ECON 205 Midterm 1 One-Page Cram Sheet

1) Core Identities

- GDP (spending): `Y = C + I + G + NX`
- Net exports: `NX = X - M`
- Private saving: `Sp = Y - C - T`
- Public saving: `Sg = T - G`
- National saving: `S = Sp + Sg = Y - C - G`
- Open economy identity: `S = I + NX`
- GDP deflator: `Def = (Nominal GDP / Real GDP) * 100`
- Inflation (deflator): `(Def_t - Def_t-1) / Def_t-1`
- Labor force: `LF = E + U`
- Unemployment rate: `u = U / LF`
- LFPR: `LF / Adult pop`
- EPOP: `E / Adult pop`
- Real interest (approx): `r = i - expected inflation`

2) Demand/Supply Rules

- Demand curve: negative price-quantity relationship.
- Supply curve: positive price-quantity relationship.
- Price change alone -> movement along curve.
- Non-price change -> shift of curve.
- Price ceiling below equilibrium -> binding -> shortage.
- Price floor above equilibrium -> binding -> surplus.

3) Elasticity + Revenue

- Midpoint elasticity: `epsilon = [ (Q2-Q1)/((Q1+Q2)/2) ] / [ (P2-P1)/((P1+P2)/2) ]`
- Demand elastic if `|epsilon| > 1`; inelastic if `< 1`.
- Elastic demand: price up -> revenue down.
- Inelastic demand: price up -> revenue up.

4) Real vs Nominal

- Nominal GDP uses current prices.
- Real GDP uses base-year prices.
- Real GDP growth is output growth; nominal growth mixes output and inflation.
- Deflator and CPI can differ: production basket vs consumer basket.

5) Labor Market Concepts

- Unemployed = not working AND actively searching.
- Discouraged workers are out of labor force.

- Natural unemployment mostly frictional + structural.
- Cyclical unemployment rises in recessions.

6) Production and Growth

- Production function: `Y = F(A, K, L)`.
- Labor productivity: `Y/L`.
- Capital productivity: `Y/K`.
- `Y = A*K^0.5*L^0.5`:
  - K doubles (A,L fixed) -> Y x `sqrt(2)` (diminishing marginal return to K)
  - K and L both double -> Y x `2` (constant returns to scale)
- Long-run growth engine: technology (A), supported by R&D + human capital.

7) Top Exam Traps

1. Using population instead of labor force in unemployment rate.
2. Counting transfers as G in GDP.
3. Counting used goods in GDP.
4. Mixing up demand shifts vs movement along demand.
5. Forgetting to use midpoint formula for elasticity.
6. Forgetting NX sign when labeling deficit/surplus.
7. Confusing marginal returns with returns to scale.

8) 10-Minute Final Check

- Can I do one GDP table problem quickly?
- Can I compute deflator + inflation correctly?
- Can I compute LF, u, LFPR, EPOP?
- Can I compute Sp, Sg, S, and NX from `S = I + NX`?
- Can I draw and label a binding price control graph cleanly?
- Can I explain elasticity-revenue link in one sentence?

ECON 205 Midterm 1 - Master Study Tool

Course: USC ECON 205 (Spring 2026)
Instructor: Andres Perez Corsini
Built from: Syllabus + Lectures 01-07 (+ class exercise style)

0) Midterm 1 Scope Snapshot

Based on the posted course outline, Midterm 1 comes after Lectures 01-07 and before Lecture 08 (Money and Inflation).

Core scope: 1. Supply and Demand model 2. Applications: price ceilings/floors, elasticities, revenue 3. Macroeconomic concepts (GDP, growth, fluctuations, unemployment, inflation, interest rates) 4. National accounts (spending, income, value-added approaches) 5. Nominal vs real GDP, growth rates, GDP deflator, inflation measurement 6. Spending shares, saving, investment, interest-rate channels 7. Labor market definitions and measurement 8. Production, productivity, growth, marginal returns, returns to scale, technology

Likely lower priority for Midterm 1: - Detailed monetary/fiscal policy tools from later lectures - Open-economy policy units scheduled after midterm

1) Lecture-by-Lecture High-Yield Map

L01 - Supply and Demand

Must know: - Law of demand: price up -> quantity demanded down - Law of supply: price up -> quantity supplied up - Shift vs movement along curve - Equilibrium, shortage, surplus, self-correction

Demand shifters: - Preferences - Information - Income - Number of consumers - Prices of substitutes/complements

Supply shifters: - Technology - Input prices - Number of firms - Expected future price - Taxes/subsidies/regulation

Exam trap: - Price change alone does not shift demand/supply; it moves along a curve.

L02 - Applications + Elasticity

Price controls: - Binding price ceiling (below equilibrium): shortage - Binding price floor (above equilibrium): surplus - Non-binding controls: no market effect

Midpoint elasticity template: - `epsilon = [ (X2 - X1) / ((X1 + X2)/2) ] / [ (Y2 - Y1) / ((Y1 + Y2)/2) ]`

Core elasticities: - Own-price elasticity of demand: usually negative - Own-price elasticity of supply: usually positive - Income elasticity of demand: normal (>0), inferior (<0)

Revenue relation: - Elastic demand: price up -> revenue down - Inelastic demand: price up -> revenue up - Unit elastic: revenue roughly unchanged

L03 - Macroeconomic Concepts

Definitions: - Real GDP: inflation-adjusted output - Business cycle: peak, recession, trough, recovery/expansion - Unemployment rate: unemployed / labor force - Inflation: sustained rise in price level - Real interest rate: nominal interest - expected inflation

Big conceptual split: - Short run fluctuations: aggregate demand side - Long run growth: production capacity (A, K, L)

L04 - National Accounts

Three equivalent GDP approaches: 1. Spending: `Y = C + I + G + NX` 2. Income: wages + profits + depreciation + taxes +/- adjustments 3. Value-added: sum of value added across production stages

Final vs intermediate goods: - GDP counts final output to avoid double-counting.

Investment subcomponents: - Business fixed - Inventory - Residential

Net exports: - `NX = X - M` - `NX > 0` surplus, `NX < 0` deficit

L05 - Spending Shares, Saving, Investment

Shares: - Consumption share: `C/Y` - Investment share: `I/Y` - Government share: `G/Y` - Net export share: `NX/Y`

Interest-rate channels: - Higher r -> lower current C, lower I, higher saving - Higher domestic r -> currency appreciation -> NX tends to fall

Saving identities: - Private saving: `Sp = Y - C - T` - Public saving: `Sg = T - G` - National saving: `S = Sp + Sg = Y - C - G` - Open economy: `S = I + NX`

L06 - Labor Market

Status categories: - Employed - Unemployed (not working, actively searching) - Not in labor force

Formulas: - Labor force: `LF = E + U` - Unemployment rate: `u = U / LF` - Labor force participation rate: `LFPR = LF / adult population` - Employment-population ratio: `EPOP = E / adult population`

Types of unemployment: - Frictional - Structural - Cyclical - Seasonal

Natural rate: - Mostly frictional + structural

L07 - Production, Productivity, Growth

Production function: - `Y = F(A, K, L)`

Productivity: - Labor productivity: `Y/L` - Capital productivity: `Y/K`

Marginal returns to one input: - Diminishing / constant / increasing

Returns to scale (all inputs move proportionally): - Diminishing / constant / increasing

Role of technology (A): - Long-run growth engine - Policy links: R&D support, innovation incentives, human capital

2) Formula Sheet (Memorize + Use Fast)

1. `Y = C + I + G + NX`
2. `NX = X - M`
3. Nominal GDP growth: `(Nom_t - Nom_t-1) / Nom_t-1`
4. Real GDP growth: `(Real_t - Real_t-1) / Real_t-1`
5. GDP deflator: `(Nominal GDP / Real GDP) * 100`
6. Deflator inflation: `(Def_t - Def_t-1) / Def_t-1`
7. Real interest rate: `r approx i - expected inflation`
8. `LF = E + U`
9. `u = U / LF`
10. `LFPR = LF / adults`
11. `EPOP = E / adults`
12. `Sp = Y - C - T`
13. `Sg = T - G`
14. `S = Sp + Sg = Y - C - G`
15. `S = I + NX`
16. Midpoint demand elasticity: `epsilon_D = [ (Q2-Q1)/((Q1+Q2)/2) ] / [ (P2-P1)/((P1+P2)/2) ]`
17. Annualized growth over n years: `g = (X_t / X_0)^(1/n) - 1`

3) Graphing Toolkit (How to Score Full Points)

When asked to graph: 1. Label axes first (P vertical, Q horizontal). 2. Draw initial `D0`, `S0`, equilibrium `(P0, Q0)`. 3. Shift only relevant curve(s): left = decrease, right = increase. 4. Mark new equilibrium `(P1, Q1)`. 5. Add one sentence: shock -> shift -> outcome.

Price control graphs: - Ceiling: horizontal line below equilibrium, show shortage `QD - QS` - Floor: horizontal line above equilibrium, show surplus `QS - QD`

Two-shock graphs: - Analyze one shift at a time, then combine. - Often price is clear and quantity is ambiguous (or vice versa) depending on shifts.

4) Top 25 Mistakes to Avoid

1. Confusing demand shift with quantity demanded change
2. Counting used goods in GDP
3. Counting financial asset purchases as GDP production
4. Forgetting residential construction is investment
5. Mixing nominal and real growth formulas
6. Forgetting deflator base-year value is 100
7. Using wrong denominator for unemployment rate (must be labor force)
8. Calling discouraged workers unemployed (they are out of labor force)
9. Getting sign wrong on income elasticity for inferior goods
10. Ignoring absolute value when classifying demand elasticity
11. Reversing revenue-elasticity relationship
12. Treating transfers as government purchases in GDP
13. Ignoring NX sign when interpreting trade balance
14. Forgetting `S = I + NX` in open economy
15. Arithmetic mistakes in midpoint formula
16. Forgetting units (millions/billions)
17. Not labeling old vs new equilibrium in graphs
18. Missing ceteris paribus in explanations
19. Confusing marginal returns with returns to scale
20. Claiming one-input increase proves returns to scale
21. Forgetting technology can shift production upward
22. Confusing real and nominal wage
23. Treating cyclical unemployment as natural unemployment
24. Writing policy answers with no transmission channel
25. Leaving final answers unlabeled

5) Worked Examples (Exam-Style)

Example 1: Binding Rent Ceiling

Given equilibrium rent `P*=2000`, ceiling `Pc=1600`, and at ceiling `QD=62`, `QS=42` (thousand): - Binding? Yes (`1600 < 2000`) - Shortage: `62 - 42 = 20` thousand - Likely outcomes: waiting lists, quality decline, side payments

Example 2: Price Elasticity (Midpoint)

Price rises `10 -> 14`, quantity demanded falls `120 -> 80`: `- %DeltaQ = (80-120)/100 = -0.4 - %DeltaP = (14-10)/12 = 0.3333 - epsilon_D = -0.4/0.3333 = -1.20` (elastic)

Example 3: Revenue + Elasticity

If demand is elastic and price rises, revenue falls because quantity drops proportionally more.

Example 4: GDP Spending Approach

Given C=17362.5, I=4625.1, G=4446.3, NX=-972.6: - Y = 17362.5 + 4625.1 + 4446.3 - 972.6 = 25461.3

Example 5: Deflator Inflation

If deflator is 150 in 2019 and 146.15 in 2020: - Inflation = (146.15 - 150)/150 = -2.57% (deflation)

Example 6: Labor Market Metrics

Adults=40, employed=30, unemployed=5: - LF=35 - u=5/35=14.29% - LFPR=35/40=87.5% - EPOP=30/40=75%

Example 7: Saving Identity

Given Y=5000, C=3200, G=1000, T=950, I=900, NX=-100: - Sp=5000-3200-950=850 - Sg=950-1000=-50 - S=800 - I+NX=900-100=800 (identity holds)

Example 8: Production Function

If Y = A*K^0.5*L^0.5, with A,L fixed and K doubles: - Y multiplies by sqrt(2) -> diminishing marginal return to K.

If both K and L double: - Y doubles -> constant returns to scale.

6) Active Recall Prompts (No Notes)

1. Define equilibrium price and quantity.
2. Difference between exogenous and endogenous shocks?
3. Five demand shifters?
4. Five supply shifters?
5. Why does a binding ceiling create shortage?
6. Difference between floor and ceiling?
7. Why use midpoint formula?
8. Revenue effect under elastic demand?
9. Revenue effect under inelastic demand?
10. Define real GDP in one line.
11. Three GDP approaches?
12. Why exclude intermediate goods?
13. What is investment in GDP?
14. Deficit vs surplus?
15. Deflator vs CPI?
16. Formula for real interest rate?
17. Natural unemployment rate definition?
18. Four unemployment types?
19. LFPR formula?

20. EPOP formula?
21. Cyclical vs structural unemployment?
22. All saving formulas?
23. Why does higher r reduce C and I?
24. How can higher domestic r reduce NX?
25. Marginal returns vs returns to scale?

7) 8-Day Sprint Plan (Feb 16 -> Feb 23)

Use this if exam date is Monday, Feb 23, 2026.

Day 1 (Mon Feb 16) - L01 + L02 concepts - 20 elasticity/price-control drills

Day 2 (Tue Feb 17) - L03 macro concepts - 15 concept checks

Day 3 (Wed Feb 18) - L04 national accounts - 2 full GDP calculation blocks

Day 4 (Thu Feb 19) - L05 spending shares + saving identities - 20 mixed numeric questions

Day 5 (Fri Feb 20) - L06 labor market metrics - 20 timed formula drills

Day 6 (Sat Feb 21) - L07 production/productivity/growth - 15 production-function drills

Day 7 (Sun Feb 22) - Full mixed mock (75 min) - Review only mistakes

Day 8 (Mon Feb 23 pre-exam) - Formula sheet + graph checklist - No new topics

8) 30-Minute Pre-Exam Checklist

1. Can you compute midpoint elasticity quickly?
2. Can you explain revenue-elasticity link without notes?
3. Can you do spending-approach GDP in under 2 minutes?
4. Can you convert nominal to real with a base year correctly?
5. Can you compute deflator and inflation correctly?
6. Can you compute LF, u-rate, LFPR, EPOP fast?
7. Can you do saving decomposition and identity check?
8. Can you classify unemployment type from a scenario?
9. Can you distinguish marginal returns vs returns to scale?
10. Can you draw and label a clean market graph in under 90 seconds?

If yes on all 10, you are ready.

ECON 205 Midterm 1 - Active Recall Bank

Use this bank to test yourself cold.
Rule: answer without notes first, then check the key.

Section A - Core Concepts (30 questions)

1. Define quantity demanded.
2. Define quantity supplied.
3. State the law of demand.
4. State the law of supply.
5. Difference between a movement along demand and a shift of demand.
6. Give two examples of demand shifters.
7. Give two examples of supply shifters.
8. Define equilibrium price.
9. Define shortage.
10. Define surplus.
11. Why do markets tend to self-correct from shortage?
12. Why do markets tend to self-correct from surplus?
13. Define a price ceiling.
14. When is a price ceiling binding?
15. Define a price floor.
16. When is a price floor binding?
17. Define own-price elasticity of demand.
18. What does |epsilon_D| $>$ 1 mean?
19. Define own-price elasticity of supply.
20. Define income elasticity of demand.
21. What sign does income elasticity have for normal goods?
22. What sign does income elasticity have for inferior goods?
23. Define real GDP.
24. Define nominal GDP.
25. Name the three approaches to GDP measurement.
26. Why are intermediate goods excluded in GDP?
27. Define net exports.
28. Difference between trade deficit and trade surplus.
29. Define real interest rate.
30. Define natural unemployment rate.

Section B - Formula Recall (20 questions)

31. Write GDP identity (spending approach).
32. Write net exports formula.
33. Write private saving formula.
34. Write public saving formula.
35. Write national saving formula.
36. Write open-economy saving-investment identity.

37. Write unemployment rate formula.
38. Write labor force formula.
39. Write LFPR formula.
40. Write employment-population ratio formula.
41. Write real interest approximation formula.
42. Write GDP deflator formula.
43. Write inflation formula using GDP deflator.
44. Write nominal growth rate formula.
45. Write real growth rate formula.
46. Write midpoint formula for percentage change.
47. Write midpoint elasticity formula for demand.
48. Write annualized growth formula over n years.
49. Write labor productivity formula.
50. Write capital productivity formula.

Section C - Graph/Direction Questions (20 questions)

51. Gasoline price rises sharply. What happens to demand for electric cars?
52. Steel input costs rise. What happens to supply of cars?
53. Government imposes a binding rent ceiling. What happens to shortage/surplus?
54. Government imposes a binding minimum wage. What happens in labor market quantity?
55. Supply shifts left, demand unchanged. Direction of equilibrium price and quantity?
56. Demand shifts right, supply unchanged. Direction of equilibrium price and quantity?
57. Demand and supply both shift right. What is generally ambiguous?
58. Demand shifts right, supply shifts left. What is generally unambiguous?
59. If demand is very elastic, what happens to revenue when price rises?
60. If demand is very inelastic, what happens to revenue when price rises?
61. If real interest rate rises, what happens to current consumption share?
62. If real interest rate rises, what happens to investment share?
63. If domestic interest rate rises, what tends to happen to exchange rate?
64. If domestic currency appreciates, what tends to happen to NX?
65. If more firms enter market, what happens to supply curve?
66. If consumers expect lower future prices, what happens to current demand?
67. If productivity improves, what happens to production function?
68. If K increases with A and L fixed, what happens to output?
69. If all inputs double in constant-returns technology, output changes by what proportion?
70. If only one input increases and each extra unit adds less output, what concept is this?

Section D - Quantitative Drills (20 questions)

71. Price falls 12 to 8, quantity demanded rises 100 to 180. Compute midpoint elasticity.
72. Price rises 5 to 7, quantity demanded falls 400 to 360. Elastic or inelastic?
73. C=1200, I=300, G=400, NX=-50. Compute GDP.
74. Nominal GDP=900, Real GDP=750. Compute GDP deflator.
75. Deflator rises from 110 to 121. Compute inflation rate.
76. Adults=50, E=30, U=5. Compute LF, u-rate, LFPR, EPOP.
77. Y=6000, C=3900, T=1000, G=1200. Compute private, public, national saving.
78. Using #77 and I=700, compute implied NX from S=I+NX.
79. 2025 nominal GDP 1000, 2026 nominal GDP 1100. Nominal growth?
80. 2025 real GDP 900, 2026 real GDP 945. Real growth?
81. i=6%, expected inflation=2%. Real rate?
82. i=4%, expected inflation=5%. Real rate?
83. Exports=450, imports=520. Compute NX and classify trade balance.
84. If $Y=AK^{0.5}L^{0.5}$ and K doubles, by what factor Y changes (A,L fixed)?
85. If $Y=AK^{0.5}L^{0.5}$ and K,L both double, by what factor Y changes?
86. Quantity supplied rises 200 to 260 when price rises 10 to 13. Compute midpoint supply elasticity.
87. Real GDP in 2025=2000 and 2030=2500. Compute total growth.
88. Using #87 over 5 years, compute annualized growth.
89. If 3 million unemployed stop searching, what happens mechanically to unemployment rate?
90. If price floor set below equilibrium price, what is market effect?

Section E - Mini Short Answers (10 questions)

91. In 3-4 lines, explain why binding ceilings can reduce quality.
92. In 3-4 lines, explain why GDP by spending and income may differ slightly in practice.
93. In 3-4 lines, explain why real GDP is usually preferred for growth analysis.
94. In 3-4 lines, explain difference between CPI inflation and GDP deflator inflation.
95. In 3-4 lines, explain cyclical unemployment with one example.
96. In 3-4 lines, explain frictional unemployment with one example.
97. In 3-4 lines, explain structural unemployment with one example.
98. In 3-4 lines, explain diminishing marginal returns.
99. In 3-4 lines, explain constant returns to scale.
100. In 3-4 lines, explain one policy channel through which technology (A) can increase.

ECON 205 Midterm 1 - Active Recall Bank Key

Section A - Core Concepts

1. Quantity demanded: amount consumers are willing and able to buy at a given price over a period.
2. Quantity supplied: amount producers are willing and able to sell at a given price over a period.
3. Law of demand: as price rises, quantity demanded falls (ceteris paribus).
4. Law of supply: as price rises, quantity supplied rises (ceteris paribus).
5. Movement along demand is caused by own-price change; shift is caused by non-price determinants.
6. Any two: income, preferences, prices of substitutes/complements, number of buyers, expectations/information.
7. Any two: input costs, technology, number of sellers, taxes/subsidies, expectations, regulation.
8. Equilibrium price: price at which quantity demanded equals quantity supplied.
9. Shortage: QD $>$ QS at prevailing price.
10. Surplus: QS $>$ QD at prevailing price.
11. Shortage pushes price up, raising QS and reducing QD toward equilibrium.
12. Surplus pushes price down, reducing QS and raising QD toward equilibrium.
13. Price ceiling: legal maximum price.
14. Binding when ceiling is below equilibrium price.
15. Price floor: legal minimum price.
16. Binding when floor is above equilibrium price.
17. Own-price demand elasticity: responsiveness of quantity demanded to own-price changes.
18. |epsilon_D| $>$ 1 means elastic demand.
19. Own-price supply elasticity: responsiveness of quantity supplied to own-price changes.
20. Income elasticity: responsiveness of quantity demanded to income changes.
21. Normal good: positive income elasticity.
22. Inferior good: negative income elasticity.
23. Real GDP: value of final output at constant (base-year) prices.
24. Nominal GDP: value of final output at current prices.
25. Spending, income, and value-added approaches.
26. To avoid double-counting the same production.
27. Net exports = exports minus imports.
28. Deficit: NX $<$ 0, Surplus: NX $>$ 0.
29. Real interest rate: nominal interest rate minus expected inflation.
30. Natural unemployment rate: rate when economy is at potential output (mainly frictional + structural).

Section B - Formula Recall

31. Y = C + I + G + NX
32. NX = X - M
33. Sp = Y - C - T
34. Sg = T - G
35. S = Sp + Sg = Y - C - G
36. S = I + NX
37. u = U / LF
38. LF = E + U
39. LFPR = LF / Adult population
40. EPOP = E / Adult population
41. r approx i - expected inflation
42. GDP deflator = (Nominal GDP / Real GDP) x 100
43. Inflation (deflator) = (Def_t - Def_{t-1})/Def_{t-1}
44. Nominal growth = (Nom_t - Nom_{t-1})/Nom_{t-1}
45. Real growth = (Real_t - Real_{t-1})/Real_{t-1}
46. Midpoint % change in X = (X2-X1)/((X1+X2)/2)
47. Epsilon_D = midpoint % change QD / midpoint % change P
48. g = (X_t / X_0)ˆ(1/n) - 1
49. Labor productivity = Y/L
50. Capital productivity = Y/K

Section C - Graph/Direction

51. Demand for electric cars shifts right.
52. Supply of cars shifts left.
53. Binding ceiling creates shortage.
54. Binding floor in labor market creates excess labor supply (unemployment pressure).
55. Supply left: P up, Q down.
56. Demand right: P up, Q up.
57. Usually price and quantity effects can differ; commonly quantity is ambiguous depending on magnitudes.
58. Price rises unambiguously.
59. Revenue falls.
60. Revenue rises.
61. Current consumption share tends to fall.
62. Investment share tends to fall.
63. Domestic currency tends to appreciate.
64. NX tends to fall (exports down, imports up).
65. Supply shifts right.
66. Current demand tends to fall.
67. Production function shifts up.
68. Output rises.
69. Output rises proportionally (same proportion as inputs).

70. Diminishing marginal returns.

Section D - Quantitative Drills

71. epsilon_D = ((180-100)/140)/((8-12)/10) = 0.5714/(-0.4) = -1.43 (elastic)
72. epsilon_D = ((360-400)/380)/((7-5)/6) = -0.1053/0.3333 = -0.32 (inelastic)
73. Y = 1200 + 300 + 400 - 50 = 1850
74. Deflator = (900/750)*100 = 120
75. Inflation = (121-110)/110 = 10%
76. LF=35, u=5/35=14.29%, LFPR=35/50=70%, EPOP=30/50=60%
77. Sp=6000-3900-1000=1100; Sg=1000-1200=-200; S=900
78. NX = S - I = 900 - 700 = 200
79. Nominal growth = (1100-1000)/1000 = 10%
80. Real growth = (945-900)/900 = 5%
81. r approx 6% - 2% = 4%
82. r approx 4% - 5% = -1%
83. NX = 450 - 520 = -70, trade deficit
84. Y factor = sqrt(2) approx 1.41
85. Y factor = 2
86. epsilon_S = ((260-200)/230)/((13-10)/11.5) = 0.2609/0.2609 = 1.00
87. Total growth = (2500-2000)/2000 = 25%
88. Annualized growth = (2500/2000)^(1/5)-1 = 4.56%
89. Measured unemployment rate usually falls because U and LF decline when job search stops.
90. No effect (non-binding floor).

Section E - Mini Short Answers

91. Binding ceilings keep posted prices low, so excess demand appears. Landlords can ration by waitlists, screening, and maintenance cuts. Non-price competition replaces price.
92. Spending and income data come from different sources and timing. Measurement error/statistical discrepancy causes small differences. Conceptually they should match.
93. Real GDP removes price-level changes, isolating output quantity changes. Nominal GDP mixes output and inflation effects.
94. CPI tracks cost of a fixed consumer basket; GDP deflator tracks prices of domestically produced final goods/services and varies with composition.
95. Cyclical unemployment rises in recessions when aggregate demand falls. Example: layoffs during a broad downturn.
96. Frictional unemployment is short-term search unemployment from normal turnover. Example: new graduate searching for first job.
97. Structural unemployment reflects mismatch in skills/location or technology shift. Example: workers displaced by automation without matching skills.
98. Diminishing marginal returns means adding more of one input (holding others fixed) increases output by smaller increments.

99. Constant returns to scale means increasing all inputs by x% increases output by the same x%.
100. Example policy: R&D tax credits or public research funding. Channel: more innovation and diffusion raises A, shifting production capacity upward.

ECON 205 Principles of Macroeconomics

Midterm 1 Mock Exam A (Timed)

Time limit: 75 minutes
Total points: 100
Allowed: basic calculator only

Coverage: Lectures 01-07

Section I: Multiple Choice (24 points; 2 each)

1. If consumer income rises for a normal good, the demand curve will: A. Shift left
   B. Shift right
   C. Move up along demand
   D. Move down along supply

2. A binding price floor causes: A. Shortage
   B. Surplus
   C. No effect
   D. Lower equilibrium price

3. Which is an example of investment in GDP? A. Buying shares of Apple stock
   B. Buying a used house
   C. A firm buying new machinery
   D. A household buying groceries

4. GDP via spending approach equals: A. C + I + G + T
   B. C + I + G + NX
   C. C + S + T + NX
   D. Wages + profits

5. If nominal GDP grows faster than real GDP, then: A. Output must be falling
   B. Price level likely rose
   C. Imports exceeded exports
   D. Unemployment must be zero

6. The unemployment rate equals: A. Unemployed / population
   B. Unemployed / employed
   C. Unemployed / labor force
   D. Labor force / population

7. Natural unemployment mainly includes: A. Cyclical only
   B. Frictional and structural
   C. Seasonal only
   D. Frictional and cyclical

8. Higher real interest rates tend to: A. Increase current consumption
   B. Decrease current saving
   C. Decrease investment
   D. Increase imports and exports equally

9. If NX is negative, the country has a: A. Trade surplus
   B. Trade deficit
   C. Balanced trade
   D. Capital surplus by definition

10. GDP deflator is: A. Real GDP / nominal GDP
    B. Nominal GDP / real GDP times 100
    C. CPI minus PPI
    D. Growth rate of real GDP

11. In Y = A*K^0.5*L^0.5, doubling both K and L causes output to: A. Double
    B. Rise by less than double
    C. Rise by more than double
    D. Stay fixed

12. Which best describes cyclical unemployment? A. Job loss from seasonal weather patterns
    B. Job search by new graduates
    C. Job loss during recession
    D. Job mismatch from obsolete skills only

Section II: Graphing and Market Analysis (20 points)

13) Urban Rental Market (10 points)

Initial equilibrium: rent P* = 1800, quantity Q* = 40,000 units.
City imposes ceiling Pc = 1500. At Pc: QD = 49,000 and QS = 31,000.

Tasks: 1. Draw and label demand, supply, initial equilibrium, and ceiling. (4) 2. Is policy binding? (1) 3. Compute shortage. (2) 4. Give two likely non-price outcomes. (2) 5. If a housing-construction subsidy shifts supply right, what happens to shortage? (1)

14) Two-Shock Coffee Market (10 points)

Shock 1: Drought raises coffee bean costs.
Shock 2: Popular health study increases demand for coffee.

Tasks: 1. Draw both shifts on one graph. (4) 2. Effect on equilibrium price. (2) 3. Effect on equilibrium quantity (and why). (3) 4. Brief ceteris paribus note. (1)

Section III: Quantitative Problems (40 points)

15) National Accounts and Deflator (16 points)

Economy produces only tablets and gym memberships.

Year	Tablet Price	Tablet Qty	Gym Price	Gym Qty
2025	500	120	50	900
2026	550	132	55	960

Tasks: 1. Compute nominal GDP in 2025 and 2026. (4) 2. Using 2025 as base year, compute real GDP in 2025 and 2026. (4) 3. Compute real GDP growth (2025->2026). (4) 4. Compute GDP deflator in both years and inflation via deflator. (4)

16) Labor Market Metrics (12 points)

Adult population = 200 million
Employed = 124 million
Unemployed = 10 million

Tasks: 1. Compute labor force. (2) 2. Compute unemployment rate. (3) 3. Compute LFPR. (3) 4. Compute employment-population ratio. (2) 5. If 2 million unemployed stop searching, recompute unemployment rate. (2)

17) Saving-Investment and Interest Channels (12 points)

Given: Y = 6200, C = 4100, T = 1100, G = 1300, I = 850

Tasks: 1. Compute private saving, public saving, national saving. (6) 2. Compute NX implied by S = I + NX. (2) 3. State whether the economy runs trade deficit/surplus. (2) 4. In one sentence each, explain effect of higher real interest rate on (i) consumption, (ii) investment. (2)

Section IV: Short Concept Responses (16 points)

18) Elasticity + Revenue (8 points)

A firm raises price by 8% and sees quantity demanded fall by 12%.

Tasks: 1. Approximate demand elasticity. (3) 2. Classify demand as elastic/inelastic. (2) 3. Predict total revenue direction and explain briefly. (3)

19) Production and Growth (8 points)

Suppose output is Y = AK^0.5L^0.5.

Tasks: 1. If K doubles with A and L fixed, by what factor does Y change? (3) 2. What does that imply about marginal returns to capital? (2) 3. Give one policy that can raise A in the long run and explain the channel. (3)

ECON 205 Midterm 1 Mock Exam A - Key

Section I: Multiple Choice

1. B
2. B
3. C
4. B
5. B
6. C
7. B
8. C
9. B
10. B
11. A
12. C

Section II: Graphing and Market Analysis

13) Urban Rental Market

1. Correct graph: downward D, upward S, equilibrium at (1800, 40k), horizontal ceiling at 1500.
2. Binding ($1500 < 1800$).
3. Shortage = QD - QS = 49,000 - 31,000 = 18,000 units.
4. Any two: waitlists, quality decline, side payments/black markets, stronger screening/rationing.
5. Supply right shift reduces shortage (may not fully eliminate it).

14) Two-Shock Coffee Market

1. Supply shifts left (cost shock), demand shifts right (preference shock).
2. Price rises unambiguously.
3. Quantity ambiguous because demand-right raises Q while supply-left lowers Q.
4. Ceteris paribus: analyze each shift separately, then combine.

Section III: Quantitative Problems

15) National Accounts and Deflator

Data: - 2025: Tablet 500x120, Gym 50x900 - 2026: Tablet 550x132, Gym 55x960

1. Nominal GDP

- 2025: 500*120 + 50*900 = 60,000 + 45,000 = 105,000
- 2026: 550*132 + 55*960 = 72,600 + 52,800 = 125,400

2. Real GDP (base 2025 prices)

- Real 2025 = 105,000
- Real 2026 = 500*132 + 50*960 = 66,000 + 48,000 = 114,000

3. Real growth

- (114,000 - 105,000) / 105,000 = 0.0857 = 8.57%

4. Deflator and inflation

- Deflator 2025 = (105,000 / 105,000)*100 = 100.00
- Deflator 2026 = (125,400 / 114,000)*100 = 110.00
- Inflation = (110.00 - 100.00)/100.00 = 10.00%

16) Labor Market Metrics

Given adults 200, employed 124, unemployed 10 (millions).

1. LF = E + U = 124 + 10 = 134 million
2. Unemployment rate = 10/134 = 7.46%
3. LFPR = 134/200 = 67.00%
4. EPOP = 124/200 = 62.00%
5. If 2 million unemployed stop searching:

- New U = 8, new LF = 132
- New unemployment rate = 8/132 = 6.06%

17) Saving-Investment and Interest Channels

Given Y=6200, C=4100, T=1100, G=1300, I=850

1. Savings:

- Private Sp = Y - C - T = 6200 - 4100 - 1100 = 1000
- Public Sg = T - G = 1100 - 1300 = -200
- National S = Sp + Sg = 800

2. NX from S = I + NX:

- NX = S - I = 800 - 850 = -50

3. NX negative means trade deficit.

4. Higher real interest rate:

- Consumption: tends to fall (higher cost of consuming today)
- Investment: tends to fall (higher cost of borrowing)

Section IV: Short Concept Responses

18) Elasticity + Revenue

1. Elasticity approx = -12% / 8% = -1.5
2. Elastic (absolute value > 1)
3. Revenue falls: quantity falls proportionally more than price rises.

19) Production and Growth

For Y = A*K^0.5*L^0.5: 1. If K doubles (A, L fixed), Y multiplies by sqrt(2) approx 1.41. 2. Output rises less than proportionally with K -> diminishing marginal returns to K. 3. Valid policy examples: R&D tax credits, public research funding, stronger education/human capital pipeline; channel is higher innovation/diffusion raising A.

ECON 205 Principles of Macroeconomics

Midterm 1 Mock Exam B (Timed)

Time limit: 75 minutes
Total points: 100
Allowed: basic calculator only

Coverage: Lectures 01-07

Section I: Multiple Choice (24 points; 2 each)

1. A rise in input prices in a competitive market will typically: A. Shift supply right
   B. Shift demand left
   C. Shift supply left
   D. Move along supply

2. A price ceiling set above equilibrium price is: A. Binding and causes shortage
   B. Non-binding and has no effect
   C. Binding and causes surplus
   D. Equivalent to a price floor

3. Which item is counted in government purchases (G)? A. Unemployment benefits
   B. Social security checks
   C. New highway construction
   D. Transfer payment to households

4. Which is true about real GDP? A. Uses current prices only
   B. Includes inflation directly
   C. Uses base-year prices
   D. Excludes investment

5. If GDP deflator increases from 125 to 130, then: A. Deflation occurred
   B. Inflation occurred
   C. Real GDP fell for sure
   D. NX must be negative

6. Labor force equals: A. Employed + adults not working
   B. Employed + unemployed searching
   C. Employed + discouraged workers only
   D. Population - children

7. Structural unemployment is best described as: A. Temporary job search between jobs
   B. Recession-driven layoffs only
   C. Skill mismatch from changing demand
   D. Seasonal holiday hiring patterns

8. If domestic real interest rate rises, domestic currency tends to: A. Depreciate
   B. Appreciate
   C. Stay fixed
   D. Become irrelevant for NX

9. In open economy accounting: A. S = I
   B. S = C + I + G
   C. S = I + NX
   D. S = Y + T

10. Income elasticity less than zero implies: A. Normal good
    B. Inferior good
    C. Luxury good
    D. Unit elastic good

11. In Y = AKˆ*0.5*Lˆ0.5, doubling K only implies Y rises by: A. 2x
    B. 1.5x
    C. sqrt(2)x
    D. unchanged

12. Which unemployment type rises most in recessions? A. Cyclical
    B. Frictional
    C. Structural
    D. Seasonal

Section II: Graphing and Market Analysis (20 points)

13) City Bus Fares (10 points)

Equilibrium fare P* = 3.00, rides Q* = 2,000,000.
Government sets price ceiling Pc = 2.20. At Pc: QD = 2,400,000 and QS = 1,700,000.

Tasks: 1. Draw and label graph. (4) 2. Binding or non-binding? (1) 3. Compute shortage. (2) 4. Give two non-price outcomes. (2) 5. If subsidy to bus operators shifts supply right, what happens to shortage? (1)

14) Avocado Market Two-Shock (10 points)

Shock 1: fertilizer costs rise.
Shock 2: nutrition campaign increases demand.

Tasks: 1. Show both shifts on one graph. (4) 2. Effect on equilibrium price. (2) 3. Effect on quantity and why ambiguity may arise. (3) 4. One-sentence ceteris paribus note. (1)

Section III: Quantitative Problems (40 points)

15) National Accounts and Deflator (16 points)

Economy produces only software subscriptions and bicycles.

Year	Software Price	Software Qty	Bicycle Price	Bicycle Qty
2025	200	500	800	90
2026	220	560	860	96

Tasks: 1. Compute nominal GDP in 2025 and 2026. (4) 2. Using 2025 as base year, compute real GDP in 2025 and 2026. (4) 3. Compute real GDP growth. (4) 4. Compute GDP deflator in both years and inflation via deflator. (4)

16) Labor Market Metrics (12 points)

Adult population = 180 million
Employed = 111 million
Unemployed = 9 million

Tasks: 1. Labor force. (2) 2. Unemployment rate. (3) 3. LFPR. (3) 4. EPOP. (2) 5. If 3 million unemployed stop searching, recompute unemployment rate. (2)

17) Saving, NX, and Interpretation (12 points)

Given: Y = 5400, C = 3500, T = 900, G = 1000, I = 950

Tasks: 1. Compute Sp, Sg, S. (6) 2. Compute NX from identity. (2) 3. Trade deficit or surplus? (2) 4. Explain in one sentence each what higher real interest does to (i) C, (ii) I. (2)

Section IV: Short Concept Responses (16 points)

18) Elasticity + Revenue (8 points)

Price falls by 6%, quantity demanded rises by 9%.

Tasks: 1. Approximate demand elasticity. (3) 2. Classify elastic/inelastic. (2) 3. Predict revenue direction and explain. (3)

19) Production and Returns (8 points)

Given Y = AK^0.5L^0.5:

Tasks: 1. If both K and L double, by what factor does Y change? (3) 2. What does this imply about returns to scale? (2) 3. Give one policy channel that raises A over time. (3)

ECON 205 Midterm 1 Mock Exam B - Key

Section I: Multiple Choice

1. C
2. B
3. C
4. C
5. B
6. B
7. C
8. B
9. C
10. B
11. C
12. A

Section II: Graphing and Market Analysis

13) City Bus Fares

1. Correct graph with P=*3.00,* Q=2,000,000 and ceiling at 2.20.
2. Binding (2.20 < 3.00).
3. Shortage = 2,400,000 - 1,700,000 = 700,000 rides.
4. Any two: rationing, crowding/queues, reduced service quality, side payments.
5. Rightward supply shift reduces shortage.

14) Avocado Market Two-Shock

1. Supply left (cost up), demand right (preference up).
2. Price rises.
3. Quantity ambiguous due to opposing effects on Q.
4. Ceteris paribus: isolate each shock before combining.

Section III: Quantitative Problems

15) National Accounts and Deflator

Data: - 2025: software 200x500, bicycles 800x90 - 2026: software 220x560, bicycles 860x96

1. Nominal GDP

- 2025: 200*500 + 800*90 = 100,000 + 72,000 = 172,000
- 2026: 220*560 + 860*96 = 123,200 + 82,560 = 205,760

2. Real GDP (base 2025)

- Real 2025 = 172,000
- Real 2026 = 200*560 + 800*96 = 112,000 + 76,800 = 188,800

3. Real growth

- (188,800 - 172,000)/172,000 = 9.77%

4. Deflator and inflation

- Deflator 2025 = 100.00
- Deflator 2026 = (205,760 / 188,800)*100 = 109.00
- Inflation = 9.00%

16) Labor Market Metrics

Given adults 180, E=111, U=9 (millions):

1. LF = 120
2. u = 9/120 = 7.50%
3. LFPR = 120/180 = 66.67%
4. EPOP = 111/180 = 61.67%
5. If 3 million unemployed stop searching:

- U=6, LF=117
- New u = 6/117 = 5.13%

17) Saving, NX, and Interpretation

Given Y=5400, C=3500, T=900, G=1000, I=950

1. Savings:

- Sp = 5400 - 3500 - 900 = 1000
- Sg = 900 - 1000 = -100
- S = 900

2. NX = S - I = 900 - 950 = -50

3. Trade deficit (NX $<$ 0)

4. Higher real interest:

- C tends to decrease
- I tends to decrease

Section IV: Short Concept Responses

18) Elasticity + Revenue

1. Elasticity approx = 9% / -6% = -1.5
2. Elastic
3. With price down and elastic demand, total revenue increases.

19) Production and Returns

1. If K and L both double, Y doubles.
2. Constant returns to scale.
3. Valid channels: R&D support, education/human capital, innovation incentives; all can raise A over time.

ECON 205 Principles of Macroeconomics

Midterm 1 Mock Exam C (Timed)

Time limit: 75 minutes
Total points: 100
Allowed: basic calculator only

Coverage: Lectures 01-07

Section I: Multiple Choice (24 points; 2 each)

1. A decrease in number of firms in a market tends to: A. Shift demand left
   B. Shift supply left
   C. Shift demand right
   D. Move along supply

2. A binding price ceiling generates: A. Surplus
   B. No effect
   C. Shortage
   D. Inflation

3. Which is NOT part of GDP under spending approach? A. Consumption
   B. Investment
   C. Net exports
   D. Transfer payments

4. Real GDP growth measures growth in: A. Prices only
   B. Quantity of output
   C. Tax revenue only
   D. Labor force only

5. If exports are 900 and imports are 980, NX is: A. +80
   B. -80
   C. +1880
   D. -1880

6. A person is unemployed if the person is: A. Not working and not searching
   B. Working part-time involuntarily only
   C. Not working and actively searching
   D. Retired and not working

7. Frictional unemployment is associated with: A. Recessions only
   B. Normal job transitions
   C. Skill obsolescence only
   D. Seasonal weather only

8. If real interest rises, all else equal, current consumption tends to: A. Rise
   B. Fall

C. Stay unchanged
D. Equal investment

9. Public saving is defined as: A. Y - C - T
B. T - G
C. Y - C - G
D. I - NX

10. GDP deflator inflation can differ from CPI inflation because: A. CPI uses domestic output basket only
B. Deflator and CPI always use same basket
C. Deflator uses production basket; CPI uses consumer basket
D. CPI excludes all services

11. In Y = A$K\hat{}0.5$L^0.5, doubling K with A,L fixed means: A. Y doubles
B. Y rises by sqrt(2)
C. Y falls
D. Y unchanged

12. Natural unemployment rate is unemployment when: A. Output is below potential only
B. Economy has no frictional unemployment
C. Economy is at potential output (no cyclical gap)
D. Inflation is zero

Section II: Graphing and Market Analysis (20 points)

13) Electricity Price Cap (10 points)

Initial equilibrium: P* = 0.20 per kWh, Q* = 500 million kWh.
Government sets ceiling Pc = 0.15. At Pc: QD = 560, QS = 430 (millions).

Tasks: 1. Draw graph with all labels. (4) 2. Binding or non-binding? (1) 3. Compute shortage. (2) 4. Two non-price consequences. (2) 5. Effect of supply subsidy on shortage. (1)

14) Wheat Market Two-Shock (10 points)

Shock 1: Fuel costs rise for farmers.
Shock 2: Population growth raises wheat demand.

Tasks: 1. Draw both shifts. (4) 2. Equilibrium price effect. (2) 3. Quantity effect and ambiguity explanation. (3) 4. One-sentence ceteris paribus note. (1)

Section III: Quantitative Problems (40 points)

15) National Accounts and Deflator (16 points)

Economy has streaming services and furniture.

Year	Streaming Price	Streaming Qty	Furniture Price	Furniture Qty
2025	100	1500	400	220
2026	110	1620	440	236

Tasks: 1. Nominal GDP in both years. (4) 2. Real GDP in both years (2025 base). (4) 3. Real GDP growth. (4) 4. Deflator in both years and inflation via deflator. (4)

16) Labor Market Metrics (12 points)

Adult population = 220 million
Employed = 136 million
Unemployed = 12 million

Tasks: 1. Labor force. (2) 2. Unemployment rate. (3) 3. LFPR. (3) 4. EPOP. (2) 5. If 4 million unemployed stop searching, recompute unemployment rate. (2)

17) Saving and NX (12 points)

Given: Y = 7000, C = 4700, T = 1200, G = 1500, I = 980

Tasks: 1. Compute Sp, Sg, S. (6) 2. Compute NX from S = I + NX. (2) 3. Trade surplus or deficit? (2) 4. Explain effect of higher r on (i) C and (ii) I. (2)

Section IV: Short Concept Responses (16 points)

18) Elasticity + Revenue (8 points)

Price increases by 5%, quantity demanded decreases by 2%.

Tasks: 1. Approximate demand elasticity. (3) 2. Elastic or inelastic? (2) 3. Revenue direction and explanation. (3)

19) Production, Returns, and Policy (8 points)

Given Y = AKˆ*0.5*Lˆ0.5:

Tasks: 1. If K and L both double, output changes by what factor? (3) 2. Name the returns-to-scale type. (2) 3. Give one policy to raise A and explain mechanism. (3)

ECON 205 Midterm 1 Mock Exam C - Key

Section I: Multiple Choice

1. B
2. C
3. D
4. B
5. B
6. C
7. B
8. B
9. B
10. C
11. B
12. C

Section II: Graphing and Market Analysis

13) Electricity Price Cap

1. Correct graph with P$=0.20$, Q=500, ceiling at 0.15.
2. Binding ($0.15 < 0.20$).
3. Shortage = 560 - 430 = 130 million kWh.
4. Any two: brownouts/rationing, waiting/priority queues, lower service quality, informal side contracts.
5. Supply subsidy (right shift) reduces shortage.

14) Wheat Market Two-Shock

1. Supply left (higher costs), demand right (population growth).
2. Price rises.
3. Quantity ambiguous due to opposing effects on Q.
4. Ceteris paribus: isolate each shock separately before combining results.

Section III: Quantitative Problems

15) National Accounts and Deflator

Data: - 2025: streaming 100x1500, furniture 400x220 - 2026: streaming 110x1620, furniture 440x236

1. Nominal GDP

- 2025: 100*1500 + 400*220 = 150,000 + 88,000 = 238,000
- 2026: 110*1620 + 440*236 = 178,200 + 103,840 = 282,040

2. Real GDP (base 2025)

- Real 2025 = 238,000
- Real 2026 = 100*1620 + 400*236 = 162,000 + 94,400 = 256,400

3. Real growth

- (256,400 - 238,000)/238,000 = 7.73%

4. Deflator and inflation

- Deflator 2025 = 100.00
- Deflator 2026 = (282,040 / 256,400)*100 = 110.00
- Inflation = 10.00%

16) Labor Market Metrics

Given adults 220, E=136, U=12 (millions)

1. LF = 148
2. u = 12/148 = 8.11%
3. LFPR = 148/220 = 67.27%
4. EPOP = 136/220 = 61.82%
5. If 4 million unemployed stop searching:

- U=8, LF=144
- New u = 8/144 = 5.56%

17) Saving and NX

Given Y=7000, C=4700, T=1200, G=1500, I=980

1. Savings:

- Sp = 7000 - 4700 - 1200 = 1100
- Sg = 1200 - 1500 = -300
- S = 800

2. NX = S - I = 800 - 980 = -180

3. Trade deficit (NX < 0)

4. Higher r:

- C tends to fall
- I tends to fall

Section IV: Short Concept Responses

18) Elasticity + Revenue

1. Elasticity approx = -2% / 5% = -0.40
2. Inelastic (absolute value < 1)
3. Revenue rises when price rises under inelastic demand.

19) Production, Returns, and Policy

1. If K and L both double, Y doubles.
2. Constant returns to scale.
3. Valid policies: R&D support, education/human capital, innovation incentives, technology diffusion policy; mechanism is higher productivity parameter A.