Problem Set 1

Due at 11:59 PM (Eastern Time) on Sunday, May 29, 2022.

Please answer this problem set on Carmen quizzes "Problem Set 1". In the following problems, the part that is in **red and bold** are the order of questions that should be answered on Carmen quizzes.

Problem 1.
Credit: Sungmin Park
Consider the following list of all final goods produced in an economy during years 2018-2020.

	2018		2019		2020	
Good	Quantity	Price	Quantity	Price	Quantity	Price
Apples	100	$1.00	120	$2.00	150	$2.50
Bananas	100	$0.50	150	$0.75	200	$1.00
Cupcakes	50	$2.00	100	$2.50	150	$3.00

(a) Compute this economy's nominal gross domestic product (GDP) and the real GDP in each year, using 2018 as the base year.
Q1: Nominal GDP in 2018 is ____
Q2: Real GDP in 2018 is ____
Q3: Nominal GDP in 2019 is ____
Q4: Real GDP in 2019 is ____
Q5: Nominal GDP in 2020 is ____
Q6: Real GDP in 2020 is ____

(b) Continuing to using 2018 as the base year, what is the GDP deflator in 2019 and 2020? What is the Consumer Price Index (CPI) in 2019 and 2020?
After calculating the CPI, the inflation formula is:
$$\text{Inflation} = \% \text{ change in } CPI_t = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100$$
What are the inflation rates in 2019 and 2020 based on the CPI?
Q7: GDP deflator in 2019 is ____
Q8: GDP deflator in 2020 is ____
Q9: CPI in 2019 is ____

Q10: CPI in 2020 is ____
Q11: Inflation rate in 2019 is ____%
Q12: Inflation rate in 2020 is ____%

(c) Now consider that in year 2021, the COVID shock is impacting the US economy and causing the price level to fluctuate:

	2021	
Good	Quantity	Price
Apples	150	$3.00
Bananas	200	$5.60
Cupcakes	150	$7.00

What is the CPI and inflation rate in 2021 using 2018 as base year?
Q13: CPI in 2021 is ____
Q14: Inflation rate in 2021 is ____%

(d) Comparing Inflation in 2021 and 2020. Is 2021 experiencing an inflation or deflation?
Q15: 2021 experiences ____

Problem 2.
Credit: Sungmin Park
Let u denote the unemployment rate of an economy. Let e denote the fraction of adult population that is employed. What is the labor-force participation rate written in terms of u and e?
[**Hint**: Write $u = \frac{U}{E+U}$ and $e = \frac{E}{E+U+N}$, where E denotes the number of the employed, U denotes the number of the unemployed, and N denotes the number of those out of the labor force. Then solve for $\frac{E+U}{E+U+N}$ in terms of u and e.]
Q16: labor-force participation rate written in terms of u and e is ____
[Note: do NOT type any space in your answer. Using "/" and "()" to represent the fraction and numerator/denominator with multiple terms. For example, if you want to write $\frac{e}{1-u}$, then you should type "e/(1-u)".]

Problem 3. (Computer Exercise):

Credit: Mike Carter

One of the most important measurements of economic output is Gross Domestic Product. This question asks you to find information about GDP for a few selected time periods to get you some practice using official data. The data we will use is accessible at http://FRED.StLouisFed.org .

- To get to *Real GDP*, click "**CATEGORY**" > "**NATIONAL ACCOUNTS**" > "**NATIONAL INCOME & PRODUCT ACCOUNTS**" > "**GDP/GNP**", then find the data series labeled "**Billions of Chained 2012 Dollars, Not Seasonally Adjusted**".

    - I think it's easier to view this data in table form. To do that, click the link halfway down the page to "**Table 1.1.6 Real Gross Domestic Product, Chained Dollars: Annual**".

    - Be sure you've selected "chained dollars" to get real GDP

    - Also be sure you've selected "annual" so you can see GDP for the whole year

- For *nominal GDP*, click "**CATEGORY**" > "**NATIONAL ACCOUNTS**" > "**NATIONAL INCOME & PRODUCT ACCOUNTS**" > "**GDP/GNP**", then find the data series labeled "**Billions of Dollars, Annual, Not Seasonally Adjusted**".

    - Again, I think this data is easier to use in table form. To find that, click the link halfway down the page to "**Table 1.1.5 Gross Domestic Product: Annual**"

    - For nominal GDP, make sure you don't see "real" or "chained" labels

    - Also be sure to select "annual" to find GDP for the whole year

- To find *population* data, click "**CATEGORY**" > "**POPULATION, EMPLOYMENT, & LABOR MARKETS**" > "**POPULATION**". The annual population should be toward the top of the list on that page.

    - Unfortunately this series doesn't have a nice table linked at the bottom of the page. But you can click the "DOWNLOAD" button near the top of the page to see values for every year.

fill in the table below.

Be sure to pay careful **attention to units** (dollars, thousands of people, millions of dollars, etc) when you type your answer on Carmen.

Be sure to **NOT include comma every three digits**. Carmen only compare exact text typed, so extra comma might cause some troubles.

You will have to calculate the last three rows of the table using the formulas that are provided.

	2019	1989	1956
Nominal GDP	Q17 (million)	Q18 (million)	Q19 (million)
Real GDP	Q20 (million)	Q21 (million)	Q22 (million)
Population	Q23	Q24	Q25
Nominal GDP per capita	Q26	Q27	Q28
Real GDP per capita	Q29	Q30	Q31
Implied Deflator (Nominal GDP per capita / Real GDP per capita * 100)	Q32 (round to second decimal point)	Q33 (round to second decimal point)	Q34 (round to second decimal point)