

AP Microeconomics – Unit 1 Progress Check FRQ

Answer Key with Student Explanations

QUESTION 1 – Comparative Advantage & Trade

1. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to “Calculate,” you must show how you arrived at your final answer.

Two countries, Marland and Teckana, can produce either clothing or food using all their available resources at constant opportunity cost. The table below shows the daily production of clothing or food in Marland and Teckana.

	Clothing	Food
Marland	120	20
Teckana	80	20

- (a) Which country has the absolute advantage in producing food? Explain.
- (b) Which country has the comparative advantage in producing food? Explain using numbers.
- (c) Assume the two countries specialize based on their comparative advantage. If the two countries engage in trade and one unit of food is exchanged for 5 units of clothing, will these terms of trade be mutually beneficial? Explain.
- (d) Suppose Teckana invented new equipment to only increase the production of clothing.
- (i) Draw a correctly labeled graph of Teckana’s initial production possibilities curve, with clothing on the horizontal axis and food on the vertical axis. Plot the numerical values above on the graph.
- (ii) Show the effect of the new equipment on Teckana’s production possibilities curve.
- Respond to all parts of the question.

Reference Table:

	Clothing	Food
Marland	120	20
Teckana	80	20

Part (a) – Absolute Advantage in Food

Answer: Neither country has an absolute advantage in producing food.

💡 What is absolute advantage?

A country has an absolute advantage when it can produce MORE of a good using the same resources.

Both Marland and Teckana can produce exactly 20 units of food per day when all resources are dedicated to food. Since they produce the same amount,

NEITHER country has an absolute advantage in food.

(Marland does have an absolute advantage in clothing: $120 > 80$.)

Part (b) – Comparative Advantage in Food

Answer: Teckana has the comparative advantage in producing food.

💡 What is comparative advantage?

A country has a comparative advantage when it can produce a good at a LOWER OPPORTUNITY COST.

Calculate the opportunity cost of 1 unit of food for each country:

- Marland: Giving up 120 clothing to get 20 food
→ 1 food costs $120 \div 20 = 6$ units of clothing
- Teckana: Giving up 80 clothing to get 20 food
→ 1 food costs $80 \div 20 = 4$ units of clothing

Teckana sacrifices only 4 units of clothing per food, while Marland sacrifices 6.
Teckana has the lower opportunity cost → Teckana has the comparative advantage in food.

(By extension, Marland has the comparative advantage in clothing:
1 clothing costs Marland $1/6$ food vs. Teckana $1/4$ food. Marland is cheaper.)

Part (c) – Are Terms of Trade (1 food = 5 clothing) Mutually Beneficial?

Answer: YES – the terms of trade are mutually beneficial for both countries.

💡 How to check if terms of trade work for both sides:

The trade price must fall BETWEEN the two countries' opportunity costs.

- Teckana's opportunity cost of food = 4 clothing per food
- Marland's opportunity cost of food = 6 clothing per food

The terms of trade = 1 food for 5 clothing.

Is $4 < 5 < 6$? YES! ✓

Why does this help BOTH countries?

- Teckana (specializes in food): Normally gets only 4 clothing for 1 food.
With trade, gets 5 clothing for 1 food. Gains 1 extra unit of clothing. ✓
- Marland (specializes in clothing): Normally must give up 6 clothing for 1 food.

With trade, only gives up 5 clothing for 1 food. Saves 1 unit of clothing. ✓

Both countries are better off → trade is mutually beneficial.

Part (d) – Teckana's Production Possibilities Curve (PPC)

Part (d)(i) – Initial PPC

The initial PPC is a straight line (constant opportunity cost) connecting:

- (0 clothing, 20 food) — if all resources go to food
- (80 clothing, 0 food) — if all resources go to clothing

💡 How to draw the initial PPC:

- Horizontal axis: Clothing (0 to 80)
- Vertical axis: Food (0 to 20)
- Plot point A at (0, 20) on the food axis
- Plot point B at (80, 0) on the clothing axis
- Draw a straight line connecting A and B
- Label the line "PPC₁" or "Initial PPC"
- The line is straight because opportunity cost is constant.

Part (d)(ii) – Effect of New Equipment on PPC

The new equipment only increases clothing production. Therefore:

- The food intercept STAYS at 20 (new equipment does not help food)
- The clothing intercept SHIFTS OUTWARD (beyond 80) on the horizontal axis
- The new PPC rotates outward from the food intercept, pivoting on (0, 20)

💡 Why does the PPC rotate (not shift out equally)?

The new technology only improves clothing production, NOT food production.
So if Teckana puts ALL resources into food, they still only get 20 units
(the food intercept is unchanged).

But if they put all resources into clothing, they can now produce MORE than 80 units (the clothing intercept increases).

The result: the PPC rotates clockwise — it pivots at the food intercept (0, 20) and swings outward along the clothing axis.

Draw the new PPC₂ as a straight line from (0, 20) to (>80, 0),
with the new clothing intercept farther right than 80.

QUESTION 2 – Marginal Utility & Consumer Choice

2. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to “Calculate,” you must show how you arrived at your final answer.

The table below shows the marginal utilities in utils that Sarah derives from consuming two goods, snacks, and movies.

Quantity of Snacks	Marginal Utility of Snacks	Quantity of Movies	Marginal Utility of Movies
0	-	0	-
1	20	1	50
2	18	2	35
3	15	3	24
4	12	4	20
5	10	5	15
6	8	6	10

Sarah has a limited weekly income of 50, and she spends it all on snacks and movies. Assume the price of snacks is \$5 per unit, the price of a movie ticket is \$10, and Sarah is a utility-maximizing consumer.

- Would Sarah be able to consume 3 snacks and 5 movies? Explain using numbers.
 - How many snacks and movies will Sarah consume to maximize her utility? Explain using marginal analysis.
 - Calculate the total utility Sarah will receive from consuming the utility-maximizing combination of snacks and movies indicated in your answer in part (b). Show your work.
 - Suppose Sarah’s income increases to \$60.
 - What will happen to the marginal utility per dollar spent on movies?
 - Will Sarah be better off buying two more snacks or one more movie ticket? Explain using numbers.
- Respond to all parts of the question.

Key Information: Income = \$50 | Price of Snacks = \$5 | Price of Movies = \$10

Marginal Utility per Dollar (MU/Price) — Key for Solving:

Qty Snacks	MU Snacks	MU/\$ Snacks (÷\$5)	Qty Movies	MU Movies	MU/\$ Movies (÷\$10)
1	20	4.0	1	50	5.0
2	18	3.6	2	35	3.5
3	15	3.0	3	24	2.4
4	12	2.4	4	20	2.0
5	10	2.0	5	15	1.5
6	8	1.6	6	10	1.0

Part (a) – Can Sarah Consume 3 Snacks and 5 Movies?

Answer: No, Sarah cannot afford 3 snacks and 5 movies.

💡 Check the total cost against Sarah's income:

3 snacks $\times$ \$5 each = \$15

5 movies $\times$ \$10 each = \$50

Total cost = \$65

$\$65 > \50 (Sarah's income)

Sarah would need \$65 but only has \$50, so this combination is NOT affordable.

Part (b) – Utility-Maximizing Combination

Answer: Sarah should consume 4 snacks and 3 movies to maximize utility.

💡 The Utility-Maximizing Rule (Marginal Analysis):

Spend each dollar where you get the MOST utility per dollar.

Keep buying until MU/Price is equal for both goods (and budget is spent).

Rank each unit by MU/\$ and buy in order:

Step 1: 1st movie: $MU/\$ = 5.0 \rightarrow$ spend \$10 $\rightarrow$ \$40 left

Step 2: 1st snack: $MU/\$ = 4.0 \rightarrow$ spend \$5 $\rightarrow$ \$35 left

Step 3: 2nd snack: $MU/\$ = 3.6 \rightarrow$ spend \$5 $\rightarrow$ \$30 left

Step 4: 2nd movie: $MU/\$ = 3.5 \rightarrow$ spend \$10 $\rightarrow$ \$20 left

Step 5: 3rd snack: $MU/\$ = 3.0 \rightarrow$ spend \$5 $\rightarrow$ \$15 left

Step 6: Tie! 3rd movie: $MU/\$ = 2.4$ (\$10) AND 4th snack: $MU/\$ = 2.4$ (\$5)

Buy the 3rd movie (\$10) $\rightarrow$ \$5 left, then 4th snack (\$5) $\rightarrow$ \$0 left

Final combination: 4 snacks + 3 movies

Budget check: $4 \times \$5 + 3 \times \$10 = \$20 + \$30 = \$50 \checkmark$

Optimality check: $MU/\$$ for 4th snack $= 12/5 = 2.4$

$MU/\$$ for 3rd movie $= 24/10 = 2.4 \checkmark$ Equal!

Part (c) – Total Utility from 4 Snacks and 3 Movies

Answer: Sarah's total utility = 174 utils.

💡 Add up the marginal utilities for each unit consumed:

Snacks (MU for each unit):

1st snack: 20

2nd snack: 18
3rd snack: 15
4th snack: 12
Total snack utility = $20 + 18 + 15 + 12 = 65$ utils

Movies (MU for each unit):
1st movie: 50
2nd movie: 35
3rd movie: 24
Total movie utility = $50 + 35 + 24 = 109$ utils

Total Utility = $65 + 109 = 174$ utils

Part (d) – Sarah's Income Increases to \$60

Part (d)(i) – What Happens to Marginal Utility per Dollar Spent on Movies?

Answer: The marginal utility per dollar spent on movies does NOT change.

💡 Why does MU/\$ stay the same?

MU per dollar = Marginal Utility $\div$ Price

The marginal utility of movies comes from how much Sarah enjoys them — that does NOT change just because her income went up.

The price of movies is still \$10 — that also has NOT changed.

Since neither MU nor Price changed, MU/\$ for movies is unchanged.
(Income changes WHAT Sarah can buy, not HOW MUCH she enjoys each unit.)

Part (d)(ii) – Should Sarah Buy 2 More Snacks or 1 More Movie?

Answer: Sarah should buy 1 more movie ticket (4th movie) — it gives more additional utility.

💡 Compare the additional utility from each option:

Sarah currently has 4 snacks and 3 movies (the old optimum).
Her income rose by \$10 (from \$50 to \$60), so she can buy \$10 more.

Option A — Buy 2 more snacks (5th and 6th snack, \$5 each = \$10 total):

5th snack MU = 10

6th snack MU = 8

Additional utility = $10 + 8 = 18$ utils

Option B — Buy 1 more movie ticket (4th movie, \$10):

4th movie MU = 20

Additional utility = 20 utils

20 utils (movie) > 18 utils (2 snacks)

Sarah is better off buying 1 more movie ticket.

She gains 20 utils instead of just 18 utils for the same \$10 spent.