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ECON 2105 FINAL EXAM REVIEW PRINCIPLES OF MACROECONOMICS

Macroeconomics

Two hours. No surprises.

Seventeen chapters of concept review, worked examples and practice sets, four checkpoints and a full-length mock final

Michael Rainwater · Rainwater Private Tutoring · Athens, Georgia

2026–27 Edition · Student Edition

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Macroeconomics: ECON 2105 Final Exam Review, Student Edition
2026–27 Edition

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How to Use This Book

This book is built for a cumulative, multiple-choice final in principles of macroeconomics, taken on a screen with a basic calculator. Most questions take under a minute. The ones that cost points are the ones that look like a question you already know.

What Is in Each Chapter

- **An opening page.** One short story, and where points are lost on the chapter. Chapters 1 to 11 also say how many of the mock exam's questions come from the chapter.
- **Concept sections.** The idea first, then the rule, then an example. Terms are defined in the margin where they first appear.
- **Worked examples.** One for each kind of question the exam asks. Every example starts by naming what is asked and ends with a check.
- **In Class at UGA.** How the chapter is taught and tested in ECON 2105 sections at UGA, where sections differ from each other or from the textbook.
- **Common Slips.** The mistakes that cost the most points, each with its fix.
- **Choosing the Method.** A table that matches the wording of a question to the first move.
- **Three practice sets.** Exam-style questions with room to work. The last third of each set is harder because the steps are layered.
- **A review set.** Fifteen mixed questions from the whole chapter.
- **Checkpoints.** After Chapters 4, 8, 11 and 17, questions across the chapters since the last checkpoint: sixteen in each of the first three and eighteen in the fourth.

A Plan That Works

- Read a chapter's sections with a pencil. Work each example before reading its steps.
- Do the practice sets timed, at about 70 seconds a question. Mark the ones you guessed.
- Check your answers. For each miss, write down which choice you picked and why you picked it.
- Take each checkpoint when you reach it, before starting the next chapter.
- Take the mock exam in one sitting, on scratch paper, with only a basic calculator.
- Use the score guide after the mock exam to pick the chapters to revisit.

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Three Moves for Every Question

Move	What it catches
1. Name what is asked.	Answering a nearby question: the price when it wants the quantity, demand when it wants quantity demanded, nominal when it wants real.
2. Name the base or the curve before the numbers.	Dividing by the wrong total, or shifting the wrong curve.
3. Check the direction against the question.	A flipped sign, a ratio never turned into a percent, a movement along a curve read as a shift.

Chapters and Your Textbook

The chapters follow the order of the course. The table lists where each one sits in Stevenson and Wolfers, the textbook used in the Achieve sections at UGA, and in Parkin, the textbook used in the MyLab sections. If your section uses a different book, the ideas are the same but some terms differ. Follow your own course where they do.

	Chapter in this book	Stevenson and Wolfers (3rd ed.)	Parkin (14th ed.)
1	The Four Core Principles	1	1, 2
2	Demand	2	3
3	Supply	3	3
4	Equilibrium	4	3
5	Sizing Up the Economy Using GDP	9	4
6	Economic Growth	10	6
7	Unemployment	11	5 (jobs)
8	Inflation and Money	12	5 (price level), 8
9	The Business Cycle	17	10, 12, and part of 5
10	IS-MP Analysis	18	No direct match. Nearest: 10, taught in Chapter 14
11	The Phillips Curve and Inflation	19	12
12	Saving, Investment and the Financial System	13, 14, 15	7
13	Money, Banks and the Federal Reserve	12, 15, 22	8
14	Aggregate Demand and Aggregate Supply	21	10
15	Fiscal Policy and the Multiplier	23 and the appendix on aggregate expenditure	11, 13
16	Monetary Policy	20, 22	14
17	International Trade and Exchange Rates	6, 7, 16	2, 9, 15

Stevenson and Wolfers numbers follow the third edition of *Principles of Macroeconomics*, the edition the Achieve sections use. Parkin numbers follow the 14th edition of *Macroeconomics*, and earlier editions number some chapters differently. Chapters 1 to 11 follow that book's order. Chapters 12 to 17 cover topics the course outline lists for every section: saving and investment, money and banks, aggregate supply and aggregate demand, fiscal policy, monetary policy, and trade and exchange rates. Check your syllabus for which chapters your section covers.

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Which Chapters Are Yours

Every ECON 2105 section at UGA covers the material of Chapters 1 to 9. Sections that use Stevenson and Wolfers, with homework in Achieve, also teach IS-MP and the Phillips curve in Chapters 10 and 11. Sections that use Parkin, with homework in MyLab, teach aggregate supply and aggregate demand, which is Chapter 14, and the expenditure multiplier, which is Chapter 15. Study Chapters 12, 13, 16 and 17 as your syllabus lists them. The mock final draws on Chapters 1 to 11 only. Chapters 12 to 17 are tested by their own practice sets and by Checkpoint 4.

About the Author

Michael Rainwater runs Rainwater Private Tutoring, a one-on-one academic coaching and test prep practice that has served more than 150 families across Athens and metro Atlanta. He works with University of Georgia students in principles of macroeconomics every semester.

He studies ecology at the University of Georgia, spoke at TEDxUGA in 2025, and performs as a concert pianist. The book is built around how he teaches the course: the idea first, then the rule, then where students go wrong, with practice sets built around the errors that cost the most points. Every page was written and drawn for this book.

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4 Equilibrium

In March 2020, toilet paper disappeared from American store shelves. Households suddenly wanted far more of it than usual. At the prices on the shelf tags, buyers wanted more rolls than sellers had, so the shelves sat empty. That gap is a shortage, and it is what a price below equilibrium looks like in real life. Points on this chapter are lost by naming the wrong gap, and by claiming to know both price and quantity when two curves move at once. The mock exam gives this chapter 10 of its 100 questions.

4.1 Where Supply Meets Demand

Demand tells you how much buyers want at each price. Supply tells you how much sellers offer at each price. **Equilibrium** is the one price where those two amounts match. At that price every buyer willing to pay it finds a seller, and every seller willing to accept it finds a buyer, so nothing pushes the price to change.

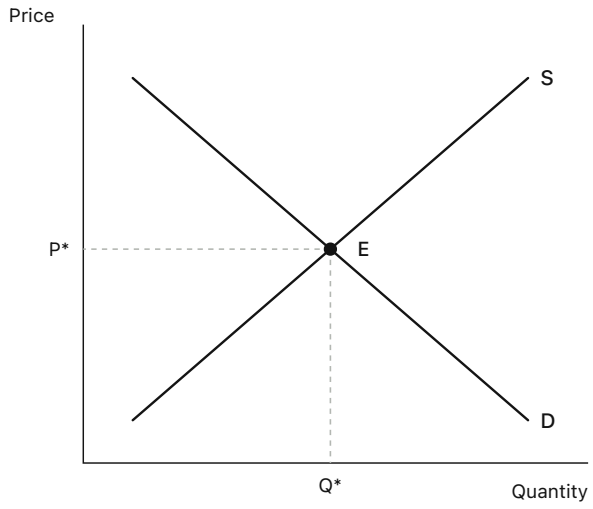
On a graph, equilibrium is the crossing point. Read across to the vertical axis for the **equilibrium price** and down to the horizontal axis for the **equilibrium quantity**. Points are lost by reporting only one of the two, or by reading a number where a curve ends instead of where the curves cross.

Equilibrium is not a rule that anyone enforces. It is where the market ends up, because any other price creates a gap that pushes the price back. That is why exam questions treat the equilibrium as the starting point and ask what changes it.

Equilibrium
The point where quantity demanded equals quantity supplied. On a graph, it is where the two curves cross.

Equilibrium price
The price at which quantity demanded equals quantity supplied.

Equilibrium quantity
The quantity bought and sold at the equilibrium price.



The curves cross at E, which gives the equilibrium price P* on the vertical axis and the equilibrium quantity Q* on the horizontal axis.

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From a schedule

A schedule gives the same information in rows. Scan for the row where the quantity demanded column and the quantity supplied column show the same number. That row's price is the equilibrium price, and the shared number is the equilibrium quantity. Never match numbers that sit in different rows.

Price	Quantity demanded	Quantity supplied
$2	100	20
$3	85	45
$4	70	70
$5	55	95
$6	40	120

EXAMPLE 4.1

The table above shows the weekly market for bottles of cold brew at a campus shop. What are the equilibrium price and quantity?

What is asked The price and the quantity where the two columns match, not the price where either column is largest.

Read At $4, quantity demanded is 70 and quantity supplied is 70.

Compare At $3 the columns show 85 and 45. At $5 they show 55 and 95. Neither row matches.

Check Below $4 buyers want more than sellers offer, and above $4 the reverse. The match has to sit between, at $4.

Answer **$4 and 70 bottles**

RULE Equilibrium is the single price where quantity demanded equals quantity supplied: the crossing point on a graph, the matching row in a schedule.

4.2 Shortages and Surpluses

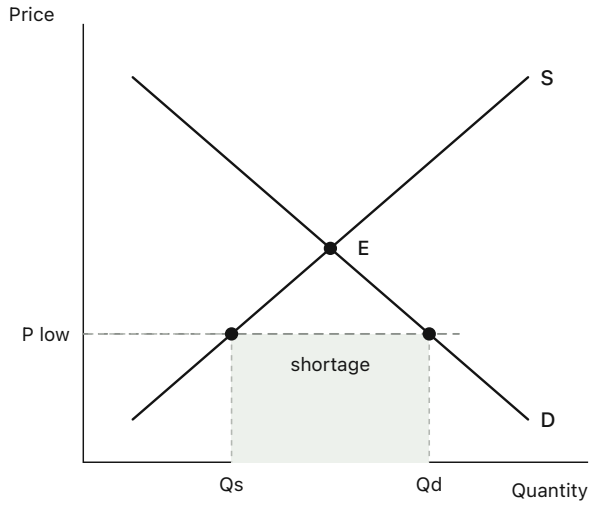
At any price other than the equilibrium price, the two quantities do not match. When the price is below equilibrium the good is cheap, so buyers want a lot of it and sellers offer little. Quantity demanded is larger than quantity supplied. That gap is a **shortage**.

When the price is above equilibrium, the reverse holds. Sellers offer a lot and buyers want little, so quantity supplied is larger than quantity demanded. That gap is a **surplus**. The size of either gap is the larger quantity minus the smaller one, with both read at the same price.

Shortage
Quantity demanded exceeds quantity supplied. It happens at any price below the equilibrium price.

Surplus
Quantity supplied exceeds quantity demanded. It happens at any price above the equilibrium price.

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At a price below equilibrium, quantity demanded (Qd) is larger than quantity supplied (Qs), and the shaded gap between them is the shortage.

On a graph, draw a horizontal line at the given price. It meets the supply curve at quantity supplied and the demand curve at quantity demanded. The horizontal distance between those two points is the gap. Do not measure from either point to the equilibrium quantity, which is the most common wrong answer on these questions.

How the price adjusts

A shortage pushes the price up. Buyers who cannot get the good offer more, and sellers see that they can charge more. As the price rises, quantity demanded falls and quantity supplied rises, and the gap closes. A surplus pushes the price down, because sellers with unsold goods cut their prices. As the price falls, quantity demanded rises and quantity supplied falls.

These adjustments are movements along the two curves. Neither curve shifts, because the only thing that changed is the good's own price. One more detail shows up in harder questions. While the price is stuck away from equilibrium, the amount actually sold is the smaller of the two quantities, since every sale needs both a buyer and a seller.

EXAMPLE 4.2

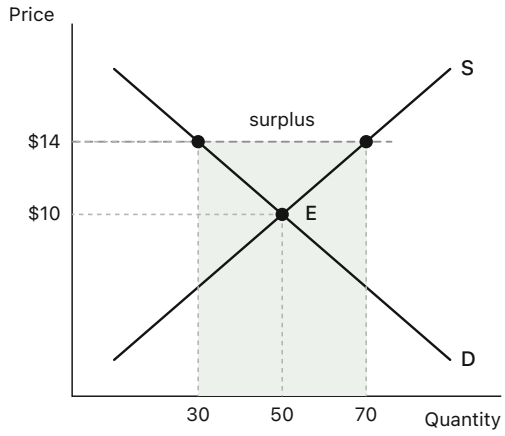
Use the cold brew table from Section 4.1. The shop sets the price at $3. Is there a shortage or a surplus, and how large is it?

What is asked	The gap between the two quantities at $3, not the distance from the equilibrium quantity of 70.
Read	At $3, quantity demanded is 85 and quantity supplied is 45.
Compare	Quantity demanded is larger, so this is a shortage: $85 - 45 = 40$.
Check	$3 is below the equilibrium price of $4, and a price below equilibrium gives a shortage.
Answer	**Shortage of 40 bottles**

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EXAMPLE 4.3

In the figure, the price is $14. What exists in this market at that price, and which way will the price move?



What is asked	The gap at $14 and the direction of the price, not the equilibrium values.
Read	At $14, quantity demanded is 30 (on D) and quantity supplied is 70 (on S).
Compare	Quantity supplied is larger, so this is a surplus: $70 - 30 = 40$.
Direction	Sellers with unsold units cut the price, so it falls toward $10.
Check	$14 is above the equilibrium price of $10, and a price above equilibrium gives a surplus.
Answer	**Surplus of 40 units, and the price falls**

RULE A price below equilibrium means a shortage and a rising price. A price above equilibrium means a surplus and a falling price.

4.3 When One Curve Shifts

The equilibrium changes only when a curve shifts, and only the demand shifters and supply shifters from the last two chapters shift a curve. Every question of this type is solved with the same three steps.

- **Step 1: which curve.** Decide whether the event changes what buyers want (demand), what sellers offer (supply), or both.
- **Step 2: which direction.** An increase shifts the curve to the right. A decrease shifts it to the left.
- **Step 3: what happens.** Find the new crossing point and compare its price and quantity with the old one.

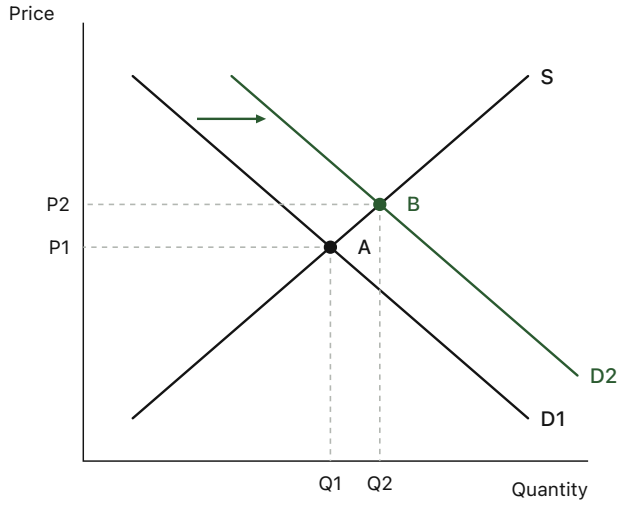
Step 1 decides most questions. Ask who the event acts on. The six demand shifters (income, preferences, prices of related goods, expectations, congestion and network effects, the type and number of buyers) act on buyers. The five supply shifters (input prices, productivity

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and technology, prices of related outputs, expectations, the type and number of sellers) act on sellers. A change in the good's own price shifts nothing.

When demand increases, buyers want more than sellers offer at the old price. That shortage pushes the price up. Sellers respond to the higher price by offering more, which is a movement along the supply curve. Price and quantity both rise. A decrease in demand does the opposite, and both fall.

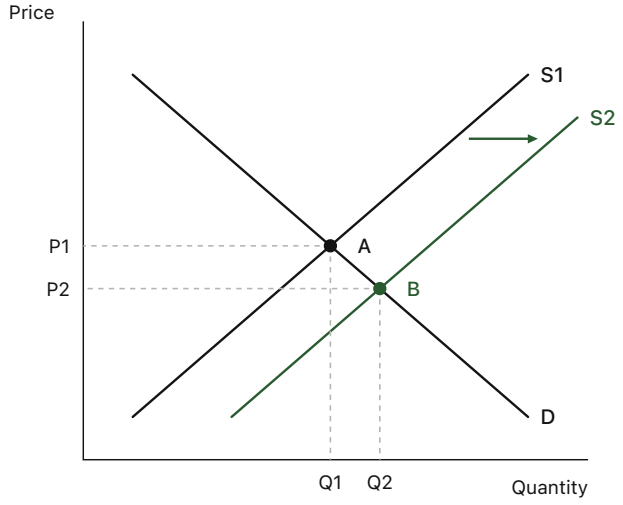
Increase in demand
Buyers want more at every price. The demand curve shifts to the right.



Demand increases from D1 to D2, and the equilibrium moves up the supply curve from A to B: a higher price and a larger quantity.

When supply increases, sellers offer more than buyers want at the old price. That surplus pushes the price down. Buyers respond to the lower price by buying more, which is a movement along the demand curve. Price falls and quantity rises. A decrease in supply raises the price and lowers the quantity.

Increase in supply
Sellers offer more at every price. The supply curve shifts to the right.



Supply increases from S1 to S2, and the equilibrium moves down the demand curve from A to B: a lower price and a larger quantity.

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Shift	Equilibrium price	Equilibrium quantity
Demand increases	Rises	Rises
Demand decreases	Falls	Falls
Supply increases	Falls	Rises
Supply decreases	Rises	Falls

The table has a pattern. A demand shift moves price and quantity in the same direction. A supply shift moves them in opposite directions. Quantity always follows the shift: an increase in either curve raises quantity, and a decrease in either curve lowers it.

Keep the wording exact. When supply increases, demand does not increase. Quantity demanded increases, because the price fell. An answer choice that says the other curve shifted is wrong.

EXAMPLE 4.4

Baristas across a city win a large raise. What happens to the equilibrium price and quantity of lattes?

What is asked The change in both price and quantity in the latte market, not the change in wages.

Shift Wages are an input price for sellers, so this is a supply shifter. Demand does not shift.

Direction A higher input price raises marginal cost, so supply decreases and the curve shifts left.

Read The new crossing point is higher up the demand curve: price rises and quantity falls.

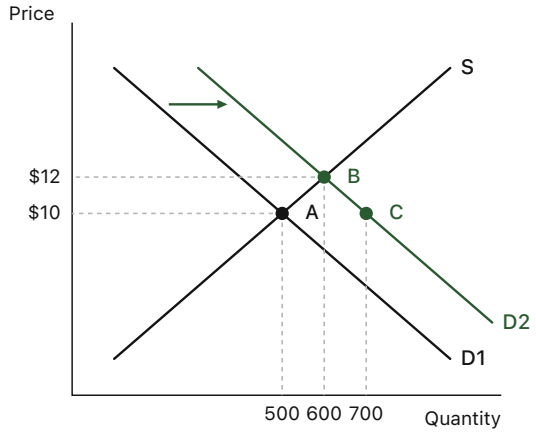
Check A supply shift should move price and quantity in opposite directions, and it does.

Answer **Price rises and quantity falls**

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EXAMPLE 4.5

In the figure, demand increases from D1 to D2. Find the new equilibrium price and quantity, and the size of the shortage at the old price right after the shift.



What is asked	The new crossing point, then the gap at the old price of $10. Point C alone is neither one.
Read	D2 crosses S at B: the new price is $12 and the new quantity is 600.
Compare	At $10, quantity demanded on D2 is 700 (point C) and quantity supplied is 500 (point A).
Substitute	Shortage at the old price: $700 - 500 = 200$.
Check	A demand increase should raise both price and quantity: $10 to $12 and 500 to 600.
Answer	**$12 and 600 units, with a shortage of 200 at $10**

RULE With one shift there is no ambiguity: a demand shift moves price and quantity together, and a supply shift moves them in opposite directions.

4.4 When Both Curves Shift

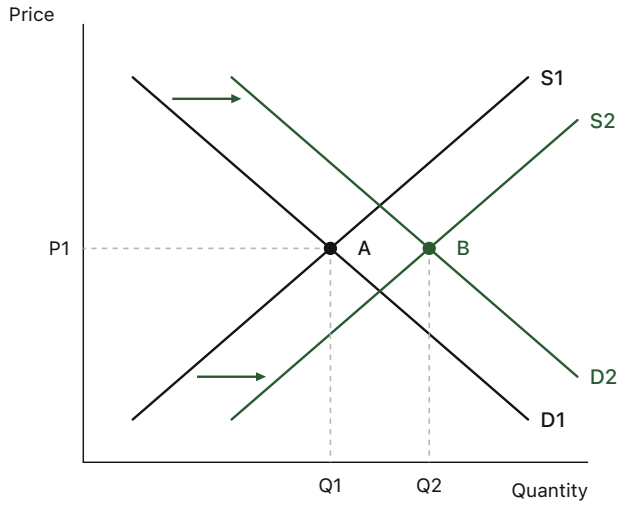
Sometimes one event hits both sides of a market, or two events happen together. Handle each shift separately with the single-shift table, then combine the results. On one of the two variables, price or quantity, the shifts agree, and that variable changes for certain. On the other they pull in opposite directions, and the result is **ambiguous**.

Ambiguous
Cannot be determined from the information given. The result depends on which shift is larger.

Take an increase in demand together with an increase in supply. The demand shift raises quantity and the supply shift raises quantity, so quantity rises for certain. The demand shift raises the price and the supply shift lowers it, so the price could rise, fall or stay the same.

Now take an increase in demand together with a decrease in supply. Both shifts raise the price, so the price rises for certain. The demand shift raises quantity and the supply shift lowers it, so the change in quantity is ambiguous.

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Demand and supply increase by equal amounts, so quantity rises from Q1 to Q2 for certain while the price happens to stay at P1.

Demand	Supply	Price	Quantity
Increases	Increases	Ambiguous	Rises
Decreases	Decreases	Ambiguous	Falls
Increases	Decreases	Rises	Ambiguous
Decreases	Increases	Falls	Ambiguous

There is a shortcut. When the curves shift in the same direction, quantity is certain and price is ambiguous. When they shift in opposite directions, price is certain and quantity is ambiguous. If a question says which shift is larger, the larger shift decides the ambiguous variable.

The common error is to answer as if both results were known. After two shifts, a choice that states a definite change in both price and quantity is wrong unless the question gave the sizes of the shifts.

EXAMPLE 4.6

Battery costs for electric bikes fall. In the same year, a jump in gasoline prices leads more commuters to want an electric bike. What happens to the equilibrium price and quantity of electric bikes?

What is asked	What is certain and what is not, for both price and quantity.
Shift	Cheaper batteries are a lower input price: supply increases. More willing buyers: demand increases.
Compare	Supply up means price falls and quantity rises. Demand up means price rises and quantity rises.
Read	Both shifts raise quantity. They disagree on price.
Check	Same-direction shifts should leave quantity certain and price ambiguous, and they do.
Answer	**Quantity rises, and the change in price is ambiguous**

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RULE When both curves shift, one of price and quantity is certain and the other is ambiguous unless you know which shift is larger.

4.5 Working Backward from Data

Some questions give the result and ask for the cause. You are told what happened to price and quantity and have to say which curve moved. Run the single-shift table in reverse. The two patterns are called the **diagnostic rules**.

Diagnostic rule
A rule that uses observed changes in price and quantity to identify which curve must have shifted.

What the data show	What must have happened
Price up, quantity up	Demand increased
Price down, quantity down	Demand decreased
Price down, quantity up	Supply increased
Price up, quantity down	Supply decreased

If price and quantity moved in the same direction, demand shifted. If they moved in opposite directions, supply shifted. The quantity change then gives the direction of the shift: quantity up means an increase, and quantity down means a decrease.

The rules say which curve definitely shifted. They do not say it was the only one. If price and quantity both rose, demand increased for certain, and supply may or may not have shifted as well. The correct answer names the one curve that shifted for certain and stays open about the other.

These questions often arrive as a short news-style story with no graph. Reduce the story to two facts, the direction of the price and the direction of the quantity, before reading the choices. Then test a choice by running it forward through the single-shift table.

EXAMPLE 4.7

Over one year, the price of a dozen eggs rose and the number of dozens sold fell. Which curve must have shifted, and in which direction?

What is asked The curve that shifted for certain and its direction, not a full list of everything that changed.

Compare Price went up and quantity went down. Those are opposite directions.

Shift Opposite directions means supply shifted. Quantity fell, so supply decreased.

Check Run it forward: a decrease in supply raises price and lowers quantity, which matches the data.

Answer **Supply decreased for certain, and demand may or may not have shifted**

RULE Price and quantity moving the same way means demand shifted. Price and quantity moving opposite ways means supply shifted.

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4.6 In Class at UGA

How these topics are taught and tested in ECON 2105 sections at UGA. Sections differ, so check each point against your own notes.

In lecture	What to do with it
Equilibrium is tested on graphs and with numbers	Be ready to find the equilibrium from a schedule, or from two equations if your section uses them, and then to size the shortage or surplus at another price.
Sections using Achieve put several graph questions on each exam	Draw the starting equilibrium first, then move one curve at a time. With two shifts, the variable they disagree on is ambiguous.
Sections using Parkin now give midterms of about 30 questions on a scantron sheet in class	Speed on routine equilibrium items buys time for the graph and calculation questions.
The lowest of three midterms is dropped	The drop covers one bad day. Do not spend it on the first midterm because supply and demand look familiar.
Stevenson and Wolfers follow equilibrium with welfare and price controls. Parkin's macroeconomics text does not	Consumer surplus, producer surplus and deadweight loss are in Sections 17.2 and 17.3, applied to trade. Price ceilings and floors are not in this book. If your syllabus lists them, study them from your textbook.

Common Slips

The slip	The fix
Swapping shortage and surplus	Below the equilibrium price the gap is a shortage. Above it the gap is a surplus.
Measuring the gap to the equilibrium quantity	Read quantity demanded and quantity supplied at the same price and subtract.
Matching numbers from different rows of a schedule	The equilibrium is the one row where the two quantity columns match.
Shifting a curve when only the good's own price changed	A change in own price is a movement along both curves.
Saying the other curve shifted after one event	Only one curve moved. The other side moved along its curve.
Giving a definite change in both price and quantity after two shifts	One of the two is ambiguous unless the question gives the sizes of the shifts.
Counting every unit offered as sold at a non-equilibrium price	The amount sold is the smaller of the two quantities.

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Choosing the Method

The most expensive errors in this chapter are swapping shortage and surplus, and saying a curve shifted when the market only moved along it. Close behind is giving a definite answer for both price and quantity when two curves shift.

The question says	Do this
Find the equilibrium from a table	Find the row where quantity demanded equals quantity supplied. Read both price and quantity from that row.
The price is below equilibrium	Shortage. Size is quantity demanded minus quantity supplied at that price. The price rises.
The price is above equilibrium	Surplus. Size is quantity supplied minus quantity demanded at that price. The price falls.
How many units are sold at a non-equilibrium price	Take the smaller of quantity demanded and quantity supplied at that price.
An event changes buyers' wants or sellers' costs	Three steps: which curve, which direction, then compare the new crossing point with the old one.
Only one curve shifts	Demand shift: price and quantity move together. Supply shift: they move in opposite directions.
Two events hit the same market	Solve each shift alone. The variable they agree on is certain. The other is ambiguous.
Price and quantity both rose, or both fell	Demand shifted for certain. Do not rule out a supply shift.
Price and quantity moved in opposite directions	Supply shifted for certain. Quantity up means an increase, quantity down a decrease.
A choice says the other curve shifted too	Reject it after one shift. The other side moved along its curve.

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PRACTICE SET 4A 8 questions · 10 minutes · no calculator needed

1. Which statement describes a market at its equilibrium price?

(A) Quantity supplied is larger than quantity demanded.
(B) The demand curve and the supply curve have the same slope.
(C) Quantity demanded equals quantity supplied.
(D) Demand equals supply at every possible price.

2. The table shows the daily market for bike helmets. What are the equilibrium price and quantity?

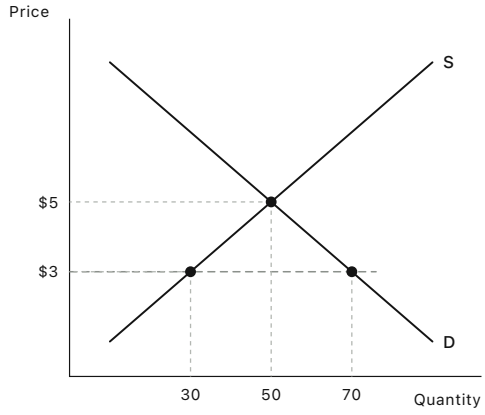
Price	Quantity demanded	Quantity supplied
$20	100	10
$25	85	25
$30	70	40
$35	55	55
$40	40	70

(A) $30 and 70 helmets
(B) $35 and 55 helmets
(C) $40 and 40 helmets
(D) $40 and 70 helmets

3. The price in a market is above the equilibrium price. What results, and how does the price respond?

(A) A surplus results, and the price falls.
(B) A surplus results, and the price rises.
(C) A shortage results, and the price falls.
(D) A shortage results, and the price rises.

4. In the figure, the price is $3. What exists in this market at that price?



(A) A shortage of 20 units
(B) A shortage of 40 units
(C) A surplus of 20 units
(D) A surplus of 40 units

5. A band prices every ticket for a 5,000-seat show at $40. The tickets sell out in ten minutes, and thousands of fans who were willing to pay $40 go without. What does this say about the $40 price?

(A) It is above the equilibrium price, so there is a surplus.
(B) It is above the equilibrium price, so there is a shortage.
(C) It is below the equilibrium price, so there is a surplus.
(D) It is below the equilibrium price, so there is a shortage.

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6. The table shows the weekly market for phone cases. If the price is $16, what exists in this market?

Price	Quantity demanded	Quantity supplied
$8	260	60
$10	220	120
$12	180	180
$14	140	240
$16	100	300

(A) A shortage of 200 cases
(B) A shortage of 100 cases
(C) A surplus of 100 cases
(D) A surplus of 200 cases

7. The table shows the market for umbrellas. The price is currently $8. Which statement describes how this market reaches equilibrium?

Price	Quantity demanded	Quantity supplied
$6	500	180
$8	420	260
$10	340	340
$12	260	420

(A) The price rises. Quantity demanded falls and quantity supplied rises until both are 340.
(B) The price rises. Demand shifts left and supply shifts right until both are 340.
(C) The price falls. Quantity demanded rises and quantity supplied falls until both are 340.
(D) The price stays at $8. Sellers raise output until quantity supplied reaches 420.

8. The table shows the monthly market for yoga mats. The price starts at $30 and then adjusts to equilibrium. How does the number of mats actually sold change?

Price	Quantity demanded	Quantity supplied
$15	900	200
$20	750	400
$25	600	600
$30	450	800
$35	300	1,000

(A) It falls by 200 mats.
(B) It falls by 150 mats.
(C) It rises by 150 mats.
(D) It rises by 350 mats.

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PRACTICE SET 4B 8 questions · 10 minutes · no calculator needed

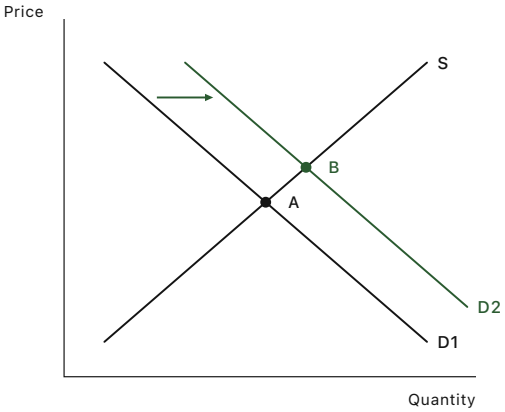
1. Demand for a good increases and supply does not change. What happens to the equilibrium price and quantity?

(A) Price rises and quantity falls.
(B) Price rises and quantity rises.
(C) Price falls and quantity rises.
(D) Price falls and quantity falls.

2. The price of lumber falls. What happens in the market for wooden furniture?

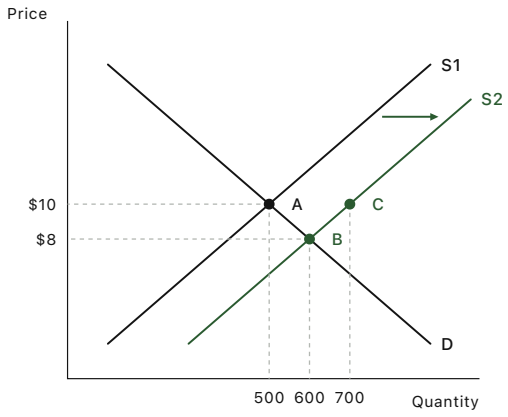
(A) Demand increases, so price rises and quantity rises.
(B) Supply decreases, so price rises and quantity falls.
(C) Demand decreases, so price falls and quantity falls.
(D) Supply increases, so price falls and quantity rises.

3. The figure shows a change in the market for tea. Which event could have caused it?



(A) The price of coffee, a substitute for tea, rises.
(B) The price of tea falls.
(C) Tea growers have an unusually large harvest.
(D) The wages of tea pickers rise.

4. In the figure, supply increases from S1 to S2. What are the new equilibrium price and quantity?



(A) $10 and 500 units **(B)** $10 and 700 units
(C) $8 and 600 units **(D)** $8 and 700 units

5. Supply of a good increases and the market reaches its new equilibrium. Which statement describes the buyers' side of the market?

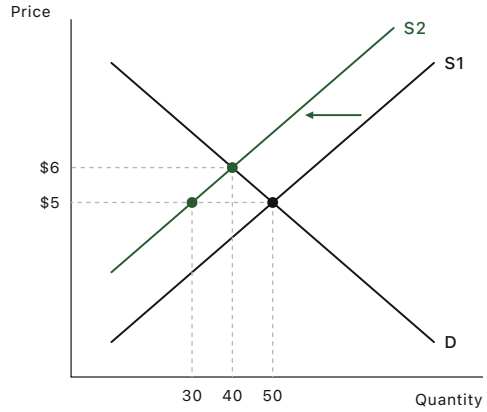
(A) Demand increases, because buyers purchase more.
(B) Quantity demanded increases, a movement along the demand curve.
(C) Demand decreases, because the price is lower.
(D) Quantity demanded is unchanged, because demand did not shift.

6. Incomes rise in a college town, and instant noodles are an inferior good. What happens in the market for instant noodles?

(A) Demand decreases, so price falls and quantity falls.
(B) Demand increases, so price rises and quantity rises.
(C) Supply decreases, so price rises and quantity falls.
(D) Supply increases, so price falls and quantity rises.

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7. In the figure, supply decreases from S1 to S2. Right after the shift, before the price has changed, what exists at the old equilibrium price?



(A) A surplus of 10 units
(B) A surplus of 20 units
(C) A shortage of 10 units
(D) A shortage of 20 units

8. The price of jet fuel rises sharply. Flights and hotel rooms in a resort town are complements. What happens in the market for hotel rooms in that town?

(A) Price rises and quantity falls.
(B) Price rises and quantity rises.
(C) Price falls and quantity falls.
(D) Price falls and quantity rises.

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PRACTICE SET 4C

8 questions · 10 minutes · no calculator needed

1. Demand and supply both increase. What happens to the equilibrium price and quantity?

(A) Price rises, and the change in quantity is ambiguous.
(B) Price falls, and the change in quantity is ambiguous.
(C) Quantity rises, and the change in price is ambiguous.
(D) Quantity falls, and the change in price is ambiguous.

2. Fewer households want a landline phone each year. Over the same period, several landline phone makers leave the industry. What happens to the equilibrium price and quantity of landline phones?

(A) Price falls, and the change in quantity is ambiguous.
(B) Quantity falls, and the change in price is ambiguous.
(C) Price falls and quantity falls, both for certain.
(D) Quantity rises, and the change in price is ambiguous.

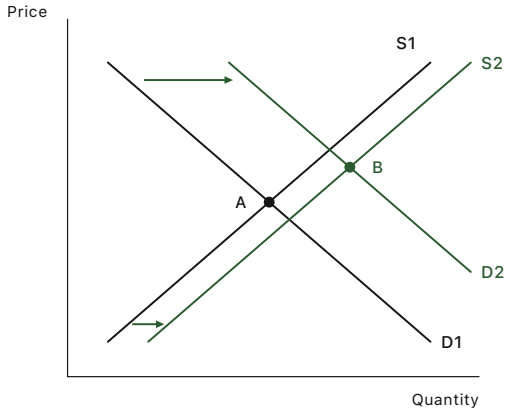
3. Over three years in one city, the price of a gym membership rose and the number of memberships sold also rose. What do the diagnostic rules say?

(A) Demand increased for certain, and supply might also have shifted.
(B) Supply increased for certain, and demand might also have shifted.
(C) Supply decreased for certain, and demand did not shift.
(D) Neither curve shifted, and the market moved along the supply curve.

4. Over five years, the price of a streaming subscription fell while the number of subscriptions sold rose. What do the diagnostic rules say?

(A) Demand increased for certain, and supply might also have shifted.
(B) Demand decreased for certain, and supply might also have shifted.
(C) Supply decreased for certain, and demand might also have shifted.
(D) Supply increased for certain, and demand might also have shifted.

5. In the figure, the market moves from point A to point B. Which statement explains why the price rose?



(A) Demand increased by more than supply increased.
(B) Supply increased by more than demand increased.
(C) Demand increased while supply decreased.
(D) Only the demand curve shifted.

6. The table shows how price and quantity changed in four markets over one year. In which market can you be certain that supply shifted?

Market	Price change	Quantity change
W	Up 4%	Up 9%
X	Down 6%	Down 2%
Y	Up 7%	Down 3%
Z	Up 12%	Up 15%

(A) Market W **(B)** Market X
(C) Market Y **(D)** Market Z

7. A city adds protected bike lanes, which makes more residents want an electric scooter. In the same year, battery costs for scooter makers fall. Afterward, the price of a scooter is higher than before. What happened to quantity, and which shift was larger?

(A) Quantity rose, and the supply shift was larger.
(B) Quantity rose, and the demand shift was larger.
(C) Quantity fell, and the supply shift was larger.
(D) Quantity fell, and the demand shift was larger.

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8. Over one year, the price of strawberries fell and the quantity sold also fell. Which explanation is consistent with those data?

(A) A late frost destroyed part of the strawberry crop.
(B) New harvesting machines cut growers' costs.
(C) Blueberries, a substitute for strawberries, became more expensive.
(D) A food safety scare made shoppers wary of strawberries.

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REVIEW SET 4

15 questions · 18 minutes · no calculator needed

1. Which statement **best** explains why the price tends to stay at its equilibrium level once it gets there?

(A) Sellers are earning the highest profit they could earn at any price.
(B) There is no shortage or surplus to push the price up or down.
(C) Buyers are paying the lowest price that any seller would accept.
(D) The demand curve and the supply curve stop shifting.

2. The table shows the weekly market for spiral notebooks at a bookstore. If the price is $2, what exists in this market?

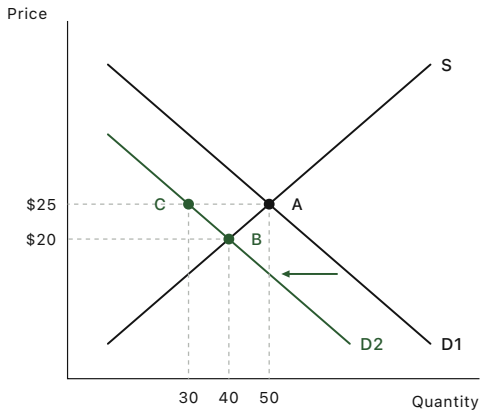
Price	Quantity demanded	Quantity supplied
$1	800	100
$2	650	300
$3	500	500
$4	350	700
$5	200	900

(A) A surplus of 350 notebooks
(B) A surplus of 150 notebooks
(C) A shortage of 150 notebooks
(D) A shortage of 350 notebooks

3. Workers in smartphone factories win a large raise. What happens to the equilibrium price and quantity of smartphones?

(A) Price rises and quantity falls.
(B) Price rises and quantity rises.
(C) Price falls and quantity rises.
(D) Price falls and quantity falls.

4. In the figure, demand decreases from D1 to D2. How does the equilibrium quantity change?



(A) It rises by 10 units.
(B) It falls by 5 units.
(C) It falls by 10 units.
(D) It falls by 20 units.

5. More buyers are switching from desktop computers to laptops. At the same time, the cost of the parts used to build desktop computers falls. What happens in the market for desktop computers?

(A) Price falls, and the change in quantity is ambiguous.
(B) Price rises, and the change in quantity is ambiguous.
(C) Quantity falls, and the change in price is ambiguous.
(D) Quantity rises, and the change in price is ambiguous.

6. In one year, the price of roses rose and the number of roses sold fell. What do the diagnostic rules say?

(A) Demand increased for certain, and supply might also have shifted.
(B) Demand decreased for certain, and supply might also have shifted.
(C) Supply increased for certain, and demand might also have shifted.
(D) Supply decreased for certain, and demand might also have shifted.

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7. A market has a surplus, and the price begins to fall. Which statement describes the adjustment?

(A) Demand increases and supply decreases until the curves meet.
(B) Quantity demanded rises and quantity supplied falls, and neither curve shifts.
(C) Quantity demanded falls and quantity supplied rises, and neither curve shifts.
(D) Supply decreases while demand stays the same.

8. The price of beef rises, so ranchers raise more cattle. Beef and leather are produced together from the same animals. What happens in the market for leather?

(A) Demand for leather increases, so its price rises and its quantity rises.
(B) Supply of leather decreases, so its price rises and its quantity falls.
(C) Supply of leather increases, so its price falls and its quantity rises.
(D) Demand for leather decreases, so its price falls and its quantity falls.

9. The cost of making paper maps falls. Over the same period, a substitute, phone navigation apps, becomes cheaper. Afterward, fewer paper maps are sold than before. What is certain about the price of paper maps, and which shift was larger?

(A) The price rose, and the increase in supply was larger.
(B) The price rose, and the decrease in demand was larger.
(C) The price fell, and the increase in supply was larger.
(D) The price fell, and the decrease in demand was larger.

10. The table shows the daily market for car washes. A city rule holds the price at $8. How many car washes are actually sold, and how large is the shortage?

Price	Quantity demanded	Quantity supplied
$6	140	40
$8	120	70
$10	100	100
$12	80	130
$14	60	160

(A) 70 sold, with a shortage of 50
(B) 70 sold, with a shortage of 30
(C) 100 sold, with a shortage of 50
(D) 120 sold, with a shortage of 50

11. Only one curve shifted in a market, and the equilibrium quantity fell. What must be true?

(A) Demand decreased.
(B) Supply decreased.
(C) Either demand decreased or supply increased.
(D) Either demand decreased or supply decreased, and the change in price tells which.

12. Hal and Ivy are the only buyers of firewood at a roadside stand. The table shows how many bundles each wants a week at each price, and the stand's quantity supplied. What are the equilibrium price and quantity?

Price	Hal	Ivy	Supplied
$2	7	9	7
$3	5	6	11
$4	4	4	15
$5	2	3	19

(A) $2 and 7 bundles **(B)** $3 and 11 bundles
(C) $3 and 22 bundles **(D)** $4 and 8 bundles

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13. Home espresso machines are a normal good, and coffee shop drinks are a substitute for them. Which pair of events would make the equilibrium price of espresso machines rise for certain?

(A) Incomes rise, and the price of stainless steel used in the machines rises.
(B) Incomes rise, and the price of stainless steel used in the machines falls.
(C) Coffee shop drinks get cheaper, and the price of stainless steel falls.
(D) Coffee shop drinks get cheaper, and the price of stainless steel rises.

14. Over two years, the price of a video game console fell 10% while the number sold rose 25%. A news report says, "Demand for consoles rose, which is why more were sold." What do the diagnostic rules say?

(A) The report is right, and demand increased for certain.
(B) Supply decreased for certain, and demand increased.
(C) Supply increased for certain, and demand may or may not have shifted.
(D) Demand increased for certain, and supply decreased.

15. A frost destroys much of the year's coffee crop, and the price of coffee rises. In the same months, tea growers adopt machines that cut their costs. Coffee and tea are substitutes. What happens in the market for tea?

(A) The price rises, and the change in quantity is ambiguous.
(B) The price falls, and the quantity rises.
(C) The price falls, and the change in quantity is ambiguous.
(D) The quantity rises, and the change in price is ambiguous.

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5 Sizing Up the Economy Using GDP

In 1934 a report directed by the economist Simon Kuznets gave the U.S. Senate the first official estimates of the nation's income, the work that grew into GDP. In the same report he warned that the welfare of a nation can scarcely be inferred from a measurement of national income. The number counts production and nothing else. Points on this material are lost by forgetting that: counting a resale, a transfer payment or a price increase as if something new had been made. The mock exam gives this chapter 11 of its 100 questions.

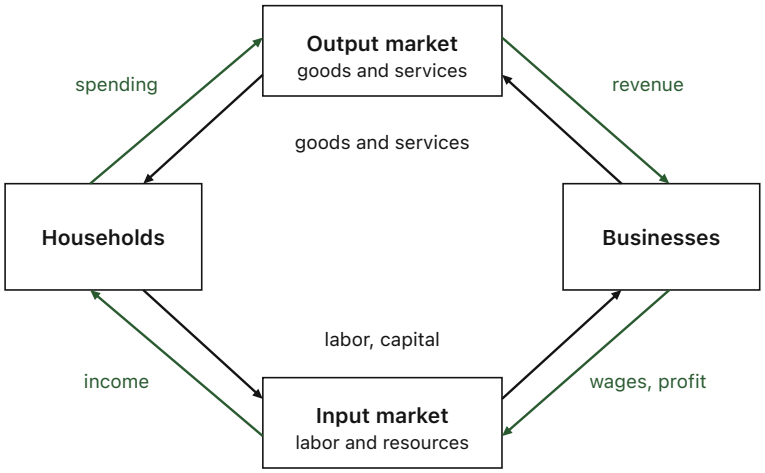
5.1 The Circular Flow

Macroeconomics adds up the whole economy: total output, total spending and total income. The circular flow diagram shows that these three totals are the same number. It has two groups, households and businesses, and two markets that connect them.

In the output market, households spend money and businesses receive it as revenue. Goods and services move the other way, from businesses to households. In the input market, businesses pay wages and profits, and households supply the labor and capital that businesses use. Every real flow is matched by a money flow of the same size moving in the opposite direction.

Output market
Where businesses sell goods and services and households buy them.

Input market
Where households sell labor and other resources and businesses pay for them.



Money moves one way around the loop, and goods, services and resources move the other way.

Follow one dollar around the loop. A household spends it in the output market, so it is spending. A business receives it for something it produced, so it is the value of output. The busi-

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ness pays it out as wages or keeps it as profit, and profit belongs to the households that own the business, so it is income. It is the same dollar, counted at three points.

$$\text{Total output} = \text{Total spending} = \text{Total income}$$

Students lose points by putting a flow in the wrong market. A paycheck passes through the input market. A grocery purchase passes through the output market. Households are the buyers in the output market and the sellers in the input market, and businesses are the reverse.

RULE Every dollar spent on output is a dollar of output produced and a dollar of income earned, so total output, total spending and total income are equal.

5.2 What Counts in GDP

GDP is the standard measure of the size of an economy. Each phrase in the definition rules something in or out. Questions on this section hand you a transaction and ask how much it adds to GDP, and the answer comes from checking the phrases one at a time.

Gross domestic product (GDP)
The market value of all final goods and services produced within a country in a given year.

Phrase	What it means	What it leaves out
Market value	Output is added up at the prices it sells for.	Unpaid work that has no price
All	Everything sold in markets, whether a household, a business or the government buys it.	No buyer is excluded
Final	Only goods and services bought by their end user.	Intermediate goods
Produced	Only new production.	Resales of used goods and existing houses
Within a country	Where it was made decides, not who owns the producer.	Output made abroad by domestic firms
In a given year	GDP is a flow over a period of time.	Anything produced in an earlier year

Final or intermediate depends on what the buyer does with the good, not on what the good is. Flour a family buys to bake at home is a final good. Flour a bakery buys is an intermediate good, and its value is already inside the price of the bread. Counting both the flour and the bread would count the flour twice. A machine that a business buys to keep and use for years is not used up, so it is a final good.

Final good
A good or service bought by its end user.

Intermediate good
A good or service used up as an input in producing something else.

Two kinds of transactions move money without producing anything. The first is a resale. A used car or an existing house was counted in the year it was made, so selling it again adds nothing this year. The second is a transfer payment, such as a Social Security check or an unemployment benefit. The government hands over money and receives no good or service,

Transfer payment
A payment that moves income from one group to another with no good or service produced in return.

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so the payment is not in GDP. When the person who receives it spends it on new goods, that spending counts.

EXAMPLE 5.1

In one year, Priya buys a new domestically made couch for $1,200 and a used pickup truck from a neighbor for $9,000. The couch maker paid $350 for the fabric and wood in that couch. Priya's father receives $1,500 in Social Security benefits. How much do these four transactions add to this year's GDP?

What is asked	The value of new final production, not the total amount of money that changed hands.
Count	The couch is new and final: $1,200.
Exclude	The fabric and wood are intermediate goods, already inside the $1,200. The truck is a resale. Social Security is a transfer payment.
Check	Only one new final good was produced, so only one of the four numbers should survive.
Answer	**$1,200**

RULE Before counting a dollar, check that something new and final was produced inside the country this year. If not, it adds zero to GDP.

5.3 Three Ways to Measure GDP

Because total output, total spending and total income are equal, GDP can be measured from any of the three. Each method counts the same production from a different side. In real data the three come out only approximately equal, because they are built from different sources.

Spending

$$Y = C + I + G + NX$$

The spending method sorts every purchase of final output by who made it. Consumption is spending by households, investment is spending on new capital, government purchases are what the government buys, and net exports cover trade with other countries. Investment has a narrow meaning here. Buying shares of stock or an existing house is not investment, because no new capital is produced.

Investment
Spending on new capital: equipment, buildings, additions to inventories, and newly built housing.

Government purchases
Government spending on goods and services. Transfer payments are not included.

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Piece	What goes in	What stays out
Consumption, C	Household spending on final goods and services	New houses
Investment, I	New equipment, buildings and inventories, and newly built housing	Stocks, bonds, existing houses
Government purchases, G	Goods and services the government buys, including public employees' pay	Transfer payments
Net exports, NX	Exports minus imports	Imports, which are subtracted

Net exports
Exports minus imports.

Exports are added because they were produced here, even though foreigners bought them. Imports are subtracted because C, I and G include spending on goods made in other countries. Subtracting imports takes that foreign production back out. Buying an imported good raises C and lowers NX by the same amount, so GDP does not change.

EXAMPLE 5.2

A country reports consumption of $830 billion, investment of $210 billion, government purchases of $260 billion, transfer payments of $95 billion, exports of $140 billion and imports of $175 billion. What is GDP?

What is asked GDP by the spending method. Transfer payments are listed but are not part of it.

Formula $Y = C + I + G + NX$, with NX equal to exports minus imports.

Net exports \$140 billion minus \$175 billion is $-$\$35 billion.

Substitute \$830 + \$210 + \$260 $-$ \$35 = \$1,265 billion.

Check C, I and G sum to \$1,300 billion and the country imports more than it exports, so GDP should be a little under \$1,300 billion.

Answer **\$1,265 billion**

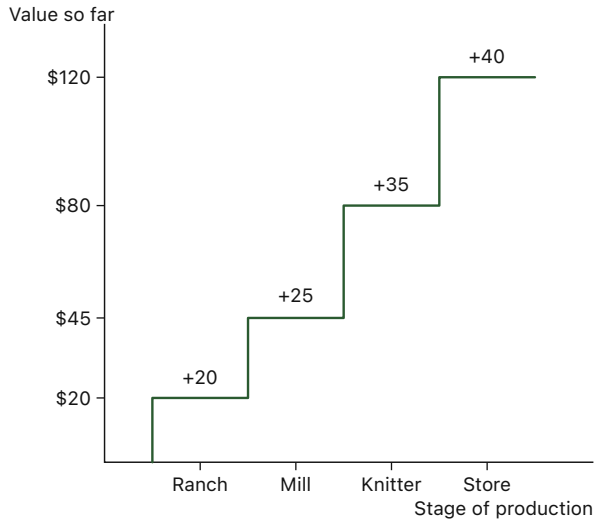
Value added

Value added
A producer's sales minus the cost of the intermediate goods it bought.

The output method adds up the value added by every producer. Take one sweater. A ranch sells wool to a mill, the mill sells yarn to a knitter, the knitter sells the sweater to a store, and the store sells it to a shopper.

Stage	Sells for	Paid for inputs	Value added
Ranch (wool)	\$20	\$0	\$20
Mill (yarn)	\$45	\$20	\$25
Knitter (sweater)	\$80	\$45	\$35
Store (retail sale)	\$120	\$80	\$40
Total			\$120

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Each step up is one stage's value added, and the steps add up to the final price of $120.

The value added at the four stages sums to $120, which is exactly the price the shopper pays. So there are two routes to the same answer: take the final sale price, or add up value added. Adding the four sales together gives $265, which counts the wool four times.

EXAMPLE 5.3

A bike shop buys a frame for $180, wheels for $90 and other parts for $60. It assembles a bicycle and sells it to a customer for $520. What is the shop's value added, and how much does the sale add to GDP?

What is asked	Two different numbers: the shop's own contribution, and the full value of the final good.
Formula	Value added = sales minus the cost of intermediate goods.
Substitute	Inputs cost $180 + $90 + $60 = $330, so value added is $520 − $330 = $190.
GDP	The bicycle is the final good, so GDP rises by its full price, $520.
Check	The parts makers added $330 and the shop added $190, and $330 + $190 = $520.
Answer	**Value added $190. GDP rises by $520.**

Income

Every dollar of value added is paid out to someone. Workers receive wages and owners receive profit, so GDP also equals total wages plus total profits. Fuller versions of the income method add rent and interest, which are also earned from production. Transfer payments are not earned from production and are left out. If the knitter in the chain pays $25 in wages, her profit is $10, and $25 + $10 is her $35 of value added.

RULE Spending, value added and income are three counts of the same production. Use the one the question gives you the pieces for, and never add pieces from two methods.

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5.4 What GDP Misses

GDP measures market production. It is often used as a stand-in for how well off a country is, and it is an imperfect one. It has six well-known limitations.

Nonmarket activity
Production that is never sold, such as unpaid housework and caring for your own children.

Shadow economy
Economic activity hidden from official statistics because it is illegal or unreported.

- **Prices are not values.** GDP adds things up at market prices, and something sold cheaply can be worth far more to the people who use it.
- **Nonmarket activity.** Unpaid cooking, cleaning and child care are left out. Pay someone else to do the same work and GDP rises.
- **Shadow economy.** Illegal sales and unreported cash work are missed.
- **Environment.** Nothing is subtracted for pollution or for natural resources that are used up.
- **Leisure.** Time off has value and is not counted. Longer work hours raise GDP even if people are worse off.
- **Distribution.** GDP is a total. It does not say who receives the income.

Exam questions give a short scenario and ask which limitation it shows, or which way GDP moves. Work out whether a market sale appears or disappears. When a parent leaves a paid job to care for a child at home, measured GDP falls even though the care is still being produced. When a family starts paying a day care center for the same care, measured GDP rises.

None of this makes GDP useless. It measures the resources a country has available for whatever its people care about, and that is why it is still the first number economists look at.

RULE GDP counts market production at market prices, so anything unpriced, unreported, or about who gets what is outside it.

5.5 Nominal and Real GDP

Nominal GDP rises when quantities rise and also when prices rise. That makes it a poor way to compare an economy across years. Real GDP holds prices fixed, so any change in it is a change in the amount produced. The table shows an economy that makes two goods.

Nominal GDP
GDP measured at the prices of the year the output was produced.

Real GDP
GDP measured at constant prices, so it changes only when quantities change.

Year	Coffee	Jackets
Year 1	100 cups at $4	20 at $30
Year 2	110 cups at $5	24 at $35

Base-year method

Base year
The year whose prices are used to value output in every year.

Pick one year as the base year and apply its prices to the quantities of every year. In the base year itself, nominal GDP and real GDP are the same number, because the prices used are that year's own.

$$\text{Real GDP in a year} = \text{base-year prices} \times \text{that year's quantities}$$

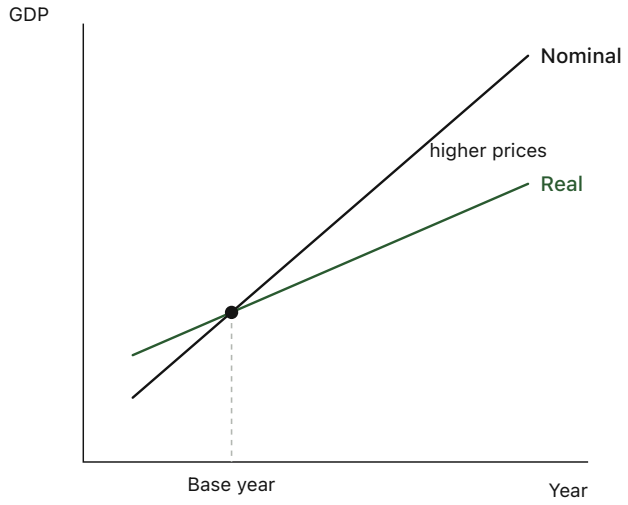
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EXAMPLE 5.4

Using the table and Year 1 as the base year, what are nominal GDP and real GDP in Year 2?

What is asked	Two values for Year 2. Both use Year 2 quantities, and only the prices differ.
Nominal	Year 2 prices: $110 \times \$5 + 24 \times \$35 = \$550 + \$840 = \$1{,}390$.
Real	Year 1 prices: $110 \times \$4 + 24 \times \$30 = \$440 + \$720 = \$1{,}160$.
Check	Prices rose, so nominal GDP should be above real GDP, and \$1,390 is above \$1,160.
Answer	**Nominal \$1,390. Real \$1,160.**

Year 1 GDP is $100 \times \$4 + 20 \times \$30 = \$1{,}000$, nominal and real. So nominal GDP grew 39% and real GDP grew 16%. The difference is higher prices.



When prices rise every year, nominal GDP climbs faster than real GDP, and the two are equal in the base year.

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Average-price method

The base-year answer depends on which year is chosen. The average-price method avoids the choice. For each good, average its price in the two years. Apply those average prices to the quantities of both years, then compare the two totals.

EXAMPLE 5.5

Using the same table and the average-price method, by what percent did real GDP grow from Year 1 to Year 2?

What is asked	A growth rate, so real GDP is needed in both years, valued at the same average prices.
Prices	Coffee averages \$4.50 and jackets average \$32.50.
Substitute	Year 1: $100 \times \$4.50 + 20 \times \$32.50 = \$1{,}100$. Year 2: $110 \times \$4.50 + 24 \times \$32.50 = \$1{,}275$.
Growth	$\frac{\$1{,}275 - \$1{,}100}{\$1{,}100} \approx 0.159$, or 15.9%.
Check	Coffee output rose 10% and jacket output rose 20%, so the answer has to fall between 10% and 20%.
Answer	**About 15.9%**

The shortcut

$$\%\Delta \text{ real GDP} \approx \%\Delta \text{ nominal GDP} - \%\Delta \text{ prices}$$

When the changes are small, growth in nominal GDP splits into growth in output and growth in prices. If nominal GDP rose 6% and prices rose 2%, real GDP rose about 4%. If prices rose faster than nominal GDP, real GDP fell. The same line rearranged gives nominal growth as real growth plus the change in prices.

EXAMPLE 5.6

Nominal GDP rose from \$800 billion to \$848 billion in a year when prices rose 3.5%. About how fast did real GDP grow?

What is asked	The growth rate of real GDP, not of nominal GDP.
Nominal	$\frac{\$848 - \$800}{\$800} = 0.06$, or 6%.
Subtract	6% minus 3.5% is 2.5%.
Check	Nominal GDP grew faster than prices, so real growth should be positive and smaller than 6%.
Answer	**About 2.5%**

RULE Real GDP values both years at the same prices. If your two totals use two different sets of prices, you have computed nominal GDP.

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5.6 Making Sense of Big Numbers

A figure in the billions or trillions cannot be judged by looking at it. Economists scale it first. There are three standard ways.

- **Per person.** Divide by the population.
- **Share of the economy.** Divide by GDP and write the result as a percent.
- **Its own history.** Compare it with the same number in earlier years, in real terms.

GDP per capita
GDP divided by population: the average output per person.

Share of GDP
An amount divided by GDP, written as a percent.

$$\text{GDP per capita} = \frac{\text{GDP}}{\text{Population}}$$

Most errors here are unit errors. One trillion is 1,000 billion, and one billion is 1,000 million. Put both numbers in the same units before dividing. A GDP of $3 trillion is $3,000,000 million, and spread over 60 million people it is $50,000 per person.

GDP per capita is an average, so it says nothing about how income is divided. To compare living standards across years, use real GDP per capita. Total GDP can rise while GDP per capita falls, if the population grows faster than output.

EXAMPLE 5.7

A government announces a $36 billion highway program. The country has 24 million people and a GDP of $1.2 trillion. What does the program cost per person, and what share of GDP is it?

What is asked	Two scalings of the same $36 billion: one by population, one by GDP.
Per person	$36 billion is $36,000 million, and $\frac{\$36{,}000 \text{ million}}{24 \text{ million}} = \$1{,}500$.
Share	$1.2 trillion is $1,200 billion, and $\frac{36}{1{,}200} = 0.03$, or 3%.
Check	GDP per capita is $50,000, and 3% of $50,000 is $1,500, so the two answers agree.
Answer	**$1,500 per person, 3% of GDP**

RULE A big number means little until it is divided by something: by population for a per person figure, by GDP for a share of the economy.

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5.7 In Class at UGA

How these topics are taught and tested in ECON 2105 sections at UGA. Sections differ, so check each point against your own notes.

In lecture	What to do with it
Parkin's GDP chapter teaches the expenditure approach and the income approach	Know $Y = C + I + G + NX$ and that adding up incomes gives the same total. Section 5.3 covers both.
Sections using Parkin may compute real GDP with chained dollars as well as base-year prices	Use the method your section shows on exams. Either way, real GDP holds prices fixed so that only quantities change.
The course outline asks you to calculate statistics from raw data and to judge GDP as a measure of well-being	Expect one computation, such as GDP from its spending parts, and one question on what GDP misses (Section 5.4).
Parkin separates gross investment from net investment	Gross investment equals net investment plus depreciation. Put it on your formula sheet next to $NX = X - M$.
Exams in Parkin sections lean on calculations	Build your own formula sheet as you go: GDP from spending, value added, nominal to real, per person. Work each one from raw numbers.
Online sections may test GDP in the same module as unemployment and the CPI	If yours does, study Chapters 5, 7 and 8 of this book together.

Common Slips

The slip	The fix
Putting a paycheck or a purchase in the wrong market	Wages pass through the input market and purchases of goods through the output market.
Counting a resale, a transfer payment or an intermediate good	Count only new final goods, so none of these adds anything on its own.
Reporting a firm's sales or its profit as its value added	Value added is sales minus what the firm paid for intermediate goods.
Flipping the sign of net exports	Net exports are exports minus imports, so imports are always subtracted.
Using each year's own prices for real GDP	Real GDP values every year's quantities at the base-year prices.
Treating nominal growth as real growth	Subtract the percent change in prices from nominal growth.
Losing a factor of ten or a thousand in the units	Convert both numbers to the same units before dividing.

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Choosing the Method

The costly errors in this chapter are counting money that changed hands instead of new final production, and using the wrong year's prices in a real GDP calculation. Find the words final, new, nominal, real and base year in the question before calculating.

The question says	Do this
How much does this add to GDP	Check: new, final, produced here, this year. Resales, intermediate goods and transfer payments add zero.
Lists C, I, G, exports and imports	Add C, I and G, add exports, subtract imports. Ignore any transfer payments listed.
GDP is given and one piece is missing	Write $Y = C + I + G + NX$ and solve for the missing piece. Keep the sign of NX.
Value added by one firm	Its sales minus what it paid for intermediate goods. Not its sales, and not its profit.
A production chain with several stages	GDP is the final sale price, which equals the sum of value added. Never add the sales.
Income approach	Add wages and profits, plus rent and interest if listed. Leave out transfer payments.
Nominal and real GDP from a table	Nominal: each year's own prices. Real: base-year prices on the quantities of the year asked about.
Average-price method	Average each good's two prices, apply them to both years' quantities, then compare.
Nominal growth and price growth are given	Subtract: real growth is about nominal growth minus the percent change in prices.
Per person, or share of the economy	Put both numbers in the same units, then divide by population or by GDP.

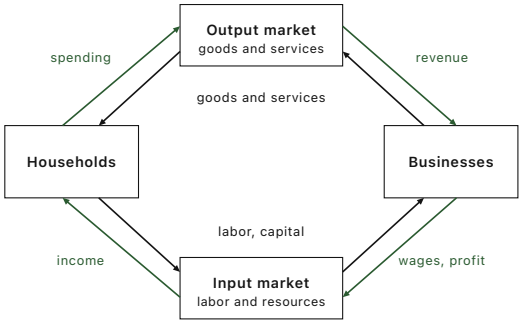
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PRACTICE SET 5A 8 questions · 10 minutes · no calculator needed

1. In the circular flow, what do households do in the two markets?

(A) They sell goods and services in the output market and buy labor in the input market.
(B) They buy goods and services in the output market and sell labor in the input market.
(C) They buy goods and services in the output market and buy labor in the input market.
(D) They sell goods and services in the output market and sell labor in the input market.

2. Lena is paid $900 for a week of work at a furniture factory. Which flow in the figure is her paycheck part of?



(A) Spending, from households to the output market
(B) Revenue, from the output market to businesses
(C) Labor, from households to the input market
(D) Income, from the input market to households

3. Why must total spending on output equal total income in the circular flow?

(A) Every dollar a buyer spends is received by a business and paid out as wages or profit.
(B) Households always save exactly the amount that businesses choose to invest.
(C) The government collects exactly as much in taxes as it pays out in spending.
(D) Prices adjust every year until nominal GDP and real GDP are the same number.

4. A firm owned by residents of Norland builds trucks at a plant located in Sudmark. In which country's GDP is that truck production counted?

(A) Norland's, because the owners of the firm live there
(B) Both countries', divided according to ownership
(C) Sudmark's, because the trucks are produced there
(D) Neither country's, because the firm is foreign owned

5. The table lists four purchases a restaurant made this year. Which one is a final good counted in GDP?

Purchase	Condition	How it is used
Tomatoes	New	Cooked into sauce for meals it sells
Pizza oven	New	Kept and used for many years
Delivery van	Used, 6 years old	Kept and used for deliveries
Takeout boxes	New	Handed out with customer orders

(A) The tomatoes
(B) The pizza oven
(C) The delivery van
(D) The takeout boxes

6. A family sells its 30-year-old house directly to another family for $310,000. How does this sale change this year's GDP?

(A) It does not change GDP, because the house was produced in an earlier year.
(B) It raises GDP by $310,000, because the house sold at its market value.
(C) It raises GDP by $310,000, because housing is counted as investment.
(D) It lowers GDP by $310,000, because the sellers gave up an asset.

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7. The table lists every transaction in a small economy this year. What is GDP?

Transaction	Amount
New laptops sold to households	$40,000
Chips sold to the laptop maker and used in those laptops	$12,000
Used textbooks sold between students	$3,000
Unemployment benefits paid by the government	$6,000
Haircuts sold to households	$9,000

(A) $70,000 **(B)** $61,000
(C) $55,000 **(D)** $49,000

8. The government sends Rosa a $1,000 unemployment check. She spends $700 of it on new, domestically produced groceries and clothing and uses the other $300 to buy a used bicycle from a friend. By how much does GDP rise as a result?

(A) $0 **(B)** $300
(C) $700 **(D)** $1,000

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PRACTICE SET 5B 8 questions · 10 minutes · calculator allowed

1. Which purchase is counted as investment in GDP?

(A) A household buys 100 shares of stock in a software firm.
(B) A family buys an existing house that was built in 1995.
(C) A family buys a newly built house from a builder.
(D) A city government buys a new fire truck.

2. An economy has consumption of $540 billion, investment of $130 billion, government purchases of $170 billion, exports of $90 billion and imports of $110 billion. What is GDP?

(A) $820 billion **(B)** $840 billion
(C) $860 billion **(D)** $1,040 billion

3. A factory doubles its output and, in doing so, doubles the pollution it releases into a nearby river. How does GDP treat this?

(A) It rises by the added output minus the pollution damage.
(B) It does not change, because the damage offsets the output.
(C) It falls, because pollution is a cost to society.
(D) It rises by the full added output, with nothing subtracted.

4. The table shows the production chain for one jar of honey. What is the grocery store's value added?

Stage	Paid for inputs	Sells for
Beekeeper	$0	$6
Bottler	$6	$10
Grocery store	$10	$15

(A) $4 **(B)** $5
(C) $10 **(D)** $15

5. Jorge quits his job as a paid cook to stay home, where he cooks and cleans for his own family. Measured GDP falls. Which limitation of GDP does this show?

(A) Nonmarket activity is left out.
(B) The shadow economy is left out.
(C) Leisure is not counted.
(D) The distribution of income is ignored.

6. A country's GDP is $2,400 billion. Consumption is $1,560 billion, investment is $410 billion and government purchases are $520 billion. What are net exports?

(A) $2,490 billion **(B)** $430 billion
(C) $90 billion **(D)** -$90 billion

7. In one year a bakery sells $500,000 of bread to households. It buys $180,000 of flour and other ingredients and pays $230,000 in wages. It has no other costs. What are the bakery's profit and its value added?

(A) Profit $90,000 and value added $500,000
(B) Profit $270,000 and value added $320,000
(C) Profit $90,000 and value added $320,000
(D) Profit $320,000 and value added $90,000

8. The table shows the only four firms in an economy, in thousands of dollars. The lumber mill sells only to the furniture maker, and the furniture maker sells only to the furniture store. What is GDP?

Firm	Sales	Intermediate goods bought
Lumber mill	$300	$0
Furniture maker	$800	$300
Furniture store	$1,100	$800
Barber shop	$200	$0

(A) $1,100 thousand **(B)** $1,300 thousand
(C) $2,100 thousand **(D)** $2,400 thousand

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PRACTICE SET 5C 8 questions · 10 minutes · calculator allowed

1. Nominal GDP rose 5% this year, and the **only** thing that changed was prices. What happened to real GDP?

(A) It did not change.
(B) It rose 5%.
(C) It fell 5%.
(D) It rose by more than 5%.

2. The table shows a one-good economy. Using Year 1 as the base year, what is real GDP in Year 2?

Year	Quantity	Price
Year 1	500	$6
Year 2	550	$8

(A) $4,400 **(B)** $4,000
(C) $3,300 **(D)** $3,000

3. In the base year, how do nominal GDP and real GDP compare?

(A) Nominal GDP is larger.
(B) They are equal.
(C) Real GDP is larger.
(D) It depends on that year's inflation rate.

4. Real GDP grew 2% in a year when prices rose 3.5%. About how fast did nominal GDP grow?

(A) -1.5% **(B)** 1.5%
(C) 1.75% **(D)** 5.5%

5. A country's GDP is $2.1 trillion and its population is 35 million. What is GDP per capita?

(A) $6,000 **(B)** $16,667
(C) $60,000 **(D)** $600,000

6. The table shows an economy that makes two goods. Using Year 1 as the base year, what are nominal GDP and real GDP in Year 2?

Year	Lamps	Rugs
Year 1	80 at $25	30 at $100
Year 2	90 at $30	33 at $110

(A) Nominal $6,330 and real $5,550
(B) Nominal $5,550 and real $6,330
(C) Nominal $6,330 and real $5,000
(D) Nominal $5,700 and real $5,550

7. The table shows a one-good economy. Using the average-price method, what is real GDP in Year 2, and how much did real GDP grow from Year 1?

Year	Quantity	Price
Year 1	400	$9
Year 2	440	$11

(A) $4,840, up 34.4% **(B)** $3,960, up 10%
(C) $4,400, up 22.2% **(D)** $4,400, up 10%

8. Using the table, how did real GDP per capita change from Year 1 to Year 2?

Year	Nominal GDP	Real GDP	Population
Year 1	$400 billion	$400 billion	10.0 million
Year 2	$462 billion	$420 billion	10.5 million

(A) It rose 10%, from $40,000 to $44,000.
(B) It did not change from $40,000.
(C) It rose 5%, from $40,000 to $42,000.
(D) It fell about 5%, from $40,000 to about $38,100.

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REVIEW SET 5

15 questions · 18 minutes · calculator allowed

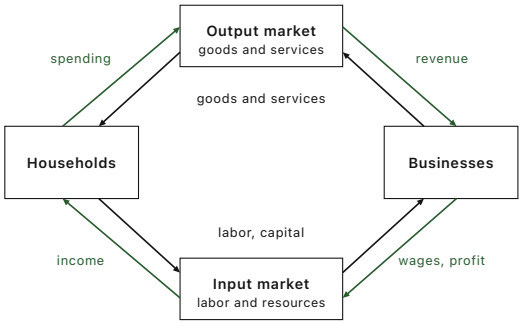
1. Why does GDP count **only** final goods and services?

(A) Intermediate goods are usually imported from other countries.
(B) Intermediate goods are not sold at market prices.
(C) Intermediate goods are produced in an earlier year.
(D) The value of intermediate goods is already in the price of the final good.

2. A government spends $300 billion on roads, equipment and employee salaries, and pays out $120 billion in Social Security and unemployment benefits. Consumption is $900 billion, investment is $250 billion and net exports are -$40 billion. What is GDP?

(A) $1,110 billion **(B)** $1,410 billion
(C) $1,490 billion **(D)** $1,530 billion

3. A customer pays a bakery $4 for a loaf of bread. In the figure, through which market does the $4 pass, and what flows in the opposite direction?



(A) The output market, with goods and services flowing the other way
(B) The output market, with labor flowing the other way
(C) The input market, with goods and services flowing the other way
(D) The input market, with labor flowing the other way

4. Two countries have the same GDP per capita. In the first, nearly all income goes to a small group. In the second, income is spread evenly. Which limitation of GDP explains why the statistic cannot tell them apart?

(A) GDP does not count leisure.
(B) GDP misses the shadow economy.
(C) GDP ignores the distribution of income.
(D) GDP uses prices, which are not values.

5. A print shop sells $84,000 of posters in a year. It spends $29,000 on paper and ink and $40,000 on wages. What is its value added?

(A) $15,000 **(B)** $55,000
(C) $69,000 **(D)** $84,000

6. The table shows an economy that makes two goods. Using Year 1 as the base year, by about what percent did real GDP grow from Year 1 to Year 2?

Year	Bikes	Helmets
Year 1	20 at $200	50 at $40
Year 2	22 at $230	60 at $45

(A) 10.3% **(B)** 11.8%
(C) 13.3% **(D)** 29.3%

7. Which change would raise nominal GDP and leave real GDP unchanged?

(A) Every quantity rises 10% and prices stay the same.
(B) Every price falls 10% and quantities stay the same.
(C) The population rises 10% and output stays the same.
(D) Every price rises 10% and quantities stay the same.

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8. A country with a GDP of \$800 billion and 16 million people spends \$20 billion a year on its public universities. Which description of that spending is correct?

(A) \$1,250 per person and 2.5% of GDP
(B) \$1,250 per person and 25% of GDP
(C) \$125 per person and 2.5% of GDP
(D) \$800 per person and 40% of GDP

9. Mia buys a \$1,000 phone that was made entirely in another country. How do the pieces of the spending formula and GDP change?

(A) C rises by \$1,000, NX falls by \$1,000, and GDP does not change.
(B) C rises by \$1,000, NX does not change, and GDP rises by \$1,000.
(C) C does not change, NX falls by \$1,000, and GDP falls by \$1,000.
(D) C does not change, NX does not change, and GDP does not change.

10. Nominal GDP rose from \$500 billion to \$540 billion in a year when prices rose 5%. About what happened to real GDP?

(A) It fell about 3%. **(B)** It rose about 3%.
(C) It rose about 8%. **(D)** It rose about 13%.

11. A farm sells \$200 of eggs to a diner and \$80 of eggs to households at its roadside stand. The diner uses its eggs in breakfasts that it sells for \$600. How much do these sales add to GDP?

(A) \$280 **(B)** \$600
(C) \$680 **(D)** \$880

12. In one year a small economy's wages total \$600 billion, profits \$250 billion, rent \$60 billion and interest \$40 billion. The government also pays \$90 billion in unemployment benefits. What is GDP measured by the income method?

(A) \$850 billion **(B)** \$860 billion
(C) \$950 billion **(D)** \$1,040 billion

13. In Corvel many plumbers do repair jobs for cash and never report them. A new tax rule leads them to report every job, while the amount of plumbing done does not change. What happens to measured GDP, and why?

(A) GDP does not change, because no new plumbing was produced
(B) GDP rises, because nonmarket activity is now counted
(C) GDP falls, because the plumbers now pay more tax
(D) GDP rises, because work hidden in the shadow economy is now counted

14. The table shows an economy that makes two goods. Using the average-price method, by what percent did real GDP grow from Year 1 to Year 2?

Year	Notebooks	Lamps
Year 1	50 at \$3	8 at \$20
Year 2	60 at \$5	8 at \$30

(A) 10.0% **(B)** 10.2%
(C) 20.0% **(D)** 74.2%

15. A country's GDP is \$2.4 trillion and its population is 60 million. It spends 2.5% of GDP on defense. How much is defense spending per person?

(A) \$100 **(B)** \$1,000
(C) \$10,000 **(D)** \$40,000

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Mock Final Exam

One hundred questions in the order of the book, at the pace of the real exam. Take it in one sitting with a basic calculator and scratch paper, mark your answers on the answer sheet that follows, then use the score guide.

MOCK FINAL EXAM

100 questions · 120 minutes · basic calculator allowed

1. Nadia is willing to pay $85 to see a concert. The ticket costs $60, and getting to the arena takes time she would pay $15 to avoid. What is her economic surplus from going?

(A) $10 **(B)** $25
(C) $70 **(D)** $85

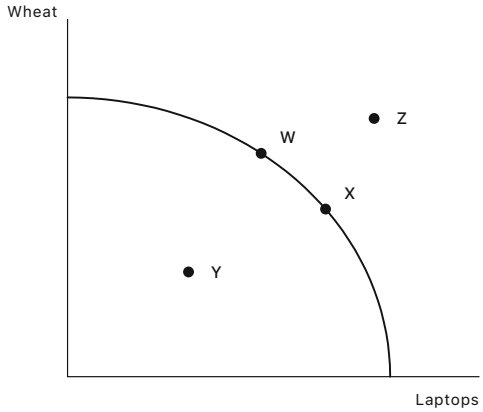
2. Carlos has one free Saturday afternoon. He can work a catering shift that pays $90, tutor for $70, or take a nap he values at $30. Instead he goes to a friend's cookout. What is the opportunity cost of the cookout?

(A) $30 **(B)** $70
(C) $90 **(D)** $190

3. Tidewater Games has spent $40,000 developing a mobile game. Finishing it would cost another $15,000, and the finished game is expected to bring in $22,000 in revenue. If the firm stops now, it earns nothing from the game. What should it do?

(A) Stop, because total costs of $55,000 exceed the $22,000 in revenue.
(B) Finish, because the $22,000 benefit exceeds the $15,000 cost still to come.
(C) Stop, because the $40,000 already spent cannot be recovered.
(D) Finish **only** if revenue is expected to exceed $40,000.

4. The figure shows a country's production possibilities frontier for wheat and laptops. Which statement about the labeled points is correct?



(A) Point Z can be reached today by moving resources from wheat to laptops.
(B) Moving from point W to point X has no opportunity cost.
(C) Point Y is efficient because it includes some of both goods.
(D) Point Y is attainable, but some resources are idle or poorly used.

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