Math & Consequences: Average Rate of Change[1]
Math 133
6 February, 2024

Names:

The following table shows the consumer price index (CPI) from 2017 to 2023 (data from Bureau of Labor Statistics). The CPI uses a representative list of goods and services to track how prices change over time (usually, how much prices are increasing due to inflation).

	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Jan	242.839	247.867	251.712	257.971	261.582	281.148	299.170
Feb	243.603	248.991	252.776	258.678	263.014	283.716	300.840
Mar	243.801	249.554	254.202	258.115	264.877	287.504	301.836
Apr	244.524	250.546	255.548	256.389	267.054	289.109	303.363
May	244.733	251.588	256.092	256.394	269.195	292.296	304.127
Jun	244.955	251.989	256.143	257.797	271.696	296.311	305.109
Jul	244.786	252.006	256.571	259.101	273.003	296.276	305.691
Aug	245.519	252.146	256.558	259.918	273.567	296.171	307.026
Sep	246.819	252.439	256.759	260.280	274.310	296.808	307.789
Oct	246.663	252.885	257.346	260.388	276.589	298.012	307.671
Nov	246.669	252.038	257.208	260.229	277.948	297.711	307.051
Dec	246.524	251.233	256.974	260.474	278.802	296.797	306.746

(a) Compute the average rate of change in CPI from January 2020 to June 2020 and write a sentence interpreting what your answer means in context (include units).

(b) Compute the average rate of change in CPI from January 2020 to January 2021 and write a sentence interpreting what your answer means in context (include units).

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[1]Worksheet adapted from work by Juliana Bukoski and Cathy Erbes on ethical reasoning in calculus.

(c) Looking at the data, find a six-month period where the average rate of change of the CPI is as high as possible. Then find a six-month period where the average rate of change is as low as possible (Clearly identify the time periods, the average rates of change, and why you chose those time periods).

(d) How could you use this data to argue that prices are increasing at an alarming rate today? How could you use this data to argue that prices are increasing at a reasonable rate today?

(e) Imagine you have an internship with a lawmaker who asks you to find evidence that inflation is out of hand. Who could benefit or incur a cost if you only present one side of the argument?

(f) What could be a better (e.g. more truthful and/or more realistic) way to talk about how prices are changing based on the data we have?