

# EC 103–002

## Problem Set 1

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**Prof. Santetti**

Fall 2022

**INSTRUCTIONS:** This problem set covers the course content from the first three weeks.

Except for the *Hands-on* section, your answers must be **handwritten**, scanned (you may use a phone app such as *CamScanner*), and submitted in a single PDF file with your *first name* (mine would be `marcio.pdf`). You can convert images to PDF format [here](#). Also, you can merge different PDF files [here](#).

For the *Hands-on* section, you will submit a single R script (that is, a `.R` file) with your *first name* (mine would be `marcio.R`). In case your script and PDF files are submitted with different file names, you will lose 2 points.

Your R script should only contain the necessary R commands and brief comments about your results. (Do not forget the `#` symbol! Also, if your answers do not contain any comments, you will lose 1 point per answer.) In case you play around with different functions and make other annotations about the questions, leave them in a script for your own use. For grading purposes, I am only interested in the code and comments that will answer the questions.

On `theSpring`, you can find a module called `Templates`, where you can download a template R script to write your code and comments. Please consider using it.

Submit your 2 files via `theSpring`. In case you experience any issues, email them to `msantetti@skidmore.edu`.

**Assignment due October 10 (M), before class.**

**Points Possible: 40**

- You have 2 weeks to complete this assignment. In accordance with our [course syllabus](#), no late submissions will be accepted.
- Be honest. Don't cheat.
- As a Skidmore student, always recall your votes of academic integrity, and the **Honor Code** you have abided by:

*"I hereby accept membership in the Skidmore College community and, with full realization of the responsibilities inherent in membership, do agree to adhere to honesty and integrity in all relationships, to be considerate of the rights of others, and to abide by the college regulations."*

**Have fun!**

## Reflection

After carefully reading [section 6.5 of OpenStax](#)—one of Week 3's required readings—reflect over some comparisons between the Gross Domestic Product (GDP) and a country's overall welfare.

For instance, if crime levels go down in a country over a year, the whole society is better off. However, this is not included in the computation of GDP. Based on this reading, *(i)* comment on the main limitations of GDP as a measure of living standards, and *(ii)* in your opinion, what should an "ideal" measure of well-being account for?

Your answer should not go beyond 1 page. (10 points)

## Concepts Review

**[True/False]** : For the following 10 parts, evaluate whether the sentences are true or false. If false, give a brief explanation of why the sentence is incorrect.

- (a) The three institutions that, together, define capitalism are: private property, markets, and firms. (1 point)
- (b) While Gross National Product (GNP) takes into account only what a country produces within its borders, Gross Domestic Product (GDP) considers what the country's citizens may also produce abroad. (1 point)
- (c) Real GDP measures may be misleading, since these do not take the rate of inflation into account. (1 point)
- (d) If a consumer buys oats for their own consumption, this purchase will not be counted for GDP purposes, since oats are an ingredient of their daily oatmeal breakfast. (1 point)
- (e) Comparison of GDP measures among different countries is possible if one uses a "common currency." (1 point)
- (f) Looking at **official data**, Japan has oscillated between periods of trade deficits and surpluses. (1 point)
- (g) Periods of ups and downs experienced by a national economy are known as recessions. (1 point)
- (h) Construction of federal highways are accounted in GDP as government expenditures. (1 point)
- (i) If Skidmore constructs a new building for the Economics Department, it will appear in GDP accounting as residential investment. (1 point)
- (j) An economy that strongly depends on trade surpluses with the United States will benefit from 1 unit of its local currency buying less than 1 US dollar. (1 point)

**[GDP accounting]** Consider the following economic data for country YYZ for a given year:

Category	Value (\$ millions)
Nondurable goods	500.00
Residential investment	150.70
Structures	275.60
Public healthcare	400.00
Imports	380.00
Services	560.80
Exports	420.00
Drug trafficking	15.45

- (a) Calculate aggregate consumption and investment for this economy. Show your calculations. (4 points)
- (b) Calculate aggregate government expenditures and the trade balance for this economy. Show your calculations. (4 points)
- (c) What is YYZ's Gross Domestic Product for this year? Show your calculations. (2 points)

## Hands-on

For this section, we will use the `gapminder` R package. It includes data on real GDP per capita (in US\$), total population, and life expectancy at birth (in years) for 142 countries between 1952 and 2007, in 5-year intervals. This [link](#) contains more details on these variables and others that are not included in the R package.

After you have successfully installed the `gapminder` package in RStudio, do the following in your R script:

```
library(tidyverse)
library(gapminder)

data("gapminder") ## this will import the data set into your environment.
```

Now, the data are ready to use, in a "tibble" format. Then, answer the following questions:

- Select all columns in the data set, except for population (`pop`). Call this new data set `gapminder_subset`. (2 points)
- From your part (a)'s R object, filter rows only containing the following countries: China, Chile, Ghana, Mexico, and Australia. Call this new data set `gapminder_5`. (2 points)
- Using `gapminder_5`, calculate the average life expectancy for each country. (2 points)
- Using the original data set, `gapminder`, *when* and *where* were the highest GDP per capita values registered by continent? (2 points)
- Using the original data set, `gapminder`, create a new column called `gdp`, obtained by multiplying the `gdpPerCap` and `pop` columns together. (2 points)