Cambridge AS & A Level · Economics 9708 · Notes

Utility A2

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Read first: **Demand and supply curves**, **Consumer and producer surplus**

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What you need to know

By the end of this topic you should be able to:

1. **Define and calculate total utility and marginal utility.** Total utility is all the satisfaction a consumer gets from the units of a good they consume; marginal utility is the extra satisfaction from one more unit. Work either one out from the other.
2. **Explain diminishing marginal utility**: as a person consumes more units of a good in a period, each extra unit adds less satisfaction than the one before.
3. **Explain the equi-marginal principle**: a consumer with a fixed income gets the most total utility by arranging spending so that the marginal utility per dollar is the same for every good bought.
4. **Derive an individual demand curve** from marginal utility: show why a consumer buys more of a good when its price falls, and add individual demand curves to get the market demand curve.
5. **Explain the limitations of marginal utility theory**, especially its assumption that consumers behave rationally.

This topic builds on demand curves (Demand and supply curves) and consumer surplus. Income and substitution effects, normal, inferior and Giffen goods on indifference curves are the next topic, Indifference curves and budget lines; here they appear only as a limitation of marginal utility theory.

Understand it

Utility, total and marginal

Utility is the satisfaction (benefit, usefulness) a person gets from consuming a good or service. Marginal utility theory pretends we can measure it in units called **utils**, so that we can do arithmetic with it.

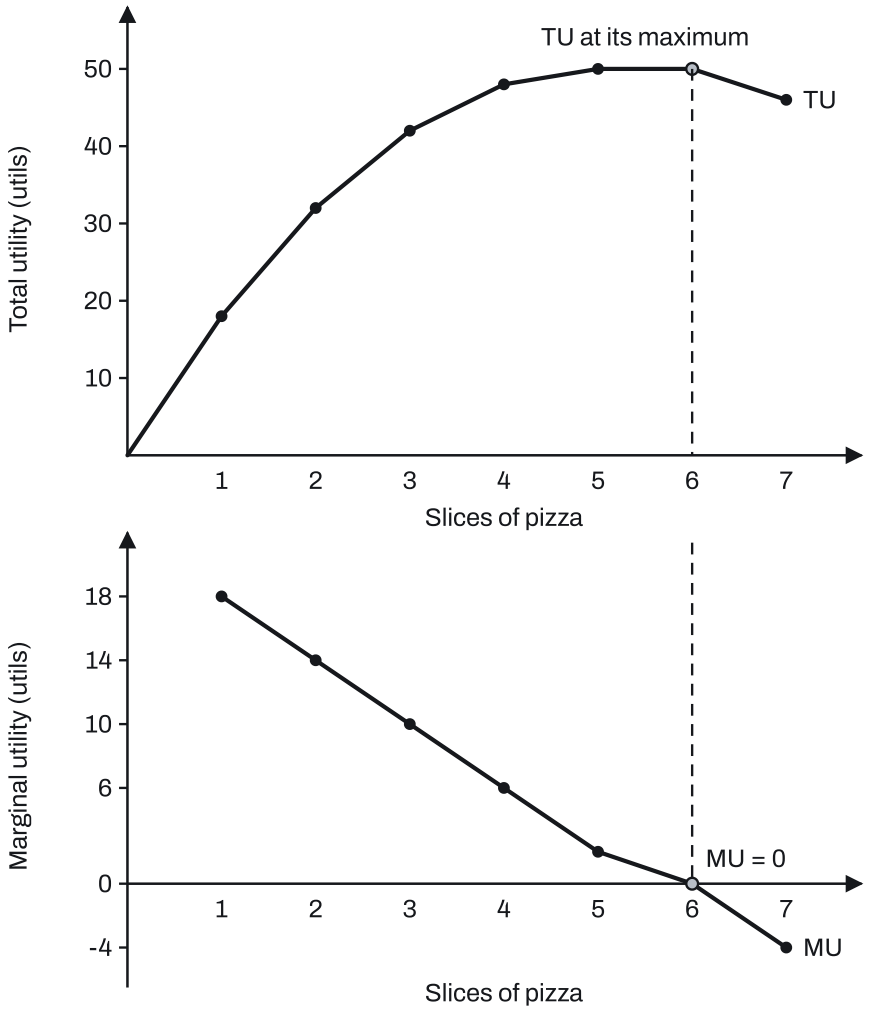
Think of Sam eating pizza slices at a party. The table gives his total utility after each slice.

Slices eaten	1	2	3	4	5	6	7
Total utility (utils)	18	32	42	48	50	50	46
Marginal utility (utils)	18	14	10	6	2	0	−4

- **Total utility (TU)** is the whole satisfaction from all the slices eaten so far.
- **Marginal utility (MU)** is the change in total utility from eating one more slice: $\mathrm{MU}_n = \mathrm{TU}_n - \mathrm{TU}_{n-1}$. The 3rd slice adds $42 - 32 = 10$ utils.
- Going the other way, total utility is the **sum of the marginal utilities**: $18 + 14 + 10 = 42$ after three slices.
- **Average utility** is $\mathrm{TU} \div$ quantity. It behaves like an average mark: when MU is above the average, the average rises; when MU is below it, the average falls. After 3 slices the average is $42 \div 3 = 14$; the 4th slice adds only 6, so the average falls to $48 \div 4 = 12$.

Diminishing marginal utility

Sam's marginal utility falls with every slice: 18, 14, 10, 6, 2, 0. This is **diminishing marginal utility**: the more of a good someone consumes in a given period, the less extra satisfaction each further unit gives. The first slice satisfies real hunger; by the fifth he is nearly full.



Read the two graphs together:

- While MU is **positive and falling**, TU **rises at a decreasing rate** (the curve gets flatter).

- Where **MU = 0**, TU is at its **maximum** (the top of the curve). A consumer who pays nothing, for example free refills or an "eat all you can" meal, keeps consuming until this point, because any unit with positive MU is worth having at a price of zero.
- Where **MU is negative**, TU **falls**: the 7th slice makes Sam feel worse.
- On a TU graph, MU is the **slope**. To compare two consumers' MU of the 4th unit, compare how much each TU curve rises between 3 and 4 units.

Diminishing marginal utility applies to **successive units of the same good, consumed close together**. It is not about producers (that is diminishing returns) and not about different goods. Some purchases seem to break it: the last coin that completes a collection, or the second of two matching items needed to finish a job, can give more satisfaction than the one before, because the units are only useful together. Addictive goods are another exception.

Marginal utility and price

To link utility with spending, think of MU in money terms: the most a person would pay for one more unit. A consumer buys a unit if its MU is at least worth its price. If MU (valued in money) is **greater than** the price, the consumer gets more benefit than the money they give up. That gap is **consumer surplus**: a fan who would pay $30 for a concert ticket priced at $22 gets $8 of consumer surplus.

Because MU falls with each unit, a consumer facing a given price buys units until the MU of the last one has fallen to the price. If the price falls, more units are now worth buying, so the quantity demanded rises. This is the simplest reason why demand curves slope downwards.

The equi-marginal principle

Real consumers divide a **fixed income** between many goods. The question is not "is this unit worth its price?" on its own, but "where does my next dollar add the most satisfaction?"

Lena spends her $24 a week on smoothies (S) and muffins (M). A muffin costs $4 and a smoothie costs $6. Her marginal utilities, and the MU per dollar ($\mathrm{MU} \div \mathrm{price}$):

Unit	1st	2nd	3rd	4th	5th	6th
MU of smoothies	36	30	28	22	18	8
MU per $ (smoothie at $6)	6	5	4.67	3.67	3	1.33
MU of muffins	24	22	20	18	16	14
MU per $ (muffin at $4)	6	5.5	5	4.5	4	3.5

She keeps spending on whichever good gives the most utility for the next dollar. She ends up with **2 smoothies and 3 muffins**: $2 \times 6 + 3 \times 4 = \$24$, all her income, and the last unit of each gives the same MU per dollar:

$$\frac{\mathrm{MU}_S}{P_S} = \frac{30}{6} = 5 = \frac{20}{4} = \frac{\mathrm{MU}_M}{P_M}.$$

Her total utility is $36 + 30 + 24 + 22 + 20 = 132$ utils. No other way of spending \$24 does better: 4 smoothies give 116, 6 muffins give 114.

Why must the ratios be equal? Suppose the last dollar on good A gave 8 utils and the last dollar on good B gave 5. Moving a dollar from B to A would lose 5 utils and gain 8, so total utility rises. She keeps switching until the two are equal, and then no switch can help. This is the **equi-marginal principle**:

$$\frac{\mathrm{MU}_A}{P_A} = \frac{\mathrm{MU}_B}{P_B} = \frac{\mathrm{MU}_C}{P_C} = \cdots$$

with all income spent. The consumer is then in **equilibrium**: they have no reason to change what they buy. Rearranged, it says the ratio of marginal utilities equals the ratio of prices, $\frac{\mathrm{MU}_A}{\mathrm{MU}_B} = \frac{P_A}{P_B}$, or $\mathrm{MU}_A \times P_B = \mathrm{MU}_B \times P_A$. Notice that it is MU **per dollar** that is equal, not MU itself and not total utility. Only when the two prices are the same does equal MU per dollar mean equal MU.

When something changes

Equilibrium lasts only while prices, income and tastes stay the same. Anything that makes one ratio bigger than the other sends the consumer towards that good:

- **A good's MU rises** (tastes change in its favour, or advertising works): its MU per dollar is now higher, so the consumer buys **more of it and less of the other**, until diminishing MU brings the ratios back into line.
- **A good's MU falls** (the consumer gets tired of it): **less of it, more of the other**.
- **A good's price rises** (for example, after a tax on it): its MU per dollar falls, so **less of it, more of the other**.
- **A good's price falls**: **more of it**.

Deriving the individual demand curve

Now let the price of smoothies change while Lena's income (\$24), the price of muffins (\$4) and her tastes stay the same.

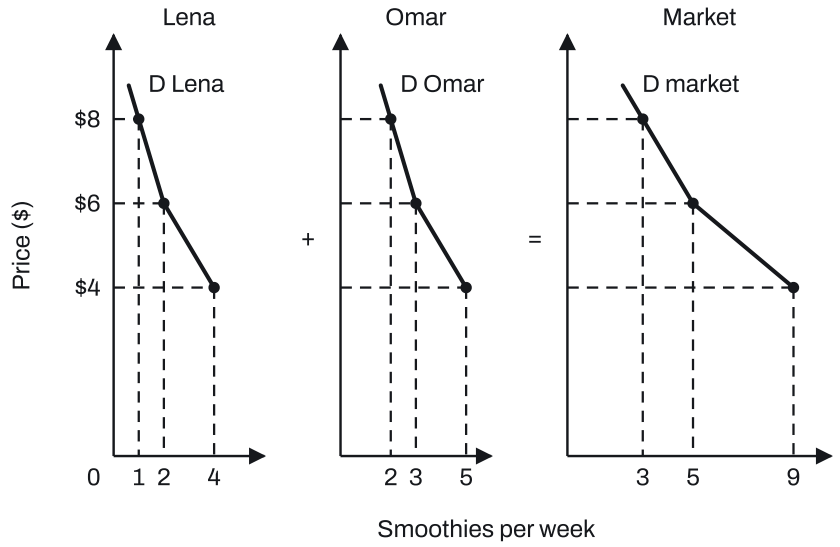
Price falls to \$4. Her old bundle now costs only \$20, and the MU per dollar of the 3rd smoothie is $28 \div 4 = 7$, more than the 4.5 from a 4th muffin. She buys more smoothies and, as the smoothie's MU falls, she rebalances. Her new equilibrium is **4 smoothies and 2 muffins**: $\frac{22}{4} = 5.5 = \frac{22}{4}$, spending $16 + 8 = \$24$.

Price rises to \$8. Her old bundle would cost \$28, more than her income, and the 2nd smoothie now gives only $30 \div 8 = 3.75$ per dollar, less than the 5 from the 3rd muffin. Her new equilibrium is **1 smoothie and 4 muffins**: $\frac{36}{8} = 4.5 = \frac{18}{4}$.

Each equilibrium gives one point on her demand curve for smoothies: 1 a week at \$8, 2 at \$6 and 4 at \$4. A lower price means a higher quantity demanded, so the curve slopes downwards. The reason is the combination of **diminishing marginal utility** (to keep MU per dollar equal at a lower price, she must push MU down by buying more) and the **equi-marginal principle**. Along the curve, income, the prices of other goods and tastes are held constant; a change in any of them gives a new set of equilibria and shifts the curve.

From individual to market demand

The **market demand curve** is the **horizontal sum** of all the individual demand curves: at each price, add the quantities every consumer would buy. If Omar buys 2 smoothies a week at $8, 3 at $6 and 5 at $4, the market made up of Lena and Omar demands 3, 5 and 9.



The assumptions

Marginal utility theory rests on assumptions about the consumer:

- **Rational**: they aim to get the most total utility from their income, and compare MU per dollar in every choice.
- **Perfect information** about the goods, their prices and the satisfaction each will bring.
- **Independent preferences**: their choices are not driven by what other people buy, and their behaviour is not **addictive** or habit-bound.
- **Utility can be measured** in units (utils) and compared, and the **marginal utility of money is constant** (each dollar is worth the same to them).
- **Income, prices and tastes are given** while the choice is made (ceteris paribus), and goods can be bought in small units.

Limitations

Each assumption is also a weakness, and examiners reward weighing them:

- **Rationality.** People don't calculate MU per dollar for every item. They have limited time and information and use rules of thumb (**bounded rationality**), buy on impulse or habit, are swayed by advertising, fashion and what friends buy, and may be addicted. They may still act roughly as the theory predicts on regular, important purchases.

- **Utility can't be measured.** Nobody can count utils, so the theory can't be tested directly, and one person's utils can't be compared with another's. The predictions (lower price, more bought) don't depend on exact numbers, though.
- **Money's marginal utility is not constant.** A dollar matters more to someone on a low income than to someone rich, and more to the same person at the end of the month.
- **Large, one-off and indivisible purchases** (a house, a car, a fridge) are bought once, so there is no run of units over which MU diminishes, and the choice is between, say, one fridge and several weeks of food, not one more unit of each.
- **Many goods, not two.** Real consumers spread income over hundreds of goods and services, so equalising MU per dollar across all of them is far beyond the model's two-good picture.
- **No income and substitution effects.** A price change has two effects: the good becomes cheaper relative to others, and the consumer's real income changes. Marginal utility theory lumps them together, so it can't explain **inferior goods** properly, or **Giffen goods**, where a price rise makes a poor household buy **more** (an upward-sloping demand curve). Indifference curve analysis separates the two effects.
- **Ceteris paribus.** In practice tastes, income and other prices change all the time, so a demand curve drawn this way soon goes out of date.
- **Some goods give status** because they are expensive; demand may rise with price, which diminishing MU does not predict.

Key facts and formulas

There is no formula list in the 9708 exam, so everything here is "Learn it".

Formula	Status
Marginal utility of the nth unit: $\mathrm{MU}_n = \mathrm{TU}_n - \mathrm{TU}_{n-1}$	Learn it
Total utility $=$ sum of the marginal utilities of every unit consumed	Learn it
Average utility $= \mathrm{TU} \div$ quantity consumed	Learn it
MU per dollar of a good $= \mathrm{MU} \div$ its price	Learn it
Equi-marginal principle: $\frac{\mathrm{MU}_A}{P_A} = \frac{\mathrm{MU}_B}{P_B}$, with all income spent	Learn it
Equi-marginal principle rearranged: $\frac{\mathrm{MU}_A}{\mathrm{MU}_B} = \frac{P_A}{P_B}$, or $\mathrm{MU}_A \times P_B = \mathrm{MU}_B \times P_A$	Learn it
Market demand at a price $=$ sum of every consumer's quantity demanded at that price	Learn it

Shape rules to learn: MU positive and falling means TU rises at a decreasing rate; MU $= 0$ where TU is at its maximum; MU negative means TU falls; MU above average utility makes the average rise, below it makes the average fall.

How to do it

We tagged 39 questions for this topic (2021–2026): 33 Paper 3 multiple choice and 6 Paper 4 essay parts. For the essays we count only the parts about utility. No question mixes types.

Question type	Questions
State or recognise the equi-marginal principle	8
Total and marginal utility from a table or a graph	8
Diminishing marginal utility and how TU, MU and average utility are linked	6
Find the utility-maximising combination or a missing MU	4
Marginal utility, price and the demand curve	4
Explain consumer equilibrium and derive the demand curve (12-mark part, 2021 papers)	4
How a utility-maximising consumer responds to a change	2
Evaluate marginal utility theory as an explanation of demand (20-mark essay)	2
What a rational consumer needs	1

1. State or recognise the equi-marginal principle (8 questions)

All multiple choice (**9708/33/M/J/25 Q1**, **9708/32/O/N/24 Q1**, **9708/33/O/N/24 Q1**, **9708/31/O/N/22 Q4**, **9708/33/M/J/22 Q4**, **9708/31/O/N/21 Q4**).

1. Look for **marginal** utility divided by **price**, equal across goods. "The same utility from the last dollar spent on each good" says the same thing in words.
2. Reject options that equalise **total** utility, equalise MU without prices, or divide one good's MU by the **other** good's price.
3. **Rearranged forms** count: $\mathrm{MU}_Y \times P_Z = \mathrm{MU}_Z \times P_Y$ is the principle with both sides multiplied by $P_Y P_Z$ (**9708/33/O/N/24 Q1**). Check by cross-multiplying the correct ratio yourself.
4. **Same prices**: if two goods cost the same, equal MU per dollar means the **last units have equal MU**. Total utilities can still differ.

2. Total and marginal utility from a table or a graph (8 questions)

All multiple choice.

- **A TU table** (**9708/32/M/J/24 Q1**, **9708/32/O/N/22 Q4**): write the MU of each unit underneath (the differences) before reading the options. "Diminishing MU first occurs after unit n" means the MU of unit $n+1$ is the first to be lower than the one before. Don't confuse MU with average utility, which the table may also show.
- **A TU curve** (**9708/31/O/N/24 Q1**, **9708/33/O/N/21 Q5**): MU is the slope. MU is zero at the **top** of the curve, positive while it rises, negative once it falls.

- **An MU curve** (9708/33/O/N/23 Q1, 9708/33/M/J/23 Q1): TU rises while MU is above the axis and falls where MU is below it. TU is at its maximum where MU crosses zero, not where MU is highest.
- **Two TU curves** (9708/32/O/N/23 Q1): find each consumer's MU of the unit asked about (the rise in TU from the unit before), then subtract.

3. Diminishing marginal utility and how TU, MU and average utility are linked (6 questions)

All multiple choice (9708/33/M/J/24 Q1, 9708/32/F/M/24 Q1, 9708/31/O/N/23 Q1, 9708/33/M/J/21 Q5).

- An extra unit of the same good gives **lower MU**; it is about consumers, not producers' productivity.
- MU positive and diminishing means **total utility rises at a decreasing rate**.
- **MU above average utility** pulls the average **up**; MU below it pulls it down.
- TU does **not** keep rising for ever: it stops where MU reaches zero.
- **Which purchase illustrates diminishing MU?** Choose one more unit of something the person has already had plenty of in a short time (the last course of a big meal). Reject units that complete a set or a collection, or that are needed together to be useful: their MU may rise.

4. Find the utility-maximising combination or a missing MU (4 questions)

All multiple choice (9708/32/O/N/25 Q5, 9708/32/F/M/23 Q2, 9708/32/M/J/21 Q4, 9708/32/F/M/21 Q5).

1. **Check the table is MU, not TU.** If it gives TU, take differences first.
2. **Divide each MU by its price** to get MU per dollar.
3. **Test each option**: the last unit of each good must give equal MU per dollar, **and** the spending must use the whole income when the question says so. An option can have equal ratios but leave money unspent, or spend everything with unequal ratios.
4. **A missing MU**: $\frac{\text{MU}_A}{P_A} = \frac{\text{MU}_B}{P_B}$, so $\text{MU}_A = \text{MU}_B \times \frac{P_A}{P_B}$. If A costs twice as much as B, its last unit must give twice the MU.

5. Marginal utility, price and the demand curve (4 questions)

All multiple choice.

- **Why demand slopes down** (9708/32/F/M/22 Q4): each extra unit gives less extra satisfaction, so the consumer buys more only at a lower price.
- **What is held constant** along an individual's demand curve (9708/33/O/N/21 Q4): income (and other prices and tastes). Price, MU and TU all change along the curve.
- **MU greater than the price paid** (9708/32/F/M/26 Q5): the extra value over the price is **consumer surplus**.
- **A price of zero** (9708/33/O/N/22 Q4): the consumer keeps consuming until **MU is zero** (TU is at its maximum), not until TU is zero.

6. Explain consumer equilibrium and derive the demand curve (4 questions)

12-mark (a) parts of 25-mark essays on the 2021 papers (**9708/42/O/N/21 Q3**, **9708/43/O/N/21 Q3**, **9708/43/M/J/21 Q3**), marked in four levels (Level 4: 9–12). Since 2023, Paper 4 essays are single 20-mark questions (type 8), but this plan is still the analysis half of any utility essay.

Answer plan

1. **Define** utility, total utility and marginal utility, and explain **diminishing MU**.
2. **Two goods and a fixed income.** State the equi-marginal principle, explain **why** equal MU per dollar maximises utility (moving a dollar to the good with the higher ratio gains more than it loses), and call this the consumer's equilibrium.
3. **Change one price.** The good's MU per dollar changes, the ratios are unequal, and the consumer rebalances: more of the cheaper good until diminishing MU restores equality.
4. **Plot the result.** Each price and its equilibrium quantity gives a point; joining them gives the downward-sloping individual demand curve. Draw it, with income, other prices and tastes held constant.
5. **Add the individual curves horizontally** to get market demand. The 2021 mark scheme capped answers that stopped at the individual curve at 9.

Answers that only wrote down the equation, or used one good, stayed in the middle levels.

7. How a utility-maximising consumer responds to a change (2 questions)

All multiple choice (**9708/31/O/N/25 Q4**, **9708/32/M/J/25 Q3**).

1. Ask which ratio the change moves. Higher MU or a lower price raises a good's MU per dollar; lower MU, a higher price or a tax on it lowers it.
2. The consumer buys **more of the good whose ratio is now higher and less of the other**, until the ratios are equal again.
3. A change that hits both goods equally (a tax on income) does not favour either one.

8. Evaluate marginal utility theory as an explanation of demand (2 questions)

Paper 4 Section B, 20 marks (**9708/44/O/N/25 Q2**: an adequate explanation of market demand for all goods; **9708/42/O/N/24 Q2**: whether it fully explains the link between price and quantity demanded). Table A gives up to 14 for knowledge and analysis (Level 3: 11–14), Table B up to 6 for evaluation (Level 2: 4–6, needing a justified conclusion and developed evaluative comments).

Answer plan

1. **Knowledge**: the assumptions; TU and MU with a short numerical example; diminishing MU.
2. **Analysis, for the theory**: the equi-marginal principle with two goods; a price fall raises the good's MU per dollar, so the consumer buys more of it until the ratios are equal again; a diagram of the resulting individual demand curve (and, if the question says "market", the horizontal sum of individual curves). This is type 6's plan, developed.

3. **Evaluation, against**: at least three limitations, each explained, not listed: rationality (bounded rationality, habit, advertising, addiction); utility can't be measured; the MU of money varies with income; one-off and indivisible goods; many goods, not two; no income and substitution effects, so no account of inferior or Giffen goods; ceteris paribus; status goods.
4. **Evaluation, for**: what the theory gets right despite this: the direction of the prediction for most goods, a clear reason why demand curves slope down, and a useful way of thinking about choices "at the margin".
5. **Judgement**: answer the question's word (**adequate**, **fully**, **all goods**). A typical justified answer: it explains the downward slope for most everyday, frequently bought normal goods, but not for Giffen goods, status goods, one-off purchases or habitual and impulse buying, so it is a useful starting point, not a full explanation; indifference curve analysis does better on the income and substitution effects.

9. What a rational consumer needs (1 question)

Multiple choice (**9708/32/F/M/23 Q1**). Rationality in this theory needs **complete information** and **choices independent of other consumers**, and rules out **addictive behaviour**, because an addict's choices are not guided by comparing MU per dollar.

Worked examples

Example 1

Ravi has \$16 to spend on e-books, which cost \$4 each, and magazines, which cost \$2 each. The table shows his marginal utility from each.

Unit	1st	2nd	3rd	4th	5th	6th
MU of e-books	48	40	32	20	12	–
MU of magazines	30	26	24	20	8	4

Which combination maximises his total utility?

A 1 e-book and 6 magazines

B 2 e-books and 2 magazines

C 2 e-books and 4 magazines

D 3 e-books and 2 magazines

[1]

MU per dollar of the last unit of each: A: $48 \div 4 = 12$ and $4 \div 2 = 2$; B: $40 \div 4 = 10$ and $26 \div 2 = 13$; C: 10 and $20 \div 2 = 10$; D: $32 \div 4 = 8$ and 13. Only C has equal ratios, and it costs $2 \times 4 + 4 \times 2 = \$16$, all his income. (B also has unequal ratios and leaves \$4 unspent.) Total utilities confirm it: A 160, B 144, C 188, D 176. The answer is **C** (1).

Example 2

A consumer is in equilibrium, spending all of her income on tea and biscuits. A new sales tax raises the price of tea. Her income, the price of biscuits and her tastes do not change. What is true straight after the price rise, and how will she respond?

A MU per dollar of tea is now lower than of biscuits; she buys less tea and more biscuits.

B MU per dollar of tea is now higher than of biscuits; she buys more tea and fewer biscuits.

C The marginal utility of tea has fallen; she buys less tea and the same quantity of biscuits.

D Both ratios are unchanged, because her tastes have not changed; she buys the same as before.

[1]

The tax raises P_{tea}, so $\frac{\text{MU}_{\text{tea}}}{P_{\text{tea}}}$ falls below $\frac{\text{MU}_{\text{biscuits}}}{P_{\text{biscuits}}}$. Moving dollars from tea to biscuits raises total utility, and she keeps moving them until diminishing MU makes the ratios equal again. C is wrong because the MU of tea has not changed (its price has). The answer is **A** (1).

Example 3

A cinema raises its ticket price from $8 to $10. Jade spends her fixed weekly allowance on cinema trips and meals out. Using the equi-marginal principle, explain how Jade, a rational consumer, is likely to respond, and show how her response produces a downward-sloping demand curve for cinema trips. **[12]**

Model answer (each paragraph, with the level descriptor it meets):

1. **Terms.** Utility is the satisfaction Jade gets from a trip or a meal. Total utility is the satisfaction from all the units she consumes in a week; marginal utility is the extra satisfaction from one more. Because of **diminishing marginal utility**, each extra cinema trip in a week adds less than the one before. *(Accurate knowledge.)*
2. **Equilibrium before.** With a fixed allowance, Jade maximises total utility when the last dollar spent on each gives the same utility: $\frac{\text{MU}_C}{P_C} = \frac{\text{MU}_M}{P_M}$, with all her allowance spent. If the last dollar on meals gave more utility than the last dollar on cinema, moving a dollar to meals would raise her total utility, so only equal ratios leave no gain from switching. *(Two goods, and why the principle maximises utility.)*
3. **The price rise.** At $10 a ticket, the MU per dollar of her last cinema trip falls, so now $\frac{\text{MU}_C}{P_C} < \frac{\text{MU}_M}{P_M}$. Her old pattern also costs more than her allowance. She gets more satisfaction per dollar from meals, so she goes to the cinema less often and spends more on meals. *(Analysis of a price change.)*
4. **Rebalancing.** With fewer trips, the MU of her last trip is higher (she is further back up her diminishing MU schedule); with more meals, the MU of her last meal is lower. She keeps adjusting until $\frac{\text{MU}_C}{P_C} = \frac{\text{MU}_M}{P_M}$ again, at fewer trips than before. *(Developed: diminishing MU is what restores equilibrium.)*
5. **The demand curve.** Each price paired with the number of trips she chooses at equilibrium gives one point: $8 with her old number, $10 with fewer. Repeating this for other prices and joining the points gives her individual demand curve for cinema trips, which slopes downwards, drawn with her allowance, the

price of meals and her tastes held constant. Adding every cinema-goer's quantity at each price gives the market demand curve, as in the second diagram above. *(Diagram and link to the demand curve, then to the market: top level, 12/12.)*

Example 4

Evaluate whether the assumption that consumers behave rationally means that marginal utility theory is of little use in explaining how consumers choose what to buy. **[20]**

Model answer (outline of each paragraph):

1. **The theory.** Marginal utility theory assumes a rational consumer who wants the most total utility from a fixed income, has full information, and makes independent choices. Total utility is the satisfaction from all units consumed; marginal utility, the extra from one more unit, diminishes as consumption rises. *(AO1: definitions and assumptions.)*
2. **How a rational consumer chooses.** Spending is arranged so that $\frac{\mathrm{MU}_A}{P_A} = \frac{\mathrm{MU}_B}{P_B}$ with all income spent; any other pattern lets the consumer gain by moving a dollar to the good with the higher ratio. A worked case: at \$6 a smoothie and \$4 a muffin, a consumer with \$24 buys 2 smoothies and 3 muffins, where both give 5 utils per dollar. *(AO2: developed analysis with a numerical example.)*
3. **What it explains.** If the price of A falls, its MU per dollar rises, so the consumer buys more A until diminishing MU restores equality. Plotting price against the chosen quantity gives a downward-sloping demand curve (diagram: Lena's curve, 1 at \$8, 2 at \$6, 4 at \$4), and summing consumers horizontally gives market demand. *(AO2: diagram, fully explained: with paragraphs 1–2, Table A Level 3.)*
4. **Against: the rationality assumption fails often.** Consumers have limited time and information and use rules of thumb (bounded rationality); they buy on impulse, out of habit, or because advertising and friends influence them; some goods are addictive. For such choices, nobody is comparing MU per dollar, so the theory describes something that does not happen. *(AO3: developed evaluative comment.)*
5. **Against: other assumptions fail too.** Utility can't be measured, the marginal utility of money differs between rich and poor, one-off purchases such as a car have no run of units for MU to diminish over, and the theory can't separate income and substitution effects, so it misses Giffen goods. So rationality is not the only weakness. *(AO3: weighs the question's assumption against others.)*
6. **For: the predictions survive.** The theory does not need people to calculate utils; it needs them to act **as if** they compare benefit with price. For regular, planned purchases such as groceries and fuel, people do switch away from goods whose prices rise, which is exactly what the theory predicts, and real demand curves for most goods slope downwards. Firms and governments rely on this when they set prices or taxes. *(AO3: the other side, developed.)*
7. **Conclusion.** The rationality assumption limits the theory most for impulse, habitual, addictive and status purchases, and for large one-off decisions, where people do not weigh MU per dollar. It does not make the theory of little use: for frequent, everyday choices it explains the direction in which consumers respond to price changes and why demand curves slope down. It is useful as a starting point, and needs behavioural ideas and indifference curve analysis to explain the cases it misses. *(Justified conclusion answering "of little use": Table B Level 2, 6/6.)*

(Table A Level 3: 14; Table B Level 2: 6; **20/20**.)

Common mistakes

- **Treating an MU table as TU, or the other way round.** The March 2023 report says many candidates worked with the wrong column. Read the heading; if it is TU, take differences before anything else.
- **Equalising MU instead of MU per dollar.** Equal MU maximises utility only when prices are equal. Divide by price every time.
- **Forgetting the budget.** A combination with equal ratios that doesn't spend all the income (or costs more than it) is not the answer when the question says all income is spent.
- **Confusing marginal with average utility.** In the November 2022 report, many candidates who chose the wrong option were looking at average utility. Diminishing MU is about the change in TU, not TU divided by quantity.
- **Saying TU is greatest where MU is greatest.** TU is greatest where MU is **zero**; while MU is positive, TU is still rising.
- **Writing the equation and stopping.** The November 2021 reports say weaker essays gave $\frac{\text{MU}_X}{P_X} = \frac{\text{MU}_Y}{P_Y}$ and nothing else. Explain why it maximises utility, then analyse a price change and link it to the demand curve.
- **One good only.** The equi-marginal principle needs two (or more) goods and a fixed income; answers about one good stayed in the lower levels.
- **Stopping at the individual demand curve** when the question asks about market demand. Add the individual curves horizontally.
- **Unclear diagrams.** Label both axes (price, quantity) and the curve, and refer to the diagram in your text.
- **Listing limitations without explaining them.** "Consumers are not rational" earns little; say why (bounded rationality, habit, advertising, addiction) and what it does to the theory's predictions.
- **Mixing up diminishing marginal utility and diminishing returns.** Utility is about consumers' satisfaction, returns about producers' output.

How to get the marks

- **Multiple choice with numbers**: make the MU and MU-per-dollar columns first, then test each option against both conditions (equal ratios, income all spent).
- **Multiple choice with graphs**: TU's slope is MU; MU crossing zero marks the top of TU.
- **"Explain"** (2021-style 12-mark parts): the top level needed two goods, the equi-marginal principle, a price change analysed through it, and a link to the demand curve, plus the market curve when asked.
- **"Evaluate"** (20 marks): Table A (14) rewards accurate definitions, developed analysis of the equi-marginal principle and a fully explained demand curve diagram. Table B (6) rewards developed evaluative comments and a **justified conclusion that answers the question's exact words** ("adequate", "fully", "all goods"). A one-sided answer, or a final paragraph that only repeats the analysis, stays in the bottom evaluation level.
- **Both sides**: for every limitation, ask "does it stop the theory predicting the right direction of change?" That gives you the counter-argument and the judgement.

- **Diagrams**: draw the demand curve with labelled axes and at least two price–quantity points derived from the analysis; for market demand, show the horizontal addition.
- **Use the terms the mark schemes reward**: total utility, marginal utility, diminishing marginal utility, equi-marginal principle, MU per dollar, rational consumer, equilibrium, ceteris paribus, bounded rationality, income and substitution effects.

Quick check

1. Kofi's total utility from cups of coffee in a day is 15, 27, 36, 42, 45 and 45 utils for 1 to 6 cups. Find the marginal utility of each cup, the cup at which MU reaches zero, and his average utility from 4 cups.
2. A consumer is maximising utility buying goods A at $5 and B at $2. The last unit of B gives 14 utils. What is the MU of the last unit of A?
3. Mei gets 40 utils from the last book she buys at $10 and 24 utils from the last cinema ticket she buys at $8. Is she maximising her total utility? If not, what should she do?
4. At $3 a sandwich, Kai buys 4 a week, Mia 6 and Leo 2. At $2, they buy 6, 9 and 3. These three make up the whole market. Find market demand at each price and say what this shows about the market demand curve.
5. Give two reasons why marginal utility theory might not predict how someone spends their money, and explain each. **[4]**

Answers

1. MU: 15, 12, 9, 6, 3, 0. MU reaches zero at the 6th cup (TU is at its maximum, 45). Average utility from 4 cups $= 42 \div 4 = 10.5$ utils.
2. $\frac{\text{MU}_A}{5} = \frac{14}{2} = 7$, so $\text{MU}_A = 35$ utils.
3. Books give $40 \div 10 = 4$ utils per dollar; tickets give $24 \div 8 = 3$. The ratios are unequal, so she is not maximising utility. She should buy more books and fewer cinema tickets; as she does, the MU of books falls and the MU of tickets rises until the ratios are equal.
4. At \$3: $4 + 6 + 2 = 12$ a week. At \$2: $6 + 9 + 3 = 18$. Market demand is the horizontal sum of the individual demand curves, and it slopes downwards because each person's demand does.
5. Any two, each identified (1) and explained (1). Consumers may not be rational: they buy on impulse or habit or under the influence of advertising, rather than comparing MU per dollar (1 + 1). Utility can't be measured, so no one can actually equalise MU per dollar (1 + 1). The MU of money varies with income, so a dollar is not worth the same to everyone (1 + 1). One-off purchases such as a car have no run of units for MU to diminish over (1 + 1). The theory can't separate income and substitution effects, so it misses Giffen goods (1 + 1).

Past questions to try

- **9708/32/F/M/23 Q2**: the utility-maximising combination from an MU table with two prices.
- **9708/32/M/J/24 Q1**: marginal utility from a total utility table.
- **9708/33/M/J/23 Q1**: what an MU curve says about total utility.
- **9708/44/O/N/25 Q2**: whether diminishing marginal utility explains market demand for all goods.