

WJEC GCE ECONOMICS

QUANTITATIVE SKILLS

**Quantitative Skills Outline**

**GRAPHICAL SKILLS**

**1st year**

**Production Possibility Frontiers**

* Illustrate opportunity cost on straight-line and concave PPFs, using accurate labelling and carrying out simple calculations
* Explain the difference in shape of straight line (perfect factor mobility / substitutability) and concave (imperfect factor substitutability) PPFs
* Explain factors that cause movements from points inside the PPF to points on the PPF, movements along the PPF, and movements inwards and outwards of the PPF (including skewed shifts and increasing opportunity cost as output increases)

**Demand and Supply**

* Explain how the Law of Diminishing Marginal Utility explains the shape of the downwards sloping demand curve (*i.e. for a rational person, as quantity demanded increases, the additional utility / satisfaction gained from consuming that additional unit decreases – the price paid by consumers for that good should be less than or equal to the marginal utility gained from consuming the good)*
* Explain the substitution effect (*i.e. as a good becomes cheaper, it encourages consumers to substitute away from alternatives therefore increasing the quantity demanded)* and the income effect (*i.e. as a good becomes cheaper it causes the purchasing power of a consumer for that good to increase – the same amount of income can be used to buy a greater quantity)* to explain the downwards slope of a demand curve
* Explain why supply curves slope upwards: a) the profit motive (higher profits are possible at higher prices) and b) rising marginal costs (*due to diminishing marginal returns)* as output rises means that the price needs to rise in order to allow profits to be earned
* Factors that cause demand and supply curves to shift, and illustration of these changes on a demand and supply diagram, indicating changes in the market equilibrium price and quantity traded
* Calculating producer surplus and consumer surplus using numbers provided on a diagram – learners must be able to calculate the area of a triangle (½ x base x height)
* Illustrate the consumer incidence and producer incidence of an indirect tax on a demand and supply diagram, and illustrating how the balance between consumer incidence and producer incidence changes when the PED and PES changes
* Government intervention diagrams:
  + Specific indirect tax (parallel upwards shift of the supply curve – or a downwards shift if the tax is removed/reduced)
  + Ad valorem indirect tax (non-parallel upwards pivot of the supply curve – or a downwards pivot if the tax is removed/reduced)
  + Subsidy (downwards shift of the supply curve)
  + Minimum price (set above the free market equilibrium)
  + Maximum price (set below the free market equilibrium)

**Labour markets**

* Draw labour demand and labour supply curves
* Illustrate labour market equilibrium
* Illustrate the impact on the equilibrium wage rate and equilibrium quantity of labour of a change in demand for labour and/or supply of labour
* Illustrate the theoretical impact of a national minimum wage on a labour market, setting the NMW above the market equilibrium leading to involuntary unemployment (learners should be able to manipulate the labour market diagram with different wage elasticities of labour demand and supply to show the differing impact on the amount of unemployment caused)

**Market failure**

* Draw a diagram to illustrate external benefits of consumption, indicating the socially optimal equilibrium and the welfare loss triangle
* Draw a diagram to illustrate external costs of production, indicating the socially optimal equilibrium and the welfare loss triangle
* Draw a diagram to illustrate external benefits of production, indicating the socially optimal equilibrium and the welfare loss triangle

**Aggregate Demand and Aggregate Supply analysis**

* Explain why AD slopes downwards (any *one* of the following: real money balance effect, real trade effect, real interest rate effect)
* The impact on an AD curve of a change in one of the components (C + I + G + X – M)
* Explain the shape of the Keynesian LRAS curve (increasingly inelastic as full employment is approached)
* Explain rightwards shifts in LRAS (quantity, quality and efficiency of factors of production)
* Explain upwards/downwards shifts in LRAS (changes in the costs of factors of production / raw materials)
* Illustrate macroeconomic equilibrium, and changes to macroeconomic equilibrium when AD and/or LRAS changes

**The Laffer Curve**

* Explain the shape of the Laffer curve (total tax revenue against percentage tax rate)

**Exchange rates**

* Draw a downwards sloping demand curve (exchange rate against quantity of currency), and explain shifts in the demand curve (changes in demand for exports and changing capital inflows)
* Draw an upwards sloping supply curve (exchange rate against quantity of currency), and explain shifts in the supply curve (changes in demand for imports and changing capital outflows)
* Illustrate equilibrium in the foreign exchange market using a demand and supply curve

**Protectionism**

* Draw and label a tariff diagram (learners should be able to indicate the areas representing the tax revenue, the change in producer surplus, the deadweight losses, the reduction in consumer surplus – learners should be able to calculate the area of these sections on diagrams, using the formulae for the area of a triangle and the area of a rectangle)

**2nd year**

**Theory of the firm diagrams**

* PRODUCT: total product, average product and marginal product
* COST: total cost, total fixed cost, total variable cost, average total cost, average fixed cost, average variable cost, marginal cost – in the short run and the long run
  + Economies and diseconomies of scale (internal and external), including the envelope curve showing the derivation of the LRAC curve from a series of SRAC curves
* REVENUE: total revenue, average revenue, marginal revenue
* **PERFECT COMPETITION:** short run and long run diagrams, with horizontal/perfectly elastic AR curves for the firm; indicate the profit maximising point, and use the diagram to analyse productive and allocative efficiency
* **MONOPOLISTIC COMPETITION:** short run and long run diagrams, with downwards-sloping AR curves for the firm; indicate the profit maximising point, and use the diagram to analyse productive and allocative efficiency
* **MONOPOLY:** diagram, with horizontal/perfectly elastic AR curves for the firm; indicate the profit maximising point, and use the diagram to analyse productive and allocative efficiency
* **COMPARE THE OUTCOMES IN PERFECT COMPETITION AND MONOPOLY** using diagrams (e.g. theoretical achievement of productive and allocative efficiency in the LR in perfect competition but not in the SR, compared with no achievement of productive or allocative efficiency in monopoly; consideration of economies/diseconomies of scale in monopoly and links with productive efficiency; dynamic efficiency in monopoly as inferred from the existence of abnormal profits in the SR and LR, etc.)

**Aggregate demand and aggregate supply**

* Explain the upwards slope of SRAS and reasons why it might shift up or down
* Explain the shape of LRAS from both Neoclassical and Keynesian perspectives
* Explain how a new macroeconomic equilibrium is reached from both Neoclassical and Keynesian perspectives

**Phillips Curves**

* Explain the shape of the SRPC and the inverse relationship between inflation and unemployment (*i.e. as the pool of available labour rises then bargaining power of the unemployed falls and the bargaining power of employers rises therefore pushing down wage demands and reducing inflation; could also use an AD/AS approach*)
* Explain the shape of the LRPC (vertical at the NAIRU / Natural Rate) by using a series of SRPCs, each associated with a different degree of inflationary expectations – (*i.e. any attempt to push unemployment below the natural rate leads to an increase in inflation and subsequently an increase in inflationary expectations, causing a return to the original level of unemployment but at a higher rate of inflation*)
* Explain shifts in the LRPC (supply side policies)

**International Trade**

* Draw and explain comparative and absolute advantages using PPFs, and tabular form

**RATIOS AND FRACTIONS CALCULATIONS / COSTS REVENUES AND PROFITS**

This list is not exhaustive, but should give an idea of the possible calculations that learners may be required to undertake.

**1st year**

* Productivity (Total Output / Total Inputs, in a given period of time; alternatively, output per person)

**2nd year**

* **Theory of the firm**
  + **PRODUCT**: total product, average product (total product / number of workers) and marginal product (addition to total product from employing an additional worker)
  + **COST**: total cost, total fixed cost, total variable cost, average total cost (total cost / total output), average fixed cost (total fixed cost / total output), average variable cost (total variable cost/total output), marginal cost (addition to total cost from producing one more unit of output) – in the short run and the long run
  + **REVENUE**: total revenue (price x quantity, or, total profits + total costs), average revenue (total revenue / total output; also the same as price), marginal revenue (addition to total revenue from selling one more unit of output)
  + **Concentration ratios**
* **Macroeconomic objectives**
  + **Unemployment:** unemployment rate, inactivity rate, explaining differences in the Claimant Count and ILO measures

**PERCENTAGES AND PERCENTAGE CHANGE CALCULATIONS**

These calculations could be in relation to:

* Elasticities (% change in quantities, prices, income)
* Wages
* Value of the currency
* Costs, revenues, profits, output
* GDP, unemployment/employment, inflation
* The size of the budget deficit or surplus as a proportion of GDP
* The size of the national debt as a proportion of GDP
* The size of the current account deficit or surplus as a proportion of GDP
* Development indicators – proportion of the population with access to certain services e.g. clean water, mobile phones, primary education etc

**MEAN, MEDIAN AND QUINTILES**1

Learners should understand the difference between calculating averages using the mean (total/quantity) and the median (the “middle” value) and understand why economists might choose one measure over the over e.g. the median is not skewed by outliers (i.e. useful for looking at “average” income without being skewed by a very small number of high earners). Learners could be expected to calculate averages for any economic indicator referred to in the specification.

Learners could be expected to interpret data, for example share of income, presented in quintile form i.e. splitting the population into 5 “groups”, from lowest earners to highest earners – learners should be aware that using quintile data is a good way of indicating the degree of inequality in, for example, income, wealth, asset ownership, access to services and so on.

The specification requires, for example, learners to consider the redistributive effects of inflation, the extent to which the benefits of growth are evenly distributed, and the effects of policies to make labour markets more flexible, and in the case of Welsh students, differences between the Welsh economy and other UK regions AND differences between regions in Wales.

**OTHER GRAPHICAL FORMS**

**2nd year**

* **2 x 2 game theory matrices**  - determination of the Nash equilibrium/equilibria in a payoff matrix (and by inference, therefore, the dominant strategies of each firm)

**INDEX NUMBERS**

**1st year**

* Explain what is meant by an Exchange Rate Index

**2nd year**

* Calculate a simple weighted price index; explain the purpose of using weights in an index
* Understand how the CPI is calculated (weighted changes in the price index over 12 month)
* Understand the differences between the CPI and RPI
* Interpret and calculate other uses of indices e.g. unemployment, GDP changes, exchange rates, labour costs, productivity, confidence, the government’s fiscal position, size of budget deficits/surpluses, asset prices
* Terms of Trade Index (Index of Export Prices / Index of Import Prices x 100)

**ELASTICITIES**

**1st year**

**Price elasticity of demand (PED)**

* Make calculations using the formula %ΔQd / %ΔP (n.b. learners should be able to rearrange this formula in order to calculate, for example, %ΔQd given information about the value of PED and %ΔP)
* Calculate %ΔQd and %ΔP, given information about new and old quantity demanded and new and old price (% change = change/original x 100)
* Interpret the meaning of PED in terms of degree of responsiveness of quantity demanded to a change in price: perfectly inelastic = 0, inelastic between 0 and -1, unitary at -1, elastic between -1 and -∞
* Understand that PED varies along a straight line demand curve (elastic in the upper half, unitary halfway along, inelastic in the lower half)
* Explain the relationship between PED and total revenue (*n.b. learners should be able to illustrate the rectangle representing TR on a demand curve, and calculate the area of that rectangle: base x height).* When PED is inelastic then a fall in the price leads to a decrease in TR and an increase in price leads to an increase in TR. When PED is elastic then a fall in the price leads to an increased in TR and a decrease in price leads to a decrease in TR. When PED is unitary, then TR remains constant whether the price increases or decreases.

**Income elasticity of demand (YED)**

* Make calculations using the formula %ΔQd / %ΔY (n.b. learners should be able to rearrange this formula in order to calculate, for example, %ΔY given information about the value of YED and %ΔQd)
* Calculate %ΔQd and %ΔY, given information about new and old quantity demanded and new and old income (% change = change/original x 100)
* Interpret the meaning of YED in terms of degree of responsiveness of quantity demanded to a change in income: positive numbers greater than 1 = income elastic normal goods, positive numbers less than 1 = income inelastic normal goods, negative numbers between 0 and -1 = income inelastic inferior goods, negative numbers between -1 and -∞ = income elastic inferior goods

**Cross (price) elasticity of demand (XED)**

* Make calculations using the formula %ΔQdA / %ΔPB (n.b. learners should be able to rearrange this formula in order to calculate, for example, %ΔPB given information about the value of XED and %ΔQdA)
* Calculate %ΔQdX and %ΔPB, given information about new and old quantity demanded of good A and new and old price of good B (% change = change/original x 100)
* Interpret the meaning of XED in terms of degree of responsiveness of quantity demanded of Good A to a change in the price of Good B: positive number = substitute, zero = unrelated goods, negative = complement

**Price elasticity of supply (PES)**

* Make calculations using the formula %ΔQs / %ΔP (n.b. learners should be able to rearrange this formula in order to calculate, for example, %ΔQs given information about the value of PES and %ΔP)
* Calculate %ΔQs and %ΔP, given information about new and old quantity supplied and new and old price (% change = change/original x 100)
* Interpret the meaning of PES in terms of degree of responsiveness of quantity supplied to a change in price: perfectly inelastic = 0, inelastic between 0 and 1, elastic between -1 and -∞

**2nd year**

* Assess the significance of changes in the exchange rate and the relative prices of exports and imports using the Marshall-Lerner Condition (*a depreciation of the exchange rate will improve the trade balance provided the sum of the price elasticities of demand for exports and imports is greater than one)*

**MONEY TERMS TO REAL TERMS CALCULATIONS**

This is a specific Ofqual requirement. To convert nominal GDP to real GDP, for example, you could use the following formula:

*(Nominal GDP/Price index)\* Base price index*

**OTHER POSSIBLE QUANTITATIVE ELEMENTS**

**1st year**

* Carry out calculations using the AD formula, and possible rearrangements of it (AD = C + I + G + (X – M))

**2nd year**

* Calculate profit, given the value for total revenue and total costs
* Determining the profit maximising point, revenue maximising point, productively efficient point, allocatively efficient point, and normal profit point(*aka limit pricing, or sales volume maximisation point)* using numerical data and/or graphical data
* Explain and **evaluate** the Quantity Theory of Money / Fisher Formula (MV=PT)
* Calculation of opportunity costs to illustrate and determine comparative advantage
* Calculate the terms of trade, in the theory of comparative advantage
* Explain the difference between GDP and GNP
* Explain what is meant by adjustments for Purchasing Parity
* Understand how the HDI is calculated (learners may also want to examine the HPI, the inequality-adjusted HDI, the OECD Better Life Index, and the Multi-Dimension Poverty Index, to contrast with the HDI

**GDP or GNP?**

Sergey Pogrebnyakilivic is a Polish citizen who now works at the Mini Factory in Cowley, Oxford and lives in Rose Hill.

David Beckham is a British citizen. He works for LA Galaxy.

Kazakshtan’s GDP/Capita is $11 500 but GNI/Capita is only $10 200. Explain the possible reason for this difference.

**What is mean GDP/Capita?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Country** | **GDP ($bn)** | **Population** | **Answer** |
| Canada | 1793.80 | 35.16m |  |
| Italy | 2129.28 | 59.83m |  |

**What is median GDP/Capita?**

**Below is a hypothetical population of 19 citizens**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Income (per year)** | Jadd | 28 000 |
| George | 79 000 | Anisha | 26 000 |
| Fadlal | 78 000 | Arina | 25 000 |
| Chantal | 71 000 | James | 23 000 |
| Freddie | 51 000 | Assel | 23 000 |
| Alec | 46 000 | Mystic | 21 000 |
| Jason | 42 000 | Pete | 21 000 |
| Sergey | 34 000 | Patrick | 17 000 |
| Horatio | 31 000 | Scarlett | 17 000 |
| Charlee | 28 000 | Carla | 15 000 |

Is mean GDP/Capita or median GDP is a better measure of this economy? Why?

**Index numbers**

**Fill in the gaps.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Georgistan | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| GDP  ($trn) | 2.0 | 2.02 | 2.06 | 2.20 | 2.16 |  |  | 2.30 | 2.36 |
| Index | 100 | 101 | 103 |  |  | 110 | 112 |  |  |

Calculate % GDP growth 2006-2007?

Calculate % GDP growth 2007-2008?

Construct an Index Table for Panama using 2011 as the Base Year.

|  |  |  |  |
| --- | --- | --- | --- |
| **Panama** | **2010** | **2011** | **2012** |
| **GDP ($bn)** | **400** | **440** | **462** |
| **GDP Index** |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Mexico** | **2010** | **2011** | **2012** |
| **GDP index** |  | **100** | **107** |

If Mexico’s GDP growth was 5% in 2010-2011, calculate the value of the missing figure.

Which country (Mexico or Panama) experienced the greatest growth 2010-2012?

**Nominal GDP**

**Real GDP**

|  |  |  |  |
| --- | --- | --- | --- |
| **Panama** | **2010** | **2011** | **2012** |
| **GDP ($bn)** | **400** | **440** | **462** |
| **Inflation Index** | **100** | **105** | **109** |

**Calculate Real GDP for 2011 and 2012:**

***(Nominal GDP/Price index)\* Base price index***