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CAIE Unit 1-4 Calculations Crib Sheet

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Percentages

Percentage change = (new – old) / old x 100 or difference / old x 100 where old is the previous value and new is the current value.

Example: calculate the percentage increase if sales revenue increases from £120m to £150m.
Percentage increase in sales revenue = (150-120)/120 x 100 = 30/120 x 100 = 0.25 x 100 = 25%

The following is an extract from TN's accounts:

Table 1: Extract from accounts ($000)

	2005	2006	% Change
Sales of computers	80	40	–50
Sales of components	50	90	
Rent on shops	20	50	+150
Stocks	5	10	+100

_ Tariq is thinking of changing the product mix by focusing more on the sale of components. _

(i) Calculate the percentage change in sales of components between 2005 and 2006. [2]

Revenue

Revenue: income earned from selling products. Sometimes called sales, sales revenue or turnover. Total revenue is found by multiplying selling price per item by the quantity (amount) of items sold.

Revenue = price x quantity or **TR = P x Q** where TR is total revenue, P is price and Q is quantity
Example: calculate total revenue if 2,000 items priced £30 each are sold. TR = £30 x 2,000 = £60,000

W13_QP_23: Revenue and PED

George's Gym (GG)

George identified a potential niche market for a new gym in his local area. He set up GG as a sole trader business three years ago. GG is a modern gym with the latest equipment.

Table 3 – Annual revenue and profit for the previous 3 years ($000)

	2010	2011	2012
Annual revenue	120	160	X
Profit	20	50	80

The local population is wealthy. Last year (2012), GG had 300 members who each paid a membership fee of $60 per month. George is thinking about new ways of increasing revenue such as offering additional 'keep fit' classes. He also plans to increase the monthly fee he charges members to $66. His accountant has told him he needs to think about the price elasticity of demand before making a pricing decision.

(i) Calculate the value of X in Table 3. [2]

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Market Size, share and growth

Market size: total sales of all the firms in a given market. Market size by value is found by multiplying the number of units sold by price

Example: Firm A sells 2,000 units at £8. Firm B sells 2,500 units at £5.

• **Market size by volume** = 2,000 units + 2,500 units = 4,500

• **Market size by value** = (2,000 x £8) + (2,500 x £5) = £16,000 + £12,500 = £28,500

Market share: measures the sales of one business as a percentage of total sales in the market.

Market share = sales of firm A / total market size x 100
Example: Firm A sells 2,000 units at £8. Firm B sells 2,500 units at £5. Calculate market share of Firm A
• **Market share by volume** = 2,000 / 4,500 x 100 = 44%
• **Market size by value** = £16,000 / £28,500 = 56%

Market growth: the change in the size of a market over time. Found by dividing the change in the size of the market by the old market size.

Market growth = (new market size – old market size) / old market size x 100
Example: if the value of market sales in 2009 of £28,500 rises to £30,000 in 2010 then the market has
increases in size by (£30,000 - £28,500) / £28, 500 x 100 = £1,500/£28,500 = 5.3%

S14_QP_21: Market Share

Top Quality Supermarkets (TQ)

TQ is a public limited company. TQ operates a large supermarket chain in its country. TQ's main competitor is CC Supermarkets.

Table 3: Supermarket Sales ($m)

	2012		2013
	Sales ($m)	Market share (%)	Sales ($m)
TQ	100	25	95
CC	200	50	250
Others	100	25	79
Total market	400	100	424

(i)   Using the data in Table 3, calculate TQ's market share for 2013. [2]

(ii) Explain why maintaining market share might **not** be a suitable objective for TQ. [4]

Labour Turnover and Labour Productivity

Labour turnover: the proportion of staff leaving an organisation each year.

Labour turnover = number of staff leaving/average number of staff employed x 100
Example: if 12 staff leave a business employing 200 then labour turnover = 12/200 x 100 = 6%

Labour productivity is output per person in a given time period and is found by dividing total output(Q) by the number of workers (L).

Labour Productivity = Q/L and can be shown as output per worker or output per hour worked. Productivity is an indicator (measure) of efficiency

Example: if 50 workers produce 10,000 items a day then daily productivity = 10,000/50 = 200 items

Table 1: Annual productivity data

	2013
Number of employees	25
Flatscreens produced	1800
Capital productivity (flatscreens produced per production line)	200

(b) (i) Using Table 1, calculate labour productivity for 2013. [2]

BREAKEVEN
Total cost, fixed cost and variable cost

Costs: the expenses involved in making a product. Firms incur costs by trading.

Total Costs (TC): the amount of money spent by a firm on producing a given level of output. Total costs are made up of fixed costs (FC) and variable costs (VC).

Fixed costs: expenses of production that do not change with output eg rent. Fixed costs are almost always **indirect costs** and are sometimes called **expenses**.

Variable costs: expenses of production that do change with output eg components and raw materials.
Variable costs are almost always **direct costs**.
Total costs = Fixed Costs + Variable Costs or TC = FC + VC.
This means FC = TC – VC and VC = TC - FC

Example: calculate total costs if fixed costs are £10,000 and variable costs are £40,000.
TC = FC + VC = £10,000 + £40,000 = £50,000

Average cost and variable cost per unit
Average cost (AC) or unit cost is the cost of producing one item. Average cost is found by dividing total costs (TC) by total output (Q).

Average costs = Total Cost / Output or AC = TC/Q
Example: calculate unit cost if the total cost of making 2,000 products is £50,000.
AC = TC/Q = £50,000/2,000 = £25. The unit or average cost of making one product is £25.

Variable cost per unit or **average variable cost** (AVC): the cost of making one item ignoring fixed
costs and is found by dividing variable cost by the level of output. **AVC = VC / Q**

Example: calculate unit variable cost if variable cost of making 2,000 products is £40,000.
AVC = VC/Q = £40,000/2,000 = £20. The unit variable cost of making one item is £20.

Contribution per unit
Contribution per unit: the difference between the selling price of an item and its unit variable cost.
Contribution per item is found by subtracting the variable costs of making an item from its selling price.

Contribution per unit = selling price per unit – unit variable costs

Example: Calculate the contribution made where selling price is £30 and unit variable cost is £20.
Contribution per unit = selling price per unit – unit variable costs = £30 - £20 = £10
Contribution pays off fixed costs. Once fixed costs are met, each item sold makes a contribution to profit. *Example*: if each item costs £20 to make, excluding fixed costs, and sells for £30, then there is £10 surplus to put towards paying off fixed costs. Once all fixed costs are met, £10 profit is made on every item sold.

Break even point

Break even: the minimum level of units that must be sold for revenue to cover total costs exactly
The **break even level of output = fixed costs/contribution per unit**
Example: Eg if fixed costs are £10,000 and each unit contributes £10 then the break even output level = £10,000/£10= 1,000.
1,000 items must be sold for total costs to be covered and neither a profit or loss made
Profit = contribution – fixed costs

Example: Fixed costs: £10,000. Per unit contribution: £10. Calculate profit made selling 800 and 1,400
a) 800 units contribute 800 x £10 = £8,000. Fixed costs = £10,000. A £2,000 loss is made
b) 1,400 units contribute 1,400 x £10 = £14,000. Fixed costs = £10,000. A £4,000 profit is made

S13_QP_22: Break Even

Trendy Paints (TP)

TP is a partnership and so the partners do not have limited liability. TP manufactures special paints for industrial use such as painting aircraft in an airline's colours. TP has one factory which uses a batch production system. This has been ideally suited to the specialised paints industry as each batch has a different colour and use.

Table 1: Cost information

	Existing system	Proposed new production system
Fixed costs per year	$200m	$300m
Average variable costs per litre	$5	$3

(i) TP sells its paints at an average price of $10 per litre. Using Table 1, calculate the break-even level of production per year for TP's proposed new production system. [3]

(ii) The annual break-even level for the existing production system is 40 million litres. Comment on the change in break-even if TP introduces the new production system. [3]

PRICING

Mark up

Mark up is found by adding a given percentage to the initial unit cost

Example: calculate the selling price of an item where unit cost = £5 and mark up is 200%. The selling

price = unit cost + (unit cost x mark up) = £5 + (£5 x 200%) = £5 + £10 = £15

S13_QP_23: Cost Based Pricing

Coffee Paradise (CP)

Table 1: Cost estimates for meals

Probable cost of ingredients	$0.80 per meal
Other direct costs	$0.30 per meal

(i) Assume CP uses a mark-up of 70% on costs for pricing its meals. Using the information in Table 1, calculate the price that CP would charge for its meals. [3]

Price elasticity

Price elasticity of demand (PED) measures the responsiveness of demand to a given change in price

PED = percentage change in demand of good X / percentage change in price of good X.
Example if a 10% fall in price results in a 5% increase in quantity demanded
PED = 5%/-10% = -0.5
(Ignore the fact that PED is negative because price and demand move in opposite directions)

If the PED value is greater than one then demand is price elastic and responsive to a given change in price. Any price results in a proportionately larger change in quantity demanded

If PED is less than 1, demand is price inelastic ie unresponsive. A given change in price results in a proportionately smaller change in quantity demanded

S13_QP_23: Price Elasticity of Demand

Cando eCables (CeC)

Jon, the Marketing Director, was studying sales data following recent price reductions.

Table 3: Impact of prices on demand for CeC's products

Product	Price decrease (%)	Increase in Demand (%)	Comments about the market
Industrial cables	10%	2%	Industry is in decline due to poor economic conditions
Computer cables	5%	20%	The information technology sector is growing and sales of home computers are increasing

(i) Using Table 3, calculate the price elasticity of demand for computer cables. [2]