The **HL-**only Paper 3 assesses the quantitative methods sections of the syllabus. The topics span the entirety of the course content, from the computation and plotting of linear demand and supply functions, to the calculation of elasticities and calculating the effects of a tariff.

- The exam is 1 hour in length (20% of your final mark)
- Answer two questions from a choice of three (25 marks per question)
- Each question will likely come from a different section of the syllabus
    - Microeconomics
    - Macroeconomics
    - International economics

Section I: Microeconomics- Questions

Chapter 1.1: Competitive Markets- Supply & Demand

Question 1

a. In a demand function of the general form $\mathbf{Q_D = a - bP}$, outline the meaning of the parameter **a** and of the parameter **−b**.

b. Outline the meaning of the negative slope in this function.

In the demand function $Q_D = 35 - 5P$, Q_D represents quantity of good Z demanded per month in thousands of units, and P represents the price per unit of Z in $.

c. Construct a graph of the corresponding demand curve.

d. Calculate the values of $\mathbf{Q_D}$ when P = $3, and P = $4.

e. Calculate the values of **P** when $\mathbf{Q_D}$ = 5 thousand, and $\mathbf{Q_D}$ = 25 thousand.

f. Calculate the vertical and horizontal intercepts using the function.

g. Identify the vertical and horizontal intercepts on your graph.

h. Assume that due to an increase in income levels, 5 thousand fewer units of **Z** are demanded at each price. Determine the equation for the new demand function.

i. Identify the vertical and horizontal intercepts of the new demand function in your graph and graph the new demand curve.

j. Assume that due to a change in tastes, 10 thousand more units of **Z** are demanded at each price (relative to the initial demand function). Determine the equation for the new demand function.

k. Draw the new demand curve on your graph.

l. If the slope changes to −3, state the new demand function, and outline how the change in slope affects the steepness of the demand curve.

m. Outline the relationship between an individual consumer's demand and market demand.

Question 2

a. In a supply function of the general form $\mathbf{Q_S = c + dP}$, outline the meaning of the parameter **c** and of the parameter **+d**.

b. Outline the meaning of the positive slope in this function.

In the supply function $Q_S = -10 + 10P$, Q_S represents quantity of good Z supplied per month in thousands of units, and P represents the price per unit of Z in $.

c. Construct a graph of the corresponding supply curve, including only positive values for Q s, up to the point where **P = 5**.

d. Calculate the values of **Q_S** when **P = $3** and **P = $4**.

e. Calculate the values of **P** when **Q_S = 10** thousand, and **Q_S = 25** thousand.

f. Calculate the vertical and horizontal intercepts using the function; which of these does not appear in your graph?

g. Identify on your graph the intercept with a positive value.

h. Assume that due to a new technology, 5 thousand more units of **Z** are supplied at each price. Determine the new supply function.

i. Calculate the new vertical and horizontal intercepts using the function.

j. Graph the new supply curve, including only positive values for **Q_S**, up to the point where **P = 4**.

k. Assume that due to a reduction in the number of firms in the industry, 5 thousand fewer units of **Z** are supplied at each price (relative to the initial supply function). Determine the new supply function.

l. Draw the new supply curve on your graph.

m. If the slope changes to +15, state the new supply function, and outline how the change in slope affects the steepness of the supply curve.

n. Outline the relationship between an individual firm's supply and market supply.

Question 3

In the demand function $Q_D = 35 - 5P$ and the supply function $Q_S = -10 + 10P$, Q_D and Q_S are quantities demanded and supplied per month in thousands of units of good Z, and P is price in $.

a. Calculate the equilibrium price and quantity.

b. Plot the demand and supply curves, and identify the equilibrium price and quantity on your graph.

c. When **P = 6**, and **P = 2**, determine whether there is excess demand or excess supply, and calculate the amount of this in each case.

d. Explain how excess demand and excess supply work to restore equilibrium in the market.

e. Due to an increase in resource prices, 15 thousand fewer units of **Z** are supplied at each price. State the new supply equation and plot the new supply curve on your graph**.**

f. Determine the new equilibrium price and quantity mathematically and on your graph.

g. Explain how price works as a signal and incentive to restore equilibrium in the market following the decrease in supply.

Chapter 1.2: Elasticities

Question 1

The following is a demand schedule for good Z.

Price per unit ($)	5	10	15	20	25	30
Q demanded per week	30	25	20	15	10	5
Total Revenue						

a. Plot the demand curve for good **Z** to show it is linear.

b. Calculate price elasticity of demand (*PED*) for an increase in price from $5 to $10.

c. Calculate price elasticity of demand (*PED*) for an increase in price from $20 to $25.

d. Using your results of parts (b) and (c), explain what happens to *PED* along a straight-line demand curve.

e. Calculate the percentage change in quantity demanded that will result from an increase in price of 10% if ***PED* = 2**, noting if quantity increases or decreases.

f. Calculate total revenue that corresponds to each price and quantity combination.

g. Using the concepts of price elastic and price inelastic demand and your calculation of *PED* for a price increase from $5 to $10 in part (b), explain what happens to total revenue as a result of the increase in price of good **Z**.

h. Using the concepts of price elastic and price inelastic demand and your calculation of *PED* for a price increase from $20 to $25 in part (c), explain what happens to total revenue as a result of the increase in price of good **Z**.

i. Using respective formulae, explain the difference between the slope and price elasticity of demand along a straight-line demand curve.

j. State the numerical values of perfectly elastic and perfectly inelastic demand, and draw diagrams to illustrate the difference between them.

k. Explain what will happen to quantity demanded if price increases by 5% and ***PED* = 0**.

Question 2

The price of meat increases by 10%, the quantity demanded of meat falls by 12% and the quantity of fish consumed increases by 9%. Answer parts (a) and (b) on the basis of this information

a. Calculate the price elasticity of demand for meat, and state if the demand for meat is price elastic or inelastic.

b. Calculate the cross-price elasticity of demand between meat and fish, and outline the relationship between meat and fish.

The price of pizzas falls by 15%, the quantity of pizzas demanded increases by 14% and the quantity of colas consumed increases by 17%. Answer parts (c) and (d) on the basis of this information

c. Calculate the price elasticity of demand for pizzas, and state if the demand for pizzas is price elastic or inelastic.

d. Calculate the cross-price elasticity of demand for pizzas and colas, and outline the relationship between pizzas and colas.

Your annual income increased from $16 000 to $20 000. Your spending on purchases of bread fell by 5%, while your spending on purchases of food in general and eating out in restaurants increased by 15% and 30% respectively. Answer parts (e) and (f) on the basis of this information

e. Identify the relevant elasticity of demand concept, and use it to calculate this demand elasticity for each of the three items.

f. Using the elasticity values you have calculated, outline which item is likely to be an inferior good, a necessity and a luxury good.

It is found that when the price of good X increased by 5%, the quantity of X supplied increased by 2% after one month and by 7% after one year. Answer parts (g), (h) and (i) on the basis of this information

g. Calculate price elasticities of supply for the two time periods.

h. Outline in which period supply was price elastic and in which it was price inelastic.

i. Outline two possible factors that might account for the different elasticity values.

j. Explain what will happen to quantity supplied if price increases by 10% and **PES = 0**.

Question 3

When the price of good Alpha increases from $100 to $125, the quantity of good Beta purchased falls from 10 units to 8 units. Answer parts (a) and (b) on the basis of this information

a. Calculate the cross-price elasticity of demand for Alpha and Beta.

b. State the relationship between Alpha and Beta.

The following table provides cross-price elasticity (*XED*) values for five pairs of goods. Answer parts (c) and (d) on the basis of this information

Pair	A & B	C & D	E & F	G & H	I & J
XED	0.3	0.7	− 0.4	−0.8	0

c. Explain the likely relationship between the goods in each pair.

d. Explain how this relationship compares for,

i. Pairs A & B and C & D
ii. Pairs E & F and G & H.

e. A firm that produces desktop and laptop computers estimates the cross-price elasticity of demand for the two types of computer is +1.2. The firm plans to lower the price of its desktop computers by 10% to encourage sales. Explain the likely effects of this pricing decision on its sales of laptops.

f. Outline why the mathematical value of *PED* is usually negative.

g. State the numerical values of perfectly elastic and perfectly inelastic supply, and draw diagrams to illustrate the difference between them.

h. Draw two unitary elastic supply curves in the same diagram, showing their point of intersection.

i. Draw a price elastic and a price inelastic supply curve, and outline how you distinguish between them.

j. Using respective formulae outline the difference between the slope of a linear supply curve and price elasticity of supply along a supply curve.

Chapter 1.3: Government Intervention

Question 1

The demand and supply functions for good Zeta are given by $Q_D = 10 - 4P$ and $Q_S = -2 + 8P$, where Q_D and Q_S are quantity demanded and supplied respectively in units per day, and P is the price of Zeta in $.

a. Calculate the equilibrium price and quantity in the Zeta market.

b. Graph the demand and supply curves up to a price of $2.00.

c. Using the demand and supply functions above, calculate price elasticity of demand (*PED*) and price elasticity of supply (*PES*) for a price increase from $1.00 to $1.50, and state if demand and supply are price elastic or price inelastic in this price range.

d. The government imposes an indirect (excise) tax of $0.75 per unit of Zeta. State the new supply function, and draw the new, post-tax supply curve in your diagram.

e. Use the demand function and the new supply function to calculate the post-tax equilibrium price and quantity in the Zeta market.

f. State the price paid by consumers, the price received by producers, and the quantity that is bought and sold. Show these in your diagram.

g. Calculate government revenue that arises from the imposition of the tax.

h. Calculate the tax incidence on consumers and the tax incidence on producers.

i. Using the results of your elasticity calculations in part (c), explain why the tax incidence on consumers and producers differs.

Question 2

Riverland has a competitive market for good kappa. Demand for kappa is given by $Q_D = 10 - P$, and supply of kappa by $Q_S = -4 + P$, where P is price in Rvl (the local currency), and Q d and Q s are the quantity of kappa demanded and supplied in units per day.

a. Calculate the equilibrium price and quantity in the kappa market.

b. Graph the demand and supply curves up to a price of Rvl 10.

c. The government imposes an indirect (excise) tax of Rvl 2 per unit of kappa. Draw the new supply curve in your diagram.

d. State the new supply function.

e. Use the demand function and the post-tax supply function to calculate the post-tax equilibrium price and quantity; show these in your diagram.

f. Explain why the imposition of the tax of Rvl 2 per unit of kappa does not increase the post-tax equilibrium price by Rvl 2.

g. State the amount of tax incidence on consumers and on producers per unit of kappa, and outline how these are related to the government's revenue per unit of kappa.

h. State the total amount of tax paid by consumers and the total amount paid by producers, and indicate how these are related to the government's total revenue from this tax.

i. In your diagram, identify consumer surplus, producer surplus, government revenues and welfare (deadweight) loss that result in the post-tax situation.

j. Explain the relationship between marginal benefits and marginal costs at the new post-tax equilibrium, and describe the impact of the tax on allocative efficiency.

k. Draw a demand and supply diagram showing competitive market equilibrium; identify consumer and producer surplus.

l. Using the concepts of marginal benefits and marginal costs, explain the significance of competitive market equilibrium for allocative efficiency (assuming no market failures).

m. Calculate social surplus (consumer plus producer surplus) at competitive market equilibrium before the imposition of the tax.

n. Calculate consumer and producer surplus after the imposition of the tax.

o. Calculate the change in consumer and producer surplus due to the imposition of the tax.

p. Calculate consumer expenditure and producer revenue before the imposition of the tax.

q. Calculate consumer expenditure and producer revenue after the imposition of the tax.

r. Calculate the change in consumer expenditure and producer revenue due to the imposition of the tax.

s. Calculate the increase in government revenue due to the imposition of the tax.

t. Explain why social surplus (the sum of consumer surplus, producer surplus, and government revenue) after the imposition of the tax is less than social surplus before the imposition of the tax.

Question 3

The government of Riverland decides it would like to encourage the production of kappa, and so removes the tax on kappa (see question 2), and grants instead a subsidy of Rvl 2 per unit of kappa, together with a purchase programme for the excess supply of kappa.

a. Using the same demand and supply functions as in question 2 ($Q_D = 10 - P$ and $Q_S = -4 + P$) graph the pre-subsidy demand and supply curves (up to a price of Rvl 10), and calculate equilibrium price and quantity.

b. State the new supply function that results following the granting of the subsidy.

c. Using the demand function and the new supply function, determine the new equilibrium price and quantity.

d. Draw the new supply curve in your diagram, and show the price paid by consumers, the price received by producers, and the quantity bought and sold.

e. Explain why the equilibrium quantity produced has increased following the granting of the subsidy.

f. Explain how the subsidy of Rvl 2 per unit of kappa is shared by consumers and producers.

g. Identify in your diagram the gain in consumer surplus and the gain in producer surplus that results from the granting of the subsidy.

h. Explain the relationship between marginal benefits and marginal costs at the post-subsidy equilibrium, and describe the impacts of the subsidy on allocative efficiency.

i. Calculate consumer expenditure and producer revenue before the subsidy is granted.

j. Calculate consumer expenditure and producer revenue after the subsidy is granted.

k. Calculate the change in consumer expenditure and producer revenue due to the granting of the subsidy.

l. Calculate the amount of government spending on the subsidy.

m. Calculate consumer and producer surplus in competitive market equilibrium before the subsidy is granted.

n. Calculate consumer and producer surplus after the granting of the subsidy.

o. Calculate the change in consumer surplus and producer surplus due to the granting of the subsidy.

p. Identify in your diagram the welfare (deadweight) loss that arises due to the subsidy.

q. Explain why social welfare is reduced after the granting of the subsidy, even though consumer and producer surplus have increased.

r. Outline two reasons why governments grant subsidies.

Question 4

A market is defined by the following equations: $Q_D = 14 - 2P$, and $Q_S = 2 + 2P$, where *P* is in $ and Q_D and Q_S are quantity demanded and supplied of good Z in tonnes per day.

a. Calculate the equilibrium price and quantity and graph the demand and supply curves.

b. The government imposes a price ceiling at ***P* = $2.** Draw the price ceiling in your diagram.

c. Calculate the shortage (excess demand).

d. Calculate the change in consumer expenditure and the change in producer revenue that arise due to the price ceiling.

e. Use your diagram to show the welfare effects (deadweight or welfare loss) arising from the price ceiling.

Suppose the market defined above is an agricultural product market in which the government imposes a price floor at *P* = $5, with government purchases of the excess supply.

f. Draw a diagram illustrating the price floor in relation to equilibrium price and quantity.

g. Calculate the surplus (excess supply).

h. Calculate the change in consumer expenditure, the change in producer revenue, and government expenditure needed to purchase the surplus (excess supply) and maintain the price floor.

i. Use your diagram to show the welfare effects (deadweight loss) arising from the price floor.

Now suppose that the equations above define instead a labour market, where ***P*** denotes the hourly wage in $, and $\boldsymbol{Q_D}$ and $\boldsymbol{Q_S}$ refer to quantity of labour demanded and supplied in millions of unskilled workers. The government imposes a minimum wage of $4.00 per hour.

j. Draw a diagram illustrating the minimum wage in relation to the equilibrium wage and quantity of labour.

k. Calculate the number of unemployed workers, showing how many of these are due to the fall in quantity of labour demanded and how many due to an increase in quantity of labour supplied

Chapter 1.4: Market Failure

No topics covered by HL paper 3.

Chapter 1.5: Theory of the Firm I- Production, Costs, Revenues and Profit

Question 1

The following table provides data for the total product (*TP*) of good Z and units of a variable input (labour) of a firm.

Units of variable input (labour)	Total product (TP) (thousand kilograms)	Marginal product (MP) (thousand kilograms)	Average product (AP) (thousand kilograms)
0	-		
1	3		
2	7		
3	12		
4	16		
5	19		
6	21		
7	22		
8	22		
9	21		

a. Fill in the missing fi gures for marginal product (*MP*) and average product (*AP*).

b. Outline whether the data describe production in the short run or in the long run.

c. Using two diagrams, plot the *TP* curve in one and the *MP* and *AP* curves in the other, illustrating how the product curves are related to each other.

d. Describe the law that explains the shape of the product curves.

e. State the number of units of variable input with which diminishing returns begin, and show this in your diagram.

The table below shows how total product changes in response to changes in quantities of inputs for three firms.

Land (number of hectares)	Labour (number of workers)	Firm 1	Firm 2	Firm 3
1	10	100	100	100
2	20	220	180	200
3	30	350	250	300

f. State which firm is experiencing constant, increasing or decreasing returns to scale.

g. Construct a long-run average total cost curve, and referring to economies and diseconomies of scale, identify the range in which each of the above three firms is most likely operating.

h. Describe two factors leading to economies of scale, and two factors leading to diseconomies of scale.

i. Construct a diagram illustrating the relationship between short-run and long-run average total cost curves, and outline how average costs relate to each other in the short run and long run.

Question 2

Consider the following data on output and total cost corresponding to each level of output.

Output (TP) (thousand units)	0	1	2	3	4	5	6
Total cost (TC) (thousand €)	10	50	60	65	75	95	140
Total fixed cost (TFC) (thousand €)							
Total variable cost (TVC) (thousand €)							
Average fixed cost (AFC) (€)							
Average variable cost (AVC) (€)							
Average total cost (ATC) (€)							
Marginal cost (MC) (€)							
Total revenue (TR) (thousand €)							
Marginal revenue (MR) (€)							

a. Outline whether this firm is operating in the short run or in the long run.

b. For each level of output, find **TFC**, **TVC**, **AFC**, **AVC**, **ATC** and **MC**.

c. Assuming that this firm has no influence over price, and sells each unit of output at €20 per unit, calculate **TR**, and using the total revenue and total cost approach, find the profit-maximizing level of output

d. How much economic profit or loss will the firm earn?

e. Calculate marginal revenue; using the **MC = MR** rule, find the profit-maximizing level of output and check if your results match with your answer for part (c).

f. Using the data in the table, plot the **TC** and **TR** curves and find the profit-maximizing level of output graphically.

g. Plot the MC and MR curves and find the profit-maximizing level of output graphically. (Does your answer match with your answer to part (f) and your calculations?)

h. Using your data, plot the **MC**, **ATC** and **AVC** curves in a single diagram.

i. Outline the reason for the shape of the curves you plotted in part (h).

Question 3

Consider the following data.

Output (TP)	0	1	2	3	4	5
Price	-	30	25	20	15	10
Total cost (TC)	5	25	40	50	65	85
Marginal cost (MC)	-					
Total Revenue (TR)	-					
Average Revenue (AR)	-					
Marginal Revenue (MR)	-					

a. For each level of output, calculate/state **MC**, **TR**, **AR** and **MR**.

b. Graph the **MC** and **MR** curves.

c. Would the profit-maximizing firm produce (i) 2 units of output, (ii) 4 units of output? Explain.

d. Calculate the amount of profit or loss earned by the profit-maximizing firm.

e. State a level of output at which this firm earns negative economic profit, and calculate this amount.

f. State the relationship between average revenue and price.

g. Outline the factor responsible for the downward-sloping **MR** curve (or why the **MR** curve is not horizontal).

h. State the cost figure that represents the firm's total opportunity costs at the profit-maximizing level of output.

i. Outline the difference between implicit and explicit costs, and their relationship to economic costs

j. State three alternative goals of firms (other than profit maximization).

Chapter 1.6: Theory of the Firm II- Market Structures

Question 1

The following table provides output and cost data for a firm in perfect competition.

Output (Q)	Total Cost (TC)	Total Variable Cost (TVC)	Average Cost (ATC)	Average Variable Cost (AVC)	Marginal Cost (MC)
0	50				
1	80				
2	90				
3	95				
4	105				
5	125				
6	170				

a. Fill in the columns for **TVC**, **ATC**, **AVC** and **MC**.

b. Construct a graph plotting the **ATC**, **AVC** and **MC** curves.

c. Identify in your diagram the firm's short-run breakeven price and shut-down price, and outline how you found them.

d. Identify the firm's long-run shut-down price.

e. Identify the price at which this firm would earn normal profi t, and state how much output it would produce at this price.

f. State the condition for productive efficiency; identify the level of output at which this firm would achieve productive efficiency.

g. State the condition for allocative efficiency; identify the price per unit of output at which this firm would achieve allocative efficiency.

h. Outline four assumed characteristics of perfect competition.

i. Given a price of £20 per unit, calculate the amount of economic profit (positive or negative) that this firm would make if it profit maximizes, and outline whether the firm would stay in business in the short run.

Question 2

The following table shows price, quantity and cost data of a firm.

Price	Quantity	Marginal Cost (MC)	Total Revenue (TR)	Marginal Revenue (MR)	Average Revenue (AR)
6	1	5			
5	2	3			
4	3	2			
3	4	3			
2	5	5			
1	6	7			

a. Calculate/state total revenue, marginal revenue and average revenue.

b. Construct a graph plotting marginal revenue, average revenue and marginal cost, and show the demand curve facing the firm.

c. Identify the market structure that cannot represent this firm.

d. Outline how the price elasticity of demand changes along this demand curve (no calculations necessary).

e. Referring to the concept of price elasticity of demand, determine the maximum level of output this firm would be willing to produce and outline why the firm would not be willing to produce more.

f. Determine the revenue-maximizing level of output and the profit-maximizing level of output, and identify them both on your graph.

g. Describe three assumed characteristics of a monopoly.

h. Describe three assumed characteristics of monopolistic competition.

i. If average total costs of the firm at the profit-maximizing level of output are $3, find the firm's economic profit or loss per unit of output and its total economic profit or loss.

Section II: Macroeconomics- Questions

Chapter 2.1: Measuring National Economic Performance

Question 1

The following are data from the national income accounts of the country of Lakeland for the year 2007 (in million Lkl, the national currency).

Investment spending	300.7
Net income from abroad	−147.4
Government spending	350.3
Income sent abroad	173.2
Exports of goods and services	95.3
Consumption spending	950.9
Income from abroad	25.8
Imports of goods and services	132.4
Green GDP	850.3

a. Calculate Lakeland's gross domestic product (GDP) in 2007.

b. Calculate Lakeland's gross national income (GNI) in 2007.

c. Identify one factor that can account for the difference in Lakeland's GDP and GNI.

d. Lakeland's population in 2007 was 1.2 million. Calculate Lakeland's GDP *per capita* and GNI *per capita* in 2007.

e. Outline two factors that might account for the difference between Lakeland's GDP and its green GDP.

The following data are from Flatland's national accounts (in billion Ftl, the national currency).

Year	2008	2009	2010	2011
Nominal GDP (billion Ftl)	301.5	311.3	309.7	314.0
GDP Deflator	100	104.2	102.7	103.9
Real GDP (billion Ftl)				
Real GDP Growth	-			

f. Outline the difference between nominal GDP and real GDP.

g. Using the information in the table, identify the base year.

h. Calculate real GDP for 2008, 2009, 2010 and 2011.

i. Calculate the rate of growth in real GDP for 2009, 2010 and 2011.

j. For 2010, explain why the fall in nominal GDP was accompanied by an increase in real GDP.

k. Identify a year in which a decrease in real GDP occurred and a year in which a decrease in real GDP growth occurred.

Chapter 2.2: Aggregate Demand & Supply

Question 1

a. Explain verbally (i.e. not using formulae), how the Keynesian multiplier leads to changes in real GDP.

b. Outline why knowledge of the multiplier could be important to policy-makers.

c. Outline the meaning of leakages (withdrawals) and injections, and describe how they are related to the size of the multiplier.

d. Outline the meaning of a marginal propensity to consume (**MPC**) of 0.75.

e. If the **MPC** in an economy is 0.75, calculate the expected change in real GDP, given an increase in investment spending of £200 million.

f. Outline the meaning of the marginal propensity to save (**MPS**), marginal propensity to tax (**MPT**) and the marginal propensity to import (**MPM**).

g. State the relationship between the **MPC** and the **MPS**, **MPT** and **MPM**.

h. Suppose Riverland has a real GDP of 470 million Rvl. If in Riverland, the *MPS* + *MPT* + *MPM* = 0.25, calculate the new level of real GDP following a decrease in exports of 5 million Rvl.

i. Riverland would like to increase its real GDP by 40 million Rvl and decides to do so through an increase in government spending. Using the information in part (h), calculate the amount by which government spending should increase.

j. Using the Keynesian *AD-AS* model, draw a diagram to show the impact of the multiplier on aggregate demand and real GDP.

Chapter 2.3: Macroeconomic Objectives I- Low Unemployment & Stable Price Levels

Question 1

The following labour statistics refer to Riverland in 2010.

Population	Labour force	Discourage workers	Underemployed workers	Part-time workers	Full-time workers
4,500,200	2,500,000	250,000	150,000	200,000	1,900,000

a. Define 'unemployment'.

b. Calculate Riverland's unemployment rate in 2010.

c. Outline the meaning of 'discouraged workers'.

d. Outline the meaning of 'underemployed workers'

Riverland's basket of goods and services consumed by the average household in the course of a year includes three items (X, Y and Z), as shown below.

Good or Service	Quantity in Basket (weight)	Price per unit (Rvl) 2008	Price per unit (Rvl) 2009	Price per unit (Rvl) 2010	Price per unit (Rvl) 2011
X	3	5	5	6	5
Y	2	3	4	6	5
Z	7	6	7	7	7

e. Calculate the value of the basket in 2008, 2009, 2010 and 2011.

f. Using 2008 as the base year, construct a price index for the period 2008–11.

g. Calculate the rate of inflation/deflation in Riverland in 2008-9, 2009–10 and 2010–11.

h. Distinguish between deflation and disinflation, and identify one year in which each occurred.

Chapter 2.3: Macroeconomic Objectives II- Economic Growth & Equity in Income Distribution

Question 1

The following table shows data from Snowland's national income accounts.

Year	2009	2010	2011
Real GDP (million Snl)	5000	5100	5151
Real GDP per capita (Snl)	2000	1980	1960

a. Calculate the rate of growth in real GDP for 2010 and 2011.

b. Calculate the rate of growth in real GDP *per capita* for 2010 and 2011.

c. Explain how it is possible for real GDP to be increasing while real GDP *per capita* is falling.

The following table shows income shares of population quintiles in Riverland and Lakeland.

	Lowest 20%	2nd 20%	3rd 20%	4th 20%	Highest 20%
Lakeland	9%	14%	18%	23%	36%
Riverland	4%	7%	12%	19%	58%

d. Outline the meaning of 'quintiles' in the table, and outline how the data would differ if income shares were shown by population deciles.

e. Analyse the data on income shares and explain which of the two countries has a more equal distribution of income.

f. Construct Lorenz curves for Lakeland and Riverland, and explain which of the two countries has a more equal distribution of income.

g. Based on your curves for part (f), explain which of the two countries, Lakeland or Riverland, has a higher Gini coefficient, and what this means for its income distribution in comparison with the other country.

h. Outline the maximum and minimum values that can be taken by a Gini coefficient.

i. Draw a diagram showing an initial Lorenz curve, and a possible Lorenz curve that would result if the government of the country placed increased emphasis on indirect taxes and lower emphasis on direct taxes as sources of government revenue.

j. Outline whether income distribution is likely to become more or less equal following the change in the government tax policies described in part (i).

Question 2

The following table provides information on income tax rates in Mountainland (in Mnl, the national currency).

Annual Income (Mnl)	Marginal Tax Rate (%)
0 – 7,000	0
7001 – 20,000	10
20,001 – 45,000	25
45,001 – 100,000	35
100,001+	45

a. Distinguish between marginal and average tax rates.

b. Calculate the amount of income tax paid by families with an annual income of
- **i.** 10 000 Mnl
- **ii.** 35 000 Mnl
- **iii.** 107 000 Mnl.

c. For each of the family incomes in part (b), calculate the corresponding average tax rate, and state the corresponding marginal tax rate.

d. The family with an annual income of 35 000 Mnl spends 30 000 Mnl on goods and services, which includes spending on indirect taxes of 6000 Mnl.

- **i.** Calculate the indirect tax rate.
- **ii.** Calculate spending on indirect taxes as a fraction of annual income.
- **iii.** Calculate this family's total average tax rate, including direct and indirect taxes.

e. Explain whether a constant indirect tax rate applied uniformly on all spending is progressive, proportional or regressive.

Snowland consists of two states, Upper Snowland and Lower Snowland. Each state has its own income tax system with its own tax rates. The following table shows the amount of income tax paid in each state on four different annual income levels (in Snl, the national currency).

Annual Income (Snl)	Upper Snowland Amount of income tax paid annually (Snl)	Lower Snowland Amount of income tax paid annually (Snl)
25,000	5,750	5,750
36,000	8,280	7,200
43,000	9,890	8,170
47,000	10,810	8,460

f. Explain what type of tax system Upper Snowland and Lower Snowland each has, progressive, proportional or regressive.

g. Explain which of the three tax systems shown in the tables above, Mountainland's, Upper Snowland's or Lower Snowland's, is most appropriate as a method to make the distribution of income more equal.

Chapter 2.4: Demand & Supply-Side Policies

No topics covered by HL paper 3.

Section III: International Economics- Questions

Chapter 3.1: International Trade

Question 1

Suppose a simple world economy with two countries, Oceanland and Grassland, each of which produces two goods, seafood and dairy products. Oceanland has an absolute advantage in the production of both seafood and dairy products, while Grassland has a comparative advantage in the production of dairy products.

a. Draw a diagram showing the absolute and comparative advantages of each country.

b. State which products each country should export and import, according to the theory of comparative advantage.

c. Show points of possible production and consumption for each of the two countries, after specialization and trade according to comparative advantage.

d. Outline two possible sources of comparative advantage.

The following data show the quantity of output that can be produced by country X and country Y if all their resources are used to produce either good A or good B.

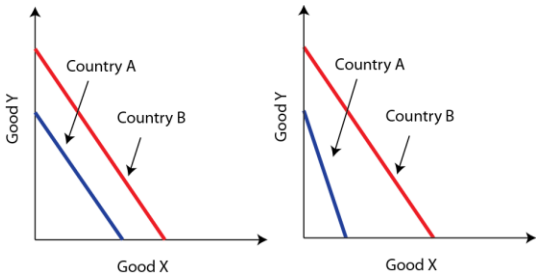
	Production Possibilities of Country A & Country B	
	Good A (Units per day)	**Good B (Units per day)**
Country X	40	20
Country Y	50	100

e. Calculate the opportunity cost of good A and good B in country X, and the opportunity cost of good A and good B in country Y.

f. State which country has a comparative advantage in good A, which in good B, and which has an absolute advantage in both goods.

g. Using the data in the table, draw a diagram illustrating the comparative advantage of each country.

The following questions are based on the diagrams below, illustrating production possibilities curves.



h. In diagram (i), can either country benefit from specialization and trade? Outline why or why not.

i. In diagram (ii), state which country has the comparative advantage in which good, and which country has the absolute advantage in both goods.

Question 2

Riverland had a tariff of 5 Rvl per kg of seafood. Domestic production of seafood with the tariff was 70 000 kg per week, domestic consumption was 150 000 kg per week, and the price was 25 Rvl per kg. Because of World Trade Organization (WTO) rules, the government of Riverland was forced to eliminate the seafood tariff. As a result, domestic production fell to 50 000 kg per week and consumption increased to 180 000 kg per week.

a. Calculate the quantity of seafood imports in Riverland with the tariff and the quantity of imports after the tariff was eliminated.

b. Calculate the price of seafood paid by consumers and the price received by producers in Riverland after the tariff was removed.

c. Draw a diagram showing the price of seafood, domestic quantity produced, domestic quantity consumed, and the quantity of imports (i) with the tariff, and (ii) after removal of the tariff. (The diagram does not have to be drawn to scale.)

d. Calculate the change in consumer expenditure on seafood in Riverland due to the removal of the tariff.

e. Calculate the change in domestic producer revenue from seafood in Riverland due to the removal of the tariff.

f. Calculate the change in the government budget in Riverland due to the removal of the tariff.

g. Calculate the change in foreign producers' export revenue from seafood exports to Riverland.

h. State two stakeholders who gained from the removal of the tariff.

i. State two stakeholders who lost from the removal of the tariff.

j. Given the information above about Riverland, explain who has a comparative or absolute advantage in seafood production, Riverland or its trading partners.

k. Using your diagram from part (c), show the amount of welfare that was gained by Riverland when the tariff was eliminated (i.e. welfare loss that was regained).

Question 3

Flatland had an import quota of 150 000 kg of dairy products per week, because it wanted to protect its dairy industry. As a result of the quota, domestic producers were selling 350 000 kg of dairy products per week, at a price of 20 Ftl (the domestic currency) per kg. Due to complaints by its World Trade Organization (WTO) trading partners, Flatland was forced to eliminate the dairy quota. The elimination of the quota caused the price of dairy products to fall to 15 Ftl per kg, domestic production dropped to 250 000 kg per week, and imports increased to 400 000 kg per week.

a. Calculate the quantity of domestic consumption of dairy products before the removal of the quota and after the removal of the quota.

b. Calculate the amount by which imports increased following the removal of the quota.

c. Draw a diagram showing the price of dairy products, domestic quantity produced, domestic quantity consumed, and the quantity of imports (i) with the quota, and (ii) after removal of the quota. (The diagram does not have to be drawn to scale.)

d. Calculate the change in consumer expenditure on dairy products in Flatland due to the removal of the quota.

e. Calculate the change in domestic producer revenue from dairy products in Flatland due to the removal of the quota.

f. Calculate the change in foreign producers' export revenue from dairy exports to Flatland.

g. Calculate the amount of quota revenue that was generated when the quota was in place.

h. Assuming that the quota revenues were given to foreign producers, calculate the total effect on foreign producers from the removal of the quota, taking into account both export revenues and quota revenues.

i. State two stakeholders who gained from the removal of the quota.

j. State one stakeholder who lost from the removal of the quota.

k. State one important difference between imposing a tariff and imposing an import quota.

l. Using your diagram from part (c), show the amount of welfare that was gained by Flatland when the quota was eliminated (i.e. welfare loss that was regained).

m. State two economic benefits for the Flatlander or global economy (other than impacts on stakeholders) that might arise from the removal of the import quota.

Question 4

Grassland used to grant a subsidy on cereals of 5 Gsl (the local currency) per kg. Due to the subsidy, domestic production was 150 000 kg per week, and imports amounted to 75 000 kg per week. The price paid by consumers was 25 Gsl per kg. A number of Grassland's trading partners complained that Grassland was dumping its cereals in the international market, and threatened to impose anti-dumping tariffs. Grassland therefore removed its subsidy on cereals. Following the removal of the subsidy, domestic cereal production fell to 80 000 kg per week.

a. Calculate/state the price received by producers when they were receiving the subsidy and after the removal of the subsidy.

b. Calculate the total amount of cereals consumed per week in Grassland before the removal of the subsidy and after the removal of the subsidy.

c. Calculate the quantity of imports per week after the removal of the subsidy.

d. Draw a diagram showing the price of cereals, domestic quantity produced, domestic quantity consumed, and the quantity of imports (i) with the subsidy, and (ii) after removal of the subsidy. (The diagram does not have to be drawn to scale.)

e. State/calculate the change in consumer expenditure on cereals arising from the removal ofthe subsidy.

f. Calculate the change in producer revenue from sales of cereals due to the removal of the subsidy.

g. Calculate the change in the government's budget due to the removal of the subsidy.

h. Calculate the change in foreign producers' export revenue from cereal exports to Grassland.

i. State two stakeholders who gained from the removal of the subsidy.

j. State one stakeholder who lost from the removal of the subsidy.

k. State one stakeholder who was unaffected by the removal of the subsidy.

l. Outline two arguments that could be used to justify the use of subsidies as a trade protection measure.

Chapter 3.2: Exchange Rates & the Balance of Payments

Question 1

Suppose a traveller from Riverland, whose currency is the Rvl, would like to visit Mountainland, whose currency is the Mnl. The two currencies initially exchange at the rate of 1 Mnl = 2.5 Rvl.

a. Find the value of 1 Rvl in terms of Mnl.

b. The traveler from Riverland would like to bring 1500 Rvl with her to Mountainland converted into Mnl. How many Mnl will she receive when she exchanges 1500 Rvl?

c. While in Mountainland, the traveller from Riverland runs out of Mnl but wants to buy some presents for her friends that cost 175 Mnl. Given the exchange rate above, how many Rvl must she exchange in order to make these purchases in Mnl?

d. While exchanging Rvl for Mnl, the traveler discovers that the exchange rate has changed, and now stands at 1 Mnl = 2.7 Rvl. How many Rvl must she exchange to get 175 Mnl at the new exchange rate?

e. Distinguish between currency appreciation and depreciation, and state which currency appreciated and which depreciated.

f. Calculate the percentage appreciation of the appreciating currency and the percentage depreciation of the depreciating currency.

g. Identify three factors that may have led to the exchange rate change between the Mnl and the Rvl.

h. Draw a diagram illustrating how one of the factors you identified above caused a change in the value of the appreciating currency.

Question 2

We are given the demand function $\mathbf{Q_D = 16 - 4P}$, and the supply function $\mathbf{Q_S = -2 + 5P}$, where $\mathbf{Q_D}$ and $\mathbf{Q_S}$ are quantity of Mnl (Mountainland's currency) demanded and supplied in millions per day, and *P* is the price of the Mnl in terms of Rvl (Riverland's currency).

a. Calculate the equilibrium exchange rate for the Mnl in terms of Rvl.

b. Calculate the equilibrium quantity of Mnl bought and sold per day.

c. State what kind of exchange rate system allows the Mnl to settle at its equilibrium value determined by demand and supply.

d. Suppose the government of Mountainland decides to peg (fi x) the Mnl at 1 Mnl = 2.3 Rvl. Calculate $\mathbf{Q_D}$ and $\mathbf{Q_S}$ at this exchange rate, and the size of the surplus (excess supply) or shortage (excess demand) of Mnl in the foreign exchange market.

e. State whether the Mnl would be overvalued or undervalued at 1 Mnl = 2.3 Rvl.

f. Describe two policies that the government or central bank of Mountainland could pursue to maintain the value of the Mnl at 1 Mnl = 2.3 Rvl.

g. Plot the demand and supply curves for the Mnl, and identify the equilibrium Mnl exchange rate and excess demand or excess supply of Mnl that results when the Mnl is pegged at 2.3 Rvl.

h. If the government of Mountainland were to peg the Mnl at 1 Mnl = 1.7 Rvl, calculate Q_D and Q_S at this exchange rate, and the size of the surplus (excess supply) or shortage (excess demand) of Mnl in the foreign exchange market.

i. State whether the Mnl would be overvalued or undervalued at 1 Mnl = 1.7 Rvl.

j. Describe two policies that the government or central bank of Mountainland could pursue to maintain the value of the Mnl at 1 Mnl = 1.7 Rvl.

Question 3

The table below shows the balance of payments accounts of Oceanland for the year 2010 (all figures in billion Ocl, the national currency).

Current Account	
Exports of goods	+25
Imports of goods	
Balance of trade in goods	−11
Exports of services	+3
Imports of services	
Balance of trade in services	+1
Balance of trade in goods & services	
Income	+3
Current transfers	+2
Balance of current account	
Capital Account	
Capital transfers	
Transactions in intangible assets	+1
Balance of the capital account	−2
Financial Account	
Direct investment	+6
Portfolio investment	−2
Reserve assets	+4
Balance on financial account	
Net errors and omissions	
Balance	

a. Outline the role of the balance of payments.

b. Fill in the blanks in the table above.

c. State which of the three accounts are in deficit and which in surplus.

d. Explain the role of reserve assets of +4 billion Ocl in the financial account.

e. The government and/or central bank decide to allow the Ocl to depreciate in order to correct the problem in the current account. It is estimated that over the short term (less then 6 months), on average the price elasticity of demand for exports is 0.49 and the price elasticity of demand for imports is 0.39. Explain the likely effect of the depreciation of the Ocl on Oceanland's current account during this period.

f. It is also estimated that 6 months or more following the depreciation, on average the price elasticity of demand for exports is 0.75 and the price elasticity of demand for imports is 0.83. Explain the likely effect of the depreciation of the Ocl on Oceanland's current account during this later period.

g. State the condition that allows you to answer parts (e) and (f) above.

h. Explain the J-curve effect as it relates to the likely changes in Oceanland's current account, resulting from the depreciation of the Ocl.

Chapter 3.4: Economic Integration & Terms of Trade

Question 1

The following table presents terms of trade indices (indexes) for three country groups in selected years during the period 1970–81, constructed by the International Monetary Fund on the basis of export and import price data. The table illustrates changes in the terms of trade occurring after the oil price shocks of 1973–74 and 1979–81, which resulted in very large oil price increases. Below are the terms of trade indices (indexes), selected years, 1990 = 100.

	Oil-exporting countries	Non-oil exporting developing countries	Developed countries
1970	21	126	110
1973	29	122	108
1974	70	119	97
1979	87	112	96
1981	119	109	87

a. State the equation that was used to calculate the terms of trade indices in the table above.

b. Explain the meaning of '1990 = 100' in the heading of the table above.

c. Calculate the percentage change in the terms of trade in the period 1970–81 for the,

i. oil-exporting countries
ii. non-oil exporting developing countries
iii. developed countries.

d. Identify which group of countries experienced a deterioration and which an improvement in their terms of trade.

e. Using the concept of specialization of exports, suggest a factor that can account for the much larger change in the oil-exporting countries' terms of trade compared to the other two groups of countries.

f. With reference to the changes in the terms of trade of oil-exporting countries in the period 1970–81, explain how long-term changes in the terms of trade may result in a global redistribution of income.

g. The oil shocks of 1973–74 and 1979–81 were the result of restrictions in the global supply of oil. Using a demand and supply diagram for the global oil market, show the effect of these restrictions on the equilibrium price and quantity of oil.

h. The huge change in the terms of trade of the oil-exporting countries over the period shown in the table resulted in very large trade and current account surpluses for these countries. Using your answer to part (g) and the concept of price elasticity of demand for exports, explain how this was possible.

Section IV: Development Economics- Questions

No topics covered by HL paper 3.