
- b. Calculate consumer surplus, producer surplus and total surplus at the equilibrium price. Shade these areas on your graph.

- c. Due to rising incomes, the demand for wine increases by 200 at each price. Complete column 4 in the table and graph the new demand curve.
What is the new equilibrium price and quantity?

- d. Calculate the new total surplus after the increase in demand. Has total surplus increased or decreased?

- e. The government decides to introduce a new tax on wine - \$20 per bottle. Complete column 5 in the table and graph the new supply curve. Using the original demand curve, what is the new price and quantity after the tax?

- f. How much tax revenue is raised? _____
- g. How much of the tax does the consumer pay and how much does the seller pay?

Multiple choice - consumer and producer surplus

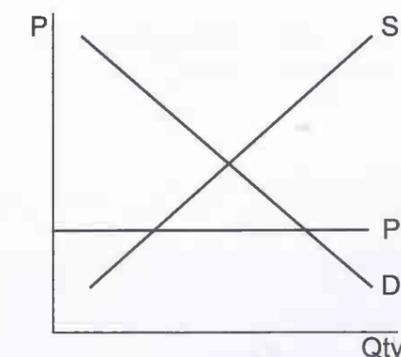
1. Consumer surplus is the
 - a. difference between a buyer's maximum price and their minimum price.
 - b. difference between a buyer's maximum price and the actual price.
 - c. difference between a buyer's minimum price and the actual price.
 - d. difference between total benefits and marginal benefits.
2. Andrea said to her friend, "I just bought a new pair of shoes and I love them so much that I totally would have paid more for them." Andrea was describing the concept of
 - a. producer surplus.
 - b. equilibrium.
 - c. consumer surplus.
 - d. total surplus.

3. A consumer's total benefit from consuming a good is equal to the
 - a. total amount spent on the good.
 - b. consumer surplus on the quantity purchased.
 - c. consumer surplus minus the total amount spent on the good.
 - d. consumer surplus plus the total amount spent on the good.
4. James pays \$10 for a pizza but he was willing to pay \$12. His consumer surplus is
 - a. \$10.
 - b. \$12.
 - c. \$2.
 - d. -\$2
5. Craig valued a ticket to the football game at \$60. The actual price was \$75. Craig's consumer surplus was
 - a. \$15
 - b. -\$15
 - c. \$60.
 - d. Zero.
6. When Lauren purchased a fluffy kitten she received a consumer surplus of \$200. If Lauren's maximum price was \$400, she must have paid
 - a. \$200.
 - b. \$300.
 - c. \$400.
 - d. \$600
7. Producer surplus is the difference between the
 - a. willingness to pay for the good and the marginal cost of producing the good.
 - b. marginal benefit of the good and the marginal cost of the good.
 - c. market price and the willingness to pay for the good.
 - d. market price and the marginal cost of producing the good.
8. Graphically, producer surplus is the area under the
 - a. demand curve and above the supply curve, up to the relevant quantity.
 - b. price and above the demand curve, up to the relevant quantity.
 - c. price and above the supply curve, up to the relevant quantity.
 - d. price and above the quantity axis, up to the relevant quantity.
9. Economic efficiency in a market occurs when
 - a. consumer surplus is equal to producer surplus.
 - b. equity is maximised.
 - c. total surplus is at a maximum.
 - d. consumer surplus is greater than producer surplus.
10. Steven is willing to pay \$1000 to see Taylor Swift in concert. The ticket price is \$300 but all the tickets have been sold. If he buys a ticket from a scalper for \$600 then his consumer surplus is
 - a. \$300
 - b. \$400
 - c. \$700
 - d. \$1000

11. Brittany is willing to sell her cupcakes for \$4. She actually receives \$6. Her producer surplus is
 - a. \$2.
 - b. \$4.
 - c. \$6.
 - d. \$10
12. If it costs \$2 per cone to make 10 ice cream cones and you sell 10 cones for \$4 each, then your producer surplus on the 10 cones is equal to
 - a. \$2.
 - b. \$10.
 - c. \$20.
 - d. \$40.
13. Julie received a producer surplus of \$450 when she sold her prize winning portrait for \$1,000. The cost of the painting is
 - a. \$450
 - b. \$550
 - c. \$1,000
 - d. \$1,550
14. Medical authorities announce that eating chocolate increases your life span. As a result, the equilibrium price of chocolate _____, the equilibrium quantity sold _____, and producer surplus _____.
 - a. increases, increases, increases.
 - b. increases, increases, decreases.
 - c. decreases, decreases, decreases.
 - d. decreases, increases, increases.
15. An increase in supply will normally result in
 - a. an increase in consumer surplus and a decrease in producer surplus.
 - b. an increase in consumer surplus and an increase in producer surplus.
 - c. a decrease in consumer surplus and a decrease in producer surplus.
 - d. a decrease in consumer surplus and an increase in producer surplus.

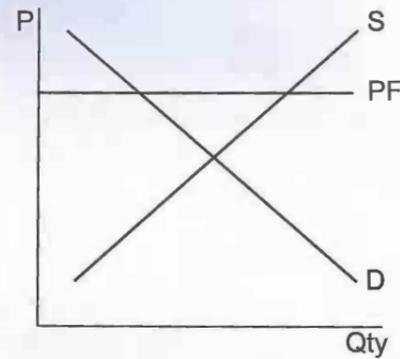
Worksheet 2 - government policies

1. What is a price ceiling? On the D/S model illustrate and explain why a price ceiling creates a shortage.



2. Explain why a price ceiling is inefficient.

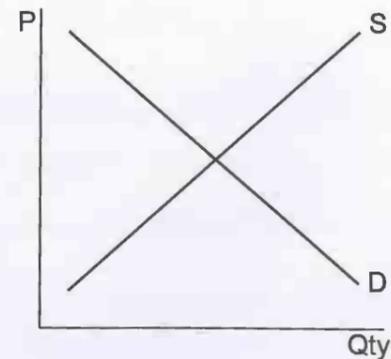
3. What is a price floor? On the D/S model below illustrate and explain why a price floor creates a surplus.



4. Explain why a price floor is inefficient.

5. Why does the government impose taxes on goods and services?

6. Use the D/S model below to illustrate and explain the effect of a tax. You will need to draw and label a new supply curve.

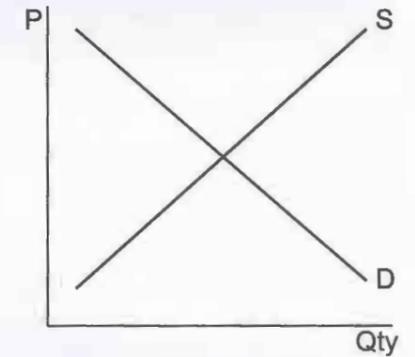


7. Explain how a tax affects consumer and producer surplus.

8. Explain why a tax creates a deadweight loss.

9. Is it better to tax a good with elastic or inelastic demand? Explain why.

10. Use the D/S model below to illustrate and explain the effect of a subsidy. You will need to draw and label a new supply curve.



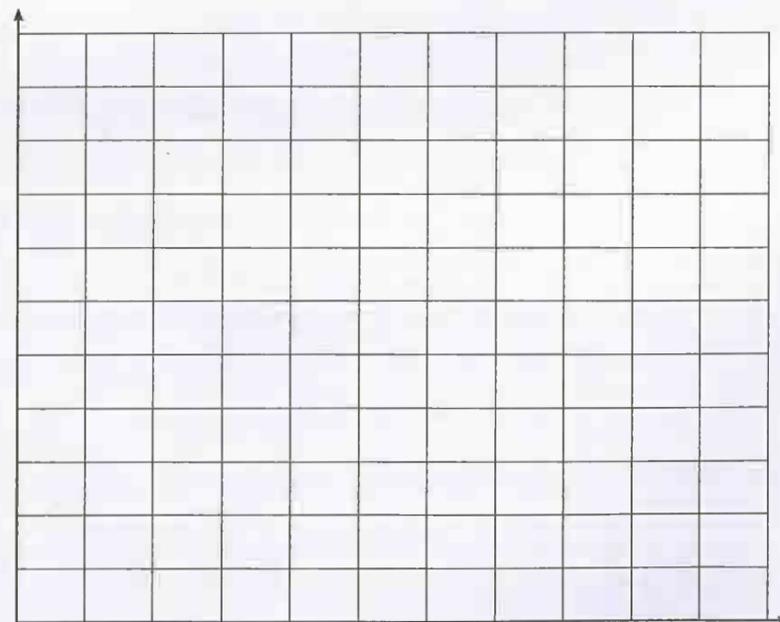
11. Explain how a subsidy affects consumer and producer surplus.

12. Explain why a subsidy creates a deadweight loss.

Data interpretation

The table below shows the market for electric vehicles sales per month.

Price \$	Quantity Demanded	Quantity Supplied	Increase in S (\$)
100,000	10,000	90,000	
90,000	20,000	80,000	
80,000	30,000	70,000	
70,000	40,000	60,000	
60,000	50,000	50,000	
50,000	60,000	40,000	
40,000	70,000	30,000	
30,000	80,000	20,000	40,000
20,000	90,000	10,000	30,000
10,000	100,000	0	20,000



- a. Use the grid to graph the demand and supply curves for electric vehicles.
The equilibrium price = \$ _____
The equilibrium quantity = _____
- b. To reduce carbon emissions, the government plans to subsidise the purchase of electric vehicles, by paying a \$20,000 subsidy to the suppliers for each vehicle sold. Complete column 4 to show the effect of the subsidy on quantity supplied.
- c. Graph the effect of the subsidy by shifting the supply curve down by \$20,000.
After the subsidy the new equilibrium price = \$ _____
After the subsidy the new equilibrium quantity = _____
- d. Calculate the cost of the subsidy to the government.

- e. Explain the effect of the subsidy on consumer and producer surplus. Will the subsidy increase or decrease market efficiency? Explain why.

Multiple choice - government intervention

1. A price ceiling is a government regulation that makes it illegal to charge a price
 - a. below the equilibrium price.
 - b. above the equilibrium price.
 - c. above some specified level.
 - d. below some specified level.
2. When a price ceiling is set below the equilibrium price, the quantity supplied _____ the quantity demanded and _____ exists.
 - a. is less than; a surplus
 - b. is less than; a shortage
 - c. is greater than; a surplus
 - d. is greater than; a shortage
3. Assume that the market clearing price for a shirt is \$60, but that the maximum price that can be charged is \$45. This is an example of
 - a. markets failing to ration a fixed quantity of a good.
 - b. a price floor that will lead to a shortage of shirts on the market.
 - c. a price control that will lead to a surplus of shirts on the market.
 - d. a price ceiling that will likely lead to a shortage of shirts on the market.

4. Suppose the equilibrium rent in Perth is \$500 per week. A rent ceiling of \$600 per week leads to
 - a. a surplus of apartments.
 - b. a shortage of apartments.
 - c. no change in the rental market.
 - d. fair prices in the rental market.
5. A price ceiling
 - a. creates market efficiency by making the good cheaper.
 - b. helps all producers by increasing the price of the good.
 - c. can create a black market for the good.
 - d. benefits all people who want to buy the good.
6. Suppose the equilibrium price of a litre of milk is \$2. If the government imposes a price floor of \$3 per litre of milk, the
 - a. quantity supplied of milk will exceed the quantity demanded.
 - b. quantity supplied of milk will be less than the quantity demanded.
 - c. supply of milk will increase.
 - d. demand for milk will decrease.
7. What will be the effect if the government gives a subsidy to a producer of a product?
 - a. A shift to the left in the demand curve and a rise in equilibrium quantity
 - b. A shift to the left in the supply curve and a rise in equilibrium quantity
 - c. A shift to the right in the demand curve and a fall in equilibrium price
 - d. A shift to the right in the supply curve and a fall in equilibrium price
8. A government wishes to raise the incomes of farmers without raising the price of food to consumers. Which policy should it use?
 - a. A maximum price below the market price for food
 - b. A minimum price below the market price for food
 - c. A payment of a subsidy to farmers to produce food
 - d. A release of government food stocks onto the market
9. What is the impact of a government subsidy to producers?
 - a. Less is produced creating a deadweight loss.
 - b. More is produced creating a deadweight loss.
 - c. Total surplus is increased.
 - d. Producers are able to sell the product at a higher price.
10. A sales tax imposed on pizza _____ consumer surplus and _____ producer surplus.
 - a. increases; decreases
 - b. increases; increases
 - c. decreases; increases
 - d. decreases; decreases
11. Tax incidence refers to the
 - a. burden buyers have to absorb from a tax on goods and services.
 - b. burden sellers have to absorb from a tax on goods and services.
 - c. lost revenue from goods and services that are not taxed.
 - d. division of the burden of a tax between the buyer and the seller.

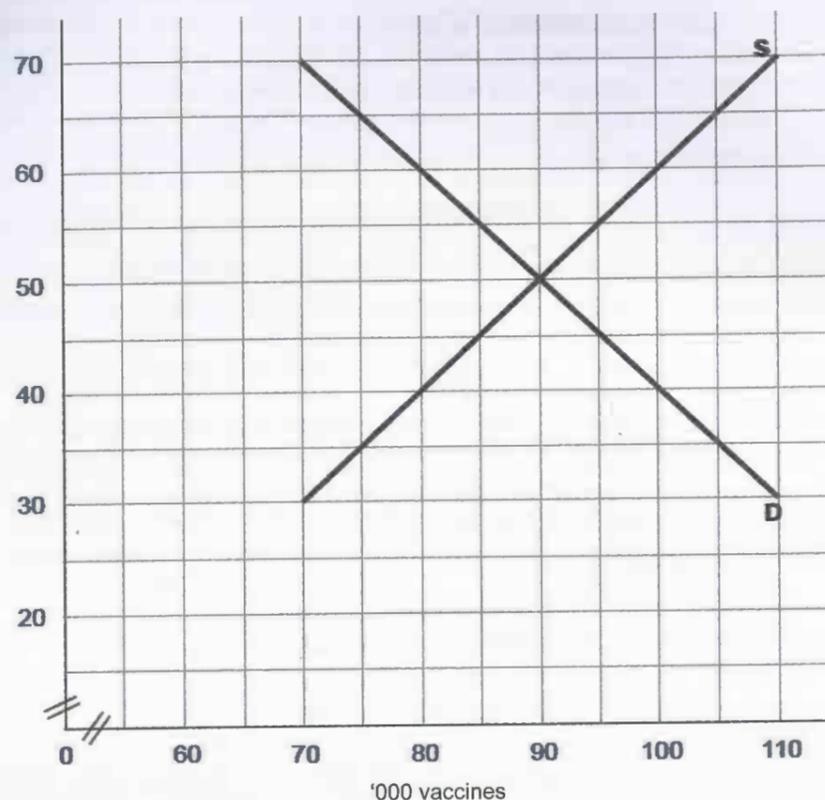
12. A sales tax imposed on sellers of a good
 - a. decreases the demand and shifts the demand curve leftward.
 - b. decreases the supply and shifts the supply curve leftward.
 - c. decreases both the demand and the supply curve.
 - d. decreases the supply and shifts the supply curve rightward.
13. Taxes _____ the price paid by the buyer and _____ the price received by the seller.
 - a. decrease, increase
 - b. decrease, decrease
 - c. increase, increase
 - d. increase, decrease
14. If the government imposes a \$10,000 tax on cars, then the price of a car
 - a. increases by \$10,000.
 - b. increases by more than \$10,000.
 - c. increases by less than \$10,000.
 - d. does not change.
15. If the demand for petrol is relatively inelastic, then
 - a. buyers of petrol will bear most of the incidence of a tax.
 - b. sellers of petrol will bear most of the incidence of a tax.
 - c. the government will bear most of the incidence of a tax.
 - d. the incidence of a tax will depend whether it is imposed on sellers or buyers.
16. A government imposes a maximum price on medical face masks, below the market equilibrium. What is the most likely effect of this?
 - a. Some consumers will be unable to buy face masks at the maximum price.
 - b. Firms will produce more masks to meet the excess demand.
 - c. Poorer consumers will be able to obtain all the masks they need.
 - d. The market will clear at the maximum price.

Short response

The Health Department is worried about a new flu virus this winter and wants to encourage people to obtain the flu vaccine. Two policies it could use are a subsidy and a price ceiling.

The graph on page 86 shows the market for flu vaccines. The government pays suppliers a \$20 subsidy per vaccine.

- a. Use the graph to illustrate and describe the effect of the subsidy on both price and quantity. Hint - you will need to draw a new supply curve. (3 marks)



b. Calculate the cost of the subsidy to the government. (2 marks)

c. Explain the effect of the subsidy on both consumer and producer surplus. (2 marks)

d. The government is considering a price ceiling of \$40 instead of the subsidy. Describe the effect of the price ceiling on both quantity demanded and quantity consumed. (2 marks)

e. Does each policy create a deadweight loss? Which policy would be a 'better' policy. Provide a reason for your answer. (3 marks)

Extended response

Answer each of the following questions in about 1 page of normal writing. Use a model where appropriate. Each question is worth 15 marks.

1. Distinguish between consumer and producer surplus. Draw a diagram showing a competitive market and label the consumer and producer surplus. Using this, demonstrate that producing less than or more than the equilibrium output will lead to an inefficient allocation of resources i.e. a deadweight loss.
2. Use a demand/supply diagram to analyse the impact of each of the following. Note that you will first need to determine whether demand or supply has shifted and the effect on equilibrium price and quantity:
 - a. If bad weather destroys this year's tomato crop, what would happen to consumer surplus? (5 marks)
 - b. If a news story highlights the health benefits of eating apples, what would happen to producer surplus? (5 marks)
 - c. If the government introduces a subsidy to the motor vehicle industry, what would happen to consumer surplus and producer surplus? (5 marks)
3.
 - a. The government is proposing to introduce a new 10% tax on beer and orange juice. Use a D/S model to show the effect of placing a tax on producers in each market. Which market would be more elastic/inelastic? (9 marks)
 - b. Which tax would affect consumers more? Which tax would affect producers more? Which tax would have a greater impact on output? Which tax would raise more revenue? Which tax would cause a larger deadweight loss? (6 marks)
4. As a result of declining incomes in the dairy milk industry, the government is choosing between two policies to help increase the income of milk producers – a price floor and a subsidy.
 - a. Use a demand/supply model to explain how a price floor will affect consumers, producers and market efficiency.
 - b. Use a demand/supply model to explain how a subsidy will affect consumers, producers and market efficiency.

Suggested answers

Price solving (p.74)

Comments / sample answer

1	Price	Qty D	Consumer Surplus Price = \$12	Consumer Surplus Price = \$8	New Quantity
	20	1	8	12	3
18	2	6	10	4	
16	3	4	8	5	
14	4	2	6	6	
12	5	0	4	7	
10	6		2	8	
8	7		0	9	
6	8			10	
4	9			12	
2	10			14	

- 1a When price is \$12, the consumer buys 5 units. Total consumer surplus = \$20.
- 1b The total value of 5 units is \$80.
- 1c When price is \$8, the consumer buys 7 units. Total consumer surplus = \$42.
- 1d The consumer would now buy 7 units. Total consumer surplus = \$42.

2	Price	Qty S	Producer Surplus Price = \$12	Producer Surplus Price = \$8	New Quantity
	20	9			
18	8				10
16	7				9
14	6				8
12	5	0			7
10	4	2			6
8	3	4	0		5
6	2	6	2		4
4	1	8	4		3
2	0				2

- 2a When price is \$12, the producer sells 5 units. Total producer surplus = \$20.
- 2b The total cost of 5 units is \$40.
- 2c When price is \$8, the producer sells 3 units. Total producer surplus = \$6.
- 2d The producer would now sell 7 units. Total producer surplus = \$30.

3	Price \$	Quantity Demanded (D)	Quantity Supplied (S)	Increase in demand (D1)	Qty S after Tax (S1)
	100	100	900	300	700
90	200	800	400	600	
80	300	700	500	500	
70	400	600	600	400	
60	500	500	700	300	
50	600	400	800	200	
40	700	300	900	100	
30	800	200	1000	-	
20	900	100	1100	-	
10	1000	0	1200	-	

- 3a Equilibrium price = \$60; equilibrium quantity = 500
- 3b CS = \$12,500; PS = \$12,500; TS = \$25,000
- 3c Equilibrium price = \$70; equilibrium quantity = 600
- 3d Total surplus has increased to \$36,000
- 3e After the tax, Equilibrium price = \$70; Equilibrium quantity = 400
- 3f Tax revenue = \$8,000 per month
- 3g The consumer pays \$10; the producer pays \$10 (incidence is split 50/50)

Data interpretation (p. 82)

Comments / sample answer	
1	The equilibrium price = \$60,000 . The equilibrium quantity is 50,000
3	After the subsidy the new equilibrium price = \$50,000 After the subsidy the new equilibrium quantity = 60,000
4	The cost of the subsidy = \$1,200 million (\$20,000 x 60,000)
5	The subsidy will increase both consumer and producer surplus. But the subsidy will decrease total surplus and cause a deadweight loss because the cost of the subsidy is greater than the gain in CS and PS.

Multiple choice

Page 77: 1 b; 2 c; 3 d; 4 c; 5 d; 6 a; 7 d; 8 c; 9 c; 10 b; 11 a; 12 c; 13 b; 14 a; 15 b

Page 83: 1 c; 2 b; 3 d; 4 c; 5 c; 6 a; 7 d; 8 c; 9 b; 10 d; 11 d; 12 b; 13 d; 14 c; 15 a; 16 a